FINAL Supplemental Environmental Impact Statement, Greater Sage-Grouse 2020

Three Hard Looks : 2015, 2019 and 2020

143 alternatives
considered in **18 EISs**

54
public meetings

48,734
total pages of NEPA analysis

2,313
people attended

$17.1 million
total cost

326
partners and cooperators

Public Comments

8,512 unique scoping comments

16,862 substantive comments on draft EISs

Habitat Investments

Treatment and Restoration

2013–19	**$294 million**	**2.7 million acres**
2020	**$37 million**	**584,000 acres**

Nevada/California

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

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In reply refer to:
1793 (NV930)

Dear Reader:

The Nevada and Northeastern California Greater Sage-Grouse Final Supplemental Environmental Impact Statement (FSEIS) is available for your review. The Bureau of Land Management (BLM) prepared this document in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, the Federal Land Policy and Management Act of 1976, as amended, implementing regulations, and other applicable law and policy. Please note when reading this document that we refer to the entire planning process that culminated in a Record of Decision in March 2019, as the 2019 Planning Process or Effort. The NEPA analysis, including the Draft Environmental Impact Statement (DEIS) and the Final Environmental Impact Statement (FEIS) were completed in 2018, so we refer to those documents as the 2018 DEIS and the 2018 FEIS.

The affected area includes the following BLM Nevada District Offices: Battle Mountain, Carson City, Elko, Ely, and Winnemucca and the BLM California ·Field Offices of Applegate (Alturas and Surprise) and Eagle Lake. The planning area encompasses approximately 45 million surface acres administered by the BLM.

The BLM has prepared this FSEIS to review its previous NEPA analysis and clarify and augment it where necessary. This FSEIS addresses four specific issues: the range of alternatives, need to take a hard look at environmental impacts, cumulative effects analysis, and the BLM's approach to compensatory mitigation. The BLM's FSEIS will help the BLM determine whether its 2015 and 2019 land use planning and NEPA processes have sufficiently addressed Greater Sage-Grouse habitat conservation or whether the BLM should initiate a new land use planning process to consider additional alternatives or new information.

Following the publishing of the Notice of Availability for the Draft Supplemental Environmental Impact Statement (DSEIS) in the Federal Register on February 21, 2020 (85 FR 10185), the BLM received public comments for 90 days, through May 21, 2020. Across the Nevada and

Northeastern California Draft SEIS and five other Draft SEISs for other BLM State Offices, a total of 126,062 submissions were received; 222 of these were considered unique submissions. In addition, the BLM received 125,840 campaign letters spearheaded by two separate organizations. In accordance with the NEPA, the BLM reviewed and considered all substantive comments received, and provides responses to such comments in this FSEIS.

To address public comments raised during this supplemental analysis, the BLM convened a team of biologists and land use planners to evaluate scientific literature provided to the agency. Upon review, the BLM found that the most up-to-date Greater Sage-Grouse science and other information has incrementally increased, and built upon, the knowledgebase of Greater Sage-Grouse management evaluated by the BLM most recently in its 2019 land use plan amendments, but does not change the scope or direction of the BLM's management; however, new science does suggest adaptations to management may be warranted at site-specific scales.

After reviewing public comments and completing the new science evaluation, the BLM determined that the most recent scientific information relating to Greater Sage-Grouse is consistent with the BLM's environmental analysis supporting its 2019 Greater Sage-Grouse land use plan amendments.

You can access the FSEIS on the project website at: https://go.usa.gov/xGJD7. Hard copies are also available for public review at BLM offices within the planning area.

Thank you for your continued interest in Greater Sage-Grouse management. We appreciate the information and suggestions you contributed to the NEPA process.

Sincerely,

Jon K. Raby
BLM Nevada State Director

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Nevada and Northeastern California Greater Sage-Grouse
Final Supplemental Environmental Impact Statement
November 2020

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

Abstract: This final supplemental environmental impact statement (FSEIS) has been prepared by the United States Department of the Interior (DOI), Bureau of Land Management (BLM). The FSEIS describes and analyzes the eight alternatives considered during the 2015 and 2019 Greater Sage-Grouse planning processes, BLM's consultation and coordination process with federal and state stakeholders, and the rigorous analysis completed to align BLM Greater Sage-Grouse management with the State of Nevada's Sage-Grouse Conservation Plan and the State of California's management direction.

On October 16, 2019, the US District Court for the District of Idaho issued an order granting a motion for a preliminary injunction filed by Plaintiffs Western Watersheds Project, WildEarth Guardians, Center for Biological Diversity, and Prairie Hills Audubon Society. The court found that the Plaintiffs were likely to succeed on the merits of their claims that the BLM violated the National Environmental Policy Act (NEPA) when adopting the 2019 Greater Sage-Grouse plan amendments. The BLM has prepared this FSEIS to review its previous NEPA analysis, clarify and augment it where necessary, and provide the public with additional opportunities to review and comment. The FSEIS will help the BLM determine whether its 2015 and 2019 land use planning and NEPA processes have sufficiently addressed Greater Sage-Grouse habitat conservation or whether the BLM should initiate a new land use planning process to consider additional alternatives or new information. To inform this decision that the BLM will make, it has prepared this FSEIS to address four specific issues: the range of alternatives, need to take a "hard look" at environmental impacts, cumulative effects analysis, and the BLM's approach to compensatory mitigation.

References to the CEQ regulations throughout this SEIS are to the regulations in effect prior to September 14, 2020. The revised CEQ regulations effective September 14, 2020 are not referred to in this SEIS because the NEPA process began prior to this date.

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ACRONYMS AND ABBREVIATIONS

	Full Phrase
ADH	all designated habitat
ARMPA	approved resource management plan amendment
BLM	Bureau of Land Management
BMP	best management practice
BSU	biologically significant unit
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulation
COT	Conservation Objectives Team
CSU	controlled surface use
DOI	US Department of the Interior
DSEIS	draft supplemental environmental impact statement
EIS	environmental impact statement
FIAT	Fire and Invasives Assessment Tool
FLMPA	Federal Land Management and Policy Act
Forest Service	US Department of Agriculture, Forest Service
FSEIS	final supplemental environmental impact statement
GHMA	General Habitat Management Area
HMA	habitat management area
HQT	Habitat Quantification Tool
IM	Instruction Memorandum
IMT	incident management team
LUPA	Land Use Plan Amendment
MZ	management zone
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NSO	no surface occupancy
NTT	National Technical Team
OHMA	Other Habitat Management Area
PAC	Priority Area for Conservation
PHMA	Priority Habitat Management Area
RDF	required design feature
RMP	resource management plan
RMPA	resource management plan amendment
ROD	record of decision

ROW	right-of-way
SETT	Sagebrush Ecosystem Technical Team
SFA	sagebrush focal area
SGMA	Sage-Grouse Management Area
SO	Secretarial Order
SRP	special recreation permit
TL	timing limitation
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
WO	Washington Office

Executive Summary

ES.1 Introduction

Greater Sage-Grouse is a state-managed species that depends on sagebrush steppe ecosystems. These ecosystems are managed in partnership across its range by federal, state, and local authorities. State agencies responsible for fish and wildlife management possess broad responsibility for protecting and managing fish, wildlife, and plants within their borders, except where preempted by federal law. Similarly, the BLM has broad responsibilities to manage public lands and resources for the public's benefit. Approximately half of Greater Sage-Grouse habitat is managed by the BLM and Forest Service. State agencies are at the forefront of efforts to maintain healthy fish and wildlife populations and to conserve at-risk species. State-led efforts to conserve the species and its habitat date back to the 1950s. For the past two decades, state wildlife agencies, federal agencies, and many others in the range of the species have been collaborating to conserve Greater Sage-Grouse and its habitats. The BLM prepared this Final Supplemental Environmental Impact Statement (FSEIS) to clarify analysis from the 2018 Final Environmental Impact Statement (2018 Final EIS) published as part of the 2019 Plan Amendment Process and subsequent Record of Decision. This FSEIS clarifies the range of alternatives analyzed, the range-wide nature of the analysis, and other aspects of the 2018 Final EIS where information was incorporated by reference from the 2015 Greater Sage-Grouse Land Use Plan Amendments.

In 2010, USFWS determined that listing the Greater Sage-Grouse under the Endangered Species Act of 1973 (ESA) was "warranted, but precluded" by other priorities. In its determination, the USFWS found there to be inadequate regulatory mechanisms to protect Greater Sage-Grouse and conserve its habitat. In response, the BLM, in coordination with the Forest Service, USFWS, and state agencies, developed a management strategy that included targeted Greater Sage-Grouse management actions. In 2015, the BLM and Forest Service adopted land use plan amendments and revisions to 98 BLM and Forest Service land use plans across ten western states. These planning decisions addressed, in part, threats to the Greater Sage-Grouse and its habitat. The amended land use plans govern the management of 67 million acres of Greater Sage-Grouse habitat on federal lands.

In September 2015, the USFWS determined that the Greater Sage-Grouse did not warrant listing under the ESA. The USFWS based its 2015 determination, in part, on the regulatory certainty provided by the conservation commitments and management actions in the federal planning decisions, as well as on other private, state, and federal conservation efforts.

The 2015 plans recommended that sagebrush focal areas (SFAs) be proposed for withdrawal from location and entry under the Mining Law of 1872. While the BLM later proposed to withdraw these areas, it canceled that proposed withdrawal on October 11, 2017. The BLM determined that the proposal to withdraw these areas was unreasonable in light of the data that showed that mining affected less than 0.1 percent of Greater Sage-Grouse across its occupied range.

On March 29, 2017, the Secretary of the Interior issued Secretary's Order 3349, *American Energy Independence*. It ordered DOI agencies to reexamine practices "to better balance conservation strategies and policies with the equally legitimate need of creating jobs for hard-working American families."

On June 7, 2017, the Secretary issued Secretary's Order 3353 with a purpose of enhancing cooperation among eleven western states and the BLM in managing and conserving Greater Sage-Grouse. Secretary's Order 3353 directed an Interior Review Team, consisting of the BLM, the US Fish and Wildlife Service (USFWS), and US Geological Survey (USGS), to coordinate with the Greater Sage-Grouse Task Force. They also were directed to review the 2015 Greater Sage-Grouse plans and associated policies to identify provisions that may require modification, including opportunities to enhance consistency with individual state plans and better balance the BLM's multiple-use mission, as directed by Secretary's Order 3349.

On August 4, 2017, the Interior Review Team submitted its Report in Response to Secretary's Order 3353. The report the team recommended modifying the Greater Sage-Grouse plans and associated policies to better align with the individual state plans. On August 4, 2017, the Secretary issued a memo to the Deputy Secretary directing the BLM to implement the recommendations found in the report.

In the *Federal Register* of October 11, 2017, the BLM published the Notice of Intent to Amend Land Use Plans Regarding Greater Sage-Grouse Conservation and Prepare Associated Environment Impact Statements or Environmental Assessments.

The BLM continues to prioritize efforts to conserve Greater Sage-Grouse and restore sagebrush habitat. From Fiscal Year 2017 to Fiscal Year 2020, the BLM has treated on average over 550,000 acres of Greater Sage-Grouse habitat every year. In Fiscal Year 2020, the BLM treated approximately 584,000 acres. These 2020 treatments included approximately 162,000 acres of conifer removal; 71,000 acres of fuel breaks; 203,000 acres with invasive species treatments; 42,000 acres of habitat protection; and restored habitat on 106,000 acres of uplands and over 700 acres of riparian habitat. In 2020, California conducted habitat treatments on 7,000 acres. In 2020, Nevada conducted habitat treatments on 136,000 acres. The BLM is committed to working directly with local communities on sagebrush conservation efforts and to emulate the successes demonstrated by the Natural Resources Conservation Service (NRCS) through the Greater Sage-Grouse Initiative on private lands. These efforts include:

- an agreement with the Intermountain West Joint Venture to work with local cattlemen associations to improve sagebrush rangeland conditions through actions such as controlling invasive species, improving mesic areas, and removing invasive conifers;
- a Memorandum of Understanding between the BLM, NRCS, and the Forest Service resulting in development of a map that identifies areas where the agencies have ongoing restoration projects and opportunities for additional collaboration across land ownerships and associated landscapes;
- promoting a locally led collaborative conservation, the BLM, the USFWS, and the Geological Survey are collaborating with the Western Association of Fish and Wildlife Agencies as they lead the development and implementation of the Sagebrush Conservation Strategy;
- working with livestock permittees and stakeholders on "targeted grazing" to utilize grazing as a tool to create and maintain fuel breaks to manage the threats of wildfire and invasive species in or next to Greater Sage-Grouse habitats; and,
- working to develop "outcome-based grazing" to provide greater flexibility for livestock permittees and land managers to meet habitat objectives as conditions on-the-ground change.

During the 2019 planning process's public scoping period, the BLM sought public comments on whether all, some, or none of the 2015 Greater Sage-Grouse plans should be amended, what issues should be considered, and if plans should be completed at the state level rather than at the national level. In addition, the BLM recognizes that the Greater Sage-Grouse is a state-managed species that depends on sagebrush steppe habitats managed in partnership by federal, state, and local authorities. Input from governors would weigh heavily when the BLM considers what management changes should be made and when ensuring consistency with the BLM's multiple-use mission.

Further, in the 2018 Draft EIS the BLM requested public comments on the BLM's approach to compensatory mitigation. In response to these comments and information supplied by the states about how to align with their compensatory mitigation laws and policies, the 2018 Final EIS clarified the BLM's approach to compensatory mitigation in its Management Alignment Alternative. Through the Draft SEIS (DSEIS), the BLM sought additional comment from the public on compensatory mitigation.

This FSEIS also addresses and clarifies the BLM's reliance on scientific information, including how the BLM addresses the recommendation and objectives in the NTT and COT reports. The BLM, the USFWS, states and other federal agency partners prepared the NTT (2011) and the COT (2013) reports to identify rangewide sage-grouse conservation objectives and conservation measures that would: inform the USFWS 2015 decision under the Endangered Species Act and for partners; and provide guidance for the BLM to consider through land use planning, which the BLM did in 2015 and 2019, and again in this FSEIS.

Further, at the time that the NTT and COT reports were being developed, the BLM, USFWS, and state agencies had not completely developed or established the robust programs to conserve Greater Sage-Grouse that exist today.

In 2015, the BLM developed an action alternative around the NTT report. In the 2018 Final EIS, the BLM incorporated this analysis by reference. The BLM also coordinated with the USFWS during the process culminating in the 2019 RODs to make sure that the conservation measures from the NTT and COT informed the management alignment alternative (**Appendix B**). Including the USFWS as a cooperating agency during the 2019 planning process ensured that BLM used the same materials and newest science that the USFWS uses and recommends for Greater Sage-Grouse management.

This FSEIS also clarifies how the BLM considered comments, including those of other federal agencies (including EPA) and experts, when developing its 2019 planning decisions.

In 2018, the Environmental Protection Agency (EPA) provided comments on the Draft RMPAs/EISs. Specifically, they provided six comments on the Idaho Draft RMPA/EIS, seven comments on the Nevada/Northeast California Draft RMPA/EIS, six on the Utah Draft RMPA/EIS, three on the Wyoming Draft RMPA/EIS, six on the Oregon Draft RMPA/EIS, and five on the Colorado Draft RMPA/EIS. EPAs comments include suggestions and questions regarding lek buffers, recent science, mitigation, adaptive management, and fluid minerals. BLM responded to each of EPAs comments and made corrections and/or changes in the 2018 Final EISs. The complete EPA comment analysis can be found in the administrative record.

ES.2 Purpose of and Need for Action

In the Federal Land Policy and Management Act (FLPMA), Congress provided the BLM with discretion and authority to manage public lands for multiple use and sustained yield and declared it the policy of the United States to, consistent with the laws governing the administration of the public lands, coordinate planning activities with the land use planning and management programs of other federal, state, and local governments. Further, FLPMA specifically provides that it neither enlarges nor diminishes the authority of the states in managing fish and wildlife. As the sovereign entities with the lead role in managing game species, including Greater Sage-Grouse, states play a critical role in conserving the Greater Sage-Grouse and its habitat.

In the 2019 Planning effort the BLM modified its approach to managing Greater Sage-Grouse habitat in land use plans by (1) enhancing cooperation and coordination with the States of Nevada and California, (2) aligning with DOI and BLM policies issued since 2015, and (3) incorporating appropriate management flexibility and adaptation to better align with Nevada's and California's conservation plans. The BLM achieved these goals while maintaining the vast majority of sage-grouse protections it incorporated into its land use plans in 2015. By implementing these land use plan conservation measures and continuing to exercise its discretion to approve future project proposals under appropriate terms and conditions or deny them where appropriate, the BLM can adequately protect sage-grouse and its habitat while meeting its general obligation under FLPMA to manage public lands under principles of multiple use and sustained yield.

On October 16, 2019, the US District Court for the District of Idaho issued an order granting a motion for a preliminary injunction filed by Plaintiffs Western Watersheds Project, WildEarth Guardians, Center for Biological Diversity, and Prairie Hills Audubon Society. The court found that the Plaintiffs were likely to succeed on the merits of their claims that the BLM violated the National Environmental Policy Act (NEPA) when adopting the 2019 sage-grouse plans.

The BLM has prepared this FSEIS to review its previous NEPA analysis, clarify and augment it where necessary, and provide the public with additional opportunities to review and comment. The BLM's FSEIS will help the BLM determine whether its 2015 and 2019 land use planning and NEPA processes have sufficiently addressed sage-grouse habitat conservation or whether the BLM should initiate a new land use planning process to consider additional alternatives or new information. To inform this decision that the BLM will make, it has prepared this FSEIS to address four specific issues: the range of alternatives, need to take a hard look at environmental impacts, cumulative effects analysis, and the BLM's approach to compensatory mitigation.

ES.3 Items to be Clarified in this FSEIS

The items considered in this FSEIS are related to the analysis in the 2018 Final EIS. These items are:

- clarifying the range of alternatives (including how the BLM considered the full range of the 2015 alternatives in the 2019 planning process),
- taking a hard look and using the best available science (including clarified effects analysis, how the 2015 and 2019 Final EISs addressed the NTT and COT recommendations and conservation measures) (**Appendix B**),
- clarifying that the cumulative effects analysis was done at the range wide level and organized by WAFWA Management Zone (MZs) Updated language also highlights why WAFWA MZs were used,
- an updated Reasonably Foreseeable Future Actions.

ES.4 New Science and Information Considered by the BLM

Land use plan decision-making is a multi-faceted and collaborative process. It involves evaluating scientific information at landscape scales to anticipate the potential environmental consequences of different policy and regulatory considerations. Science aides this process by educating policy makers on these potential consequences. Science does not and cannot tell policy makers how to weigh competing values and goals, particularly in a multiple-use environment.

The BLM has long utilized the best available science and information to facilitate informed choices among different values for policy and management decisions regarding the Greater Sage-Grouse. The agency has simultaneously sought to adapt and align its efforts with other federal and state management frameworks. Science, regulations, and policy considerations help define how the BLM can adaptively implement its multiple-use mission, including habitat management, while supporting a state's obligation to manage wildlife populations.

The BLM's decade-long land use planning process for Greater Sage-Grouse began with the best available science at that time, and the agency has consistently built upon that body of knowledge to inform its adaptive management. In 2011, the BLM assembled a "National Technical Team" (NTT), comprising state and federal land managers and scientists to review the scientific literature available at that time. On December 21, 2011, the NTT finalized a document entitled *A Report on National Greater Sage-Grouse Conservation Measures*, also known as the *National Technical Team Report* (NTT Report). The NTT Report was developed to synthesize "the latest science and best biological judgement" from the available literature (NTT Report, Introduction, page 5) and was not itself a new or original scientific product.

While the NTT Report provided a synthesis of available information regarding sage-grouse management, it did not evaluate conservation measures against other regulatory and policy requirements associated with land use planning and NEPA; nor did it provide conservation measures specific to all populations, landscapes, and site-specific condition. The NTT Report acknowledges this inherent uncertainty and clearly indicates the conservation measures are not management decisions. Rather, the NTT Report was intended "to assist [the BLM] in making management decisions." (NTT Report, Introduction, page 5.) In other words, "the conservation measures described in [the] report *are not an end point* but, rather, *a starting point* to be used in the BLM's planning processes" (ibid, page 5) (emphasis added). The BLM was not bound to the NTT Report recommendations and has subsequently built upon that body of knowledge and considered new policy and regulatory considerations to adapt its management to changing circumstances.

The BLM understood the NTT Report to be a compendium of conservation measures based on best science available and was meant to be adapted based on site-specific considerations. The BLM anticipated adjustments to the conservation measures to address local ecological site variability, regulatory frameworks, and an evolving body of science related to Greater Sage-Grouse management, and intended its management and planning process to be adaptive to changing scientific, regulatory, and policy considerations. In point of fact, the BLM issued policy in 2012 (IM 2012-044) guiding use of the NTT Report in land use planning and instructing the BLM to consider its recommended conservation measures insofar as they were consistent with applicable law.

While the BLM's Greater Sage-Grouse habitat management efforts build upon recommendations in the NTT Report, its approach has adapted as expected to new information, policy, regulation, and informed choices among competing uses of Public Lands. At regular intervals, the BLM has assessed and synthesized new science, using it to inform efforts to better aligned its management with state and local frameworks. The BLM first initiated its own assessment through the NTT as described above, followed by the USFWS efforts to develop the COT report. The BLM then commissioned a second synthesis from USGS in 2017 prior to initiating the 2019 planning process. Finally, the BLM coordinated with USGS in 2020 to review scientific literature presented during the DSEIS comment period. The USGS has continuously evaluated science published after 2018 and has maintained an annotated bibliography of scientific research on greater sage-grouse. The BLM relied upon USGS' annotated bibliography for the 2020 review. Out of the 75 articles considered by the BLM as new science, USGS had already reviewed 67 articles. BLM biologists summarized the remaining eight papers submitted by the public for validation.

The BLM plans also call for rigorous annual reviews of adaptive management triggers and anthropogenic disturbances, that allows the plans to adapt with changing information and conditions on the ground.

This common progression of informed decision-making and adaptive management is further exemplified by the BLM application of the Conservation Objectives Team report.

In 2012 the director of the USFWS convened a Conservation Objectives Team (COT) of state and USFWS representatives. The team developed a peer-reviewed report (COT Report) that established broad conservation objectives based on the "best scientific and commercial data available at the time of its release" (COT Report, page ii). Like the NTT, the COT Report was an assessment of the best available science at the time and did not present new or original scientific research.

The COT Report, released in March 2013, identifies conservation objectives, measures, and options for each of the Greater Sage-Grouse threats assessed. The COT Report also identified Priority Areas for Conservation (PACs) which were described as "the most important areas needed for maintaining Greater Sage-Grouse representation, redundancy, and resilience across the landscape" (ibid, page 13). In contrast to the NTT Report, the COT Report identified threats to each PAC, recognizing that threats vary across the range, and therefore corresponding management should vary to address those threats. The preface to the report is clear that the COT report "is guidance only" and that the "identification of conservation objectives and measures does not create a legal obligation beyond existing legal requirements" (ibid, page ii). Further, the preface notes that the objectives "are subject to modification as dictated by new findings, changes in species' status, and the completion of conservation actions" (ibid, page ii).

Similar to the NTT Report, the BLM understood that the COT Report was a compendium of conservation objectives established to relative to identified threats to Greater Sage-Grouse conservation. The COT Report recommended objectives for the BLM to evaluate and consider but was not bound to achieving only those objectives. Further, like the NTT Report, the COT recognizes uncertainty in land management and anticipated adapting management strategies to changing scientific, regulatory, and policy considerations. In the management of natural resources such as Greater Sage-Grouse habitat, it is unlikely that a manager knows with certainty that a management action will result in precisely the expected outcome. While science and information can inform the managers decision among a variety of management options, it cannot account for all variability across landscapes, time, and conditions. The COT acknowledges that varying management strategies may be employed to achieve the recommended conservation objectives. The COT does not establish an expectation that conservation outcomes will be uniform across all BLM managed landscapes. The BLM further recognizes the challenges land managers face when selecting from among a range of management options to achieve objectives and outcomes that may be uncertain due to varying natural conditions. This recognition creates a variable management framework wherein the BLM may choose locally from among a range of informed science, policy, and regulatory considerations. See **Appendix B** for a full discussion of the NTT and COT reports and their role in informing decisions in the 2015 and 2019 plans.

The 2015 plans took a one-size-fits-all approach. Through a decade of land use planning and implementation of Greater Sage-Grouse management decisions, the BLM has continuously collaborated in the development, synthesis, and application of new science. Throughout this planning and conservation effort, the BLM has remained well-connected to our partners. Many of these cross-agencies partnerships are facilitated by the Western Association of Fish and Wildlife Agencies (WAFWA). For example, WAFWA has convened the Sagebrush Executive Oversight Committee to coordinate sage-grouse and sagebrush conservation efforts across Federal and State agencies. The BLM is represented on this committee by the Assistant Director for Resources and Planning. WAFWA has also formed sub-committees to work on a Sagebrush Conservation Strategy and a 2020 Sage-grouse Conservation Assessment, of which the latter will rely heavily on the BLM's Five-Year Sage-grouse Monitoring Report. The BLM has also formed other partnerships, such as with the Natural Resources Conservation Service's Sage Grouse Initiative (now a component of NRCS's Working Lands for Wildlife initiative) and with the Intermountain West Joint Venture. There are also several state-level agreements related to BLM's management of sagebrush and sage-grouse.

As acknowledged by the NTT and COT reports and the growing body of scientific information, there exist site-specific variables not anticipated in either report or adopted in the 2015 approved plans. The 2019 plans thoughtfully considered the unique needs of each state's specific regulatory and policy considerations and addressed new science in that capacity. This tailored and adaptive approach accounted for more site-specific conditions, maximizing the collaborative approach between federal and state resource management, in a way that the 2015 plans failed to do.

To address science and information raised through public comments on this supplemental analysis, the BLM convened a team of biologists and land use planners to evaluate scientific literature provided to the agency. The BLM found that the most up-to-date Greater Sage-Grouse science and other information has incrementally increased, and built upon, the knowledgebase of Greater Sage-Grouse management evaluated by the BLM most recently in its 2019 land use plan amendments, but does not change the scope or direction of the BLM's management. While the NTT, the COT and this new science and information remain consistent with the scope of the 2019 planning decisions, new science does suggest adaptations to management may be warranted at site-specific scales. This is precisely the approach envisioned by the NTT and COT reports as well as the BLM's decades long planning efforts to address local actions that may affect Greater Sage-Grouse. Where appropriate, the BLM will consider this science and information through implementation-level NEPA analysis, consistent with its approved land use plans, policies, and regulatory frameworks.

ES.5 Analysis Conclusions

The additional information provided in this SEIS do not change analytical conclusions from either the 2018 Proposed RMPA/Final EIS or the 2015 Proposed LUPA/Final EIS. See summary of environmental consequences from 2018 in Section ES.6of the Proposed RMPA/Final EIS and from 2015 in Section 2.12 of the Proposed LUPA/Final EIS.

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Chapter 1. Purpose and Need for Action

1.1 Introduction

Greater Sage-Grouse (*Centrocercus urophasianus*) is a state-managed species dependent on sagebrush steppe ecosystems that are managed in partnership across its range by federal, state, local, and private authorities. State agencies responsible for fish and wildlife management possess broad powers for the protection and management of fish, wildlife, and plants within their borders, except where preempted by federal law. Similarly, the Department of the Interior (DOI) has broad responsibilities to manage federal lands and resources for the public's benefit. The BLM and US Forest Service (Forest Service) manage approximately half of the Greater Sage-Grouse habitat range-wide across 11 states; approximately 20.5 million acres of this is within the Nevada and Northeastern California Sub-regional planning area.

State and local agencies are at the forefront of efforts to maintain healthy fish and wildlife populations and to conserve at-risk species. State-led efforts to conserve Greater Sage-Grouse and its habitat date back to the 1950s. For the past two decades, state wildlife agencies, local agencies, federal agencies, and many others in the range of the species have been collaborating to conserve Greater Sage-Grouse and its habitats.

In response to a 2010 determination by the US Fish and Wildlife Service (USFWS) that the listing of the Greater Sage-Grouse under the Endangered Species Act was "warranted, but precluded by higher priority listing actions," the BLM in coordination with the DOI and the US Department of Agriculture developed a management strategy that included targeted Greater Sage-Grouse management actions. In 2015, the agencies adopted amendments and revisions to 98 BLM and Forest Service land use plans (LUPs) across 10 western states. The 2015 LUPs addressed, in part, threats to the Greater Sage-Grouse and its habitat. The amended LUPs govern the management of 67 million acres of Greater Sage-Grouse habitat on federal lands.

In September 2015, the USFWS determined that the Greater Sage-Grouse did not warrant listing under the Endangered Species Act of 1973. The USFWS attributed its 2010 "warranted, but precluded" determination primarily to "inadequate regulatory mechanisms." In concluding "not warranted" in 2015, the USFWS based its decision in part on regulatory certainty from the conservation commitments and management actions in the federal land use plan amendments (LUPAs) and revisions, as well as on other private, state, and federal conservation efforts.

The BLM continues to prioritize efforts to conserve Greater Sage-Grouse and restore sagebrush habitat. From Fiscal Year 2017 to Fiscal Year 2020, the BLM has treated on average over 550,000 acres of Greater Sage-Grouse habitat every year. In Fiscal Year 2020, the BLM treated approximately 584,000 acres. These 2020 treatments included approximately 162,000 acres of conifer removal; 71,000 acres of fuel breaks; 203,000 acres with invasive species treatments; 42,000 acres of habitat protection; and restored habitat on 106,000 acres of uplands and over 700 acres of riparian habitat. In 2020, California conducted habitat treatments on 7,000 acres. In 2020, Nevada conducted habitat treatments on 136,000 acres. The BLM is committed to working directly with local communities on sagebrush conservation efforts and to emulate the successes demonstrated by the Natural Resources Conservation Service (NRCS) through the Sage-Grouse Initiative on private lands. These efforts include:

- an agreement with the Intermountain West Joint Venture to work with local cattlemen associations to improve sagebrush rangeland conditions through actions such as controlling invasive species, improving mesic areas, and removing invasive conifers;
- a Memorandum of Understanding between the BLM, NRCS, and the Forest Service resulting in development of a map that identifies areas where the agencies have ongoing restoration projects and opportunities for additional collaboration across land ownerships and associated landscapes;
- promoting locally led collaborative conservation, the BLM, the USFWS, and the Geological Survey are collaborating with the Western Association of Fish and Wildlife Agencies as they lead the development and implementation of the Sagebrush Conservation Strategy;
- working with livestock permittees and stakeholders on "targeted grazing" to utilize grazing as a tool to create and maintain fuel breaks to manage the threats of wildfire and invasive species in or next to Greater Sage-Grouse habitats; and,
- working to develop "outcome-based grazing" to provide greater flexibility for livestock permittees and land managers to meet Habitat Objectives for Greater Sage-Grouse (Table 2-2 of the 2015 Final EIS) as conditions on-the-ground change.

The 2015 LUPAs recommended that approximately 10 million acres of SFAs be proposed for withdrawal, 2.8 million acres of which fall within Nevada; however, a proposed withdrawal of Sagebrush Focal Areas (SFAs) was cancelled on October 11, 2017. The BLM determined the proposal to withdraw 10 million acres was unreasonable in light of the data that showed that mining affected less than 0.1 percent of Greater Sage-Grouse habitat across its occupied range.

On March 29, 2017, the Secretary of the Interior (Secretary) issued Secretarial Order (SO) 3349, *American Energy Independence*, ordering DOI agencies to reexamine practices "to better balance conservation strategies and policies with the equally legitimate need of creating jobs for hard-working American families."

On June 7, 2017, the Secretary issued SO 3353 with a purpose of enhancing cooperation among 11 western states and the BLM in managing and conserving Greater Sage-Grouse. SO 3353 directed an Interior Review Team, consisting of the BLM, USFWS, and US Geological Survey (USGS), to coordinate with the Sage-Grouse Task Force Team and review the 2015 Greater Sage-Grouse plans and associated policies to identify provisions that will maintain healthy Greater Sage-Grouse populations but may require modification to make the plans more consistent with the individual state plans and better balance the BLM's multiple-use mission as directed by SO 3349.

On August 4, 2017, the Interior Review Team submitted its "Report in Response to SO 3353." This report made recommendations for modifying the 2015 Greater Sage-Grouse LUPA decisions and associated policies to better align with the individual state plans and management direction. On August 4, 2017, the Secretary issued a memo to the Deputy Secretary directing the BLM to implement the recommendations found in the report.

Consistent with the report, the BLM published a Notice of Intent titled "Notice of Intent to Amend Land Use Plans Regarding Greater Sage-Grouse Conservation and Prepare Associated Environment Impact Statements or Environmental Assessments" in the *Federal Register* on October 11, 2017. During this public scoping period, the BLM sought public comments on a list of specific issues on whether all, some, or none of the 2015 Greater Sage-Grouse plans should be amended, what additional issues should be considered, and if plans should be completed at the state level rather than at the national level. In addition, the BLM recognized that Greater Sage-Grouse is a state-managed species dependent on sagebrush steppe habitats managed in partnership between federal, state, and local authorities and that input from state governors would be given significant weight when considering what management changes should be made and in ensuring consistency with the BLM's multiple-use mission during a land use plan amendment process.

On March 31, 2017, the United States District Court for the District of Nevada held that the BLM violated the National Environmental Policy Act NEPA) by failing to prepare a supplemental Environmental Impact Statement (EIS) for the designation of SFA in the 2015 Nevada and Northeastern California Greater Sage-Grouse Resource Management Plan Amendment in Nevada. In 2018, the BLM published the Nevada and Northeastern California Greater Sage-Grouse Proposed Resource Management Plan Amendment (2018 PRMPA) and Final Environmental Impact Statement (2018 Final EIS) in response to the Court's order and evaluated the SFA designation and provided the public with an opportunity to review and comment on that evaluation. The BLM also provided the public with an opportunity to review and comment on the designation of Greater Sage-Grouse habitat management areas (HMAs), such as priority, general, and other, which provide a landscape-level reference of relative Greater Sage-Grouse habitat as determined by landscape characteristics and the likelihood of Greater Sage-Grouse occurrence (Coates et al.).

The 2018 Final EIS incorporated by reference the 2015 Nevada and Northeastern California Greater Sage-Grouse Final EIS (BLM 2015a; 2015 Final EIS) and incorporated by reference all the descriptions of the affected environment and impacts analyzed in the 2015 Final EIS and subsequently Approved Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Record of Decision (BLM 2015b; 2015 ARMPA/ROD). The 2018 RMPA/Final EIS also incorporated by reference the 2016 Sagebrush Focal Area Withdrawal Draft EIS (BLM 2016; 2016 SFA Draft EIS). The 2018 Final EIS was prepared to analyze the impacts associated with aligning the 2015 Final EIS with the State of Nevada and State of California's Greater Sage-Grouse management strategies.

Incorporation by reference and tiering provide opportunities to reduce paperwork and redundant analysis in the NEPA process. When incorporating by reference, the author refers to other available documents that cover similar issues, effects, and/or resources considered in the NEPA analysis that is being prepared. Incorporation by reference allows brief summarizations of relevant portions of other documents rather than repeating them.

During the 2019 planning process's public scoping period, the BLM sought public comments on whether all, some, or none of the 2015 Greater Sage-Grouse plans should be amended, what issues should be considered, and if new plans should be completed at the state level rather than at the national level. The BLM specifically sought public comment on SFA designations, mitigation standards, lek buffers, disturbance and density caps, habitat boundaries to reflect new information, and reversing adaptive management responses when the BLM determines that resource conditions no longer warrant those responses. In addition, the BLM recognized that the Greater Sage-Grouse is a state-managed species that depends on sagebrush steppe habitats managed in partnership by federal, state, and local authorities. Input from governors weighed heavily when the BLM considered what management changes should be made and when ensuring consistency with the BLM's multiple-use mission.

After reviewing comments received during the public scoping period, the BLM proposed the Draft EIS on May 4, 2018 and ultimately issued the Final EIS on December 6, 2018. Through the notice and comment process, the BLM was able to accomplish the objectives set forth in SO 3353 and remedy inconsistencies that existed in the 2015 LUPAs. Below is a summary of some of the issues raised during the Draft EIS and addressed during the Final EIS.

Further, in the 2018 Draft EIS, the BLM again requested public comments on a number of issues, including the BLM's approach to compensatory mitigation. In response to the comments received on the 2018 Draft EIS, and information supplied by the states about how to align with their compensatory mitigation laws and policies, the 2018 Final EIS clarified the BLM's approach to compensatory mitigation in its Proposed Plan Amendment. Through the Draft Supplemental EIS (DSEIS), the BLM sought additional comment from the public on compensatory mitigation.

This Final Supplemental EIS (FSEIS) also addresses and clarifies the BLM's reliance on scientific information, including how the BLM addresses the recommendation and objectives in the National Technical Team (NTT) and Conservation Objectives Team (COT) Reports. The BLM, the USFWS, states and other federal agency partners prepared the NTT (2011) and the COT (2013) reports to identify range-wide Greater Sage-Grouse conservation objectives and conservation measures that would: (1) inform the USFWS 2015 listing decision under the Endangered Species Act and inform partnersand, (2)provide guidance for the BLM to consider through the NEPA and land use planning process, which the BLM completed in 2015 and 2019, and again in this FSEIS. The NTT and COT Reports constituted starting points for the BLM to consider in at least one alternative to be considered through the NEPA and land use planning process. They are not compendiums that, standing alone, represent best available science. The NTT and COT reports do not address, or even attempt to address, how the implementation of their Greater Sage-Grouse conservation measures would affect other uses of public lands—such as recreation, fluid mineral development, mining, and livestock grazing. Moreover, the NTT and COT reports do not quantify, or even attempt to quantify, the Greater Sage-Grouse conservation benefits of each respective conservation measure.

At the time that the NTT and COT Reports were being developed, the BLM, USFWS, and state agencies had not completely developed or established the robust programs to conserve Greater Sage-Grouse that exist today.

In 2015, the BLM developed an action alternative around the NTT report. In the 2018 Final EIS, the BLM incorporated this analysis by reference. The BLM also coordinated with the USFWS during the process culminating in the 2019 RODs to make sure that the conservation measures from the NTT and COT informed the management alignment alternative (**Appendix B).** Including the USFWS as a cooperating agency during the 2019 planning process ensured that BLM was aware of the same materials and newest science that the USFWS uses/recommends for Greater Sage-Grouse management.

In 2018, the Environmental Protection Agency (EPA) provided comments on the Draft RMPAs/EISs. Specifically, they provided seven comments on the Nevada and Northeastern California Draft RMPA/EIS, six comments on the Utah Draft RMPA/EIS, six comments on the Idaho Draft RMPA/EIS, three comments on the Wyoming Draft RMPA/EIS, six comments on the Oregon Draft RMPA/EIS, and five comments on the Colorado Draft RMPA/EIS. The EPA's comments included suggestions and questions regarding lek buffers, recent science, mitigation, adaptive management, and fluid minerals. The BLM responded to each of the EPA's comments and made corrections and/or changes in the 2018 Final EISs. The complete EPA comment analysis can be found in the administrative record.

This FSEIS also clarifies how the BLM considered comments, including those of other federal agencies and experts, when developing its 2019 planning decisions. For example, in the Nevada and Northeastern California Sub-region the BLM addressed comments related to Data and Science, Adaptive Management, Fire and Invasives, Greater Sage-Grouse Habitat Management Areas, lek buffers, SFAs and Mitigation, among other topics.

1.2 PURPOSE OF AND NEED FOR ACTION

In the Federal Land Policy and Management Act (FLPMA), Congress provided the BLM with discretion and authority to manage public lands for multiple use and sustained yield and declared it the policy of the United States to, consistent with the laws governing the administration of the public lands, coordinate planning activities with the land use planning and management programs of other federal, state, and local governments. Further, FLPMA specifically provides that it neither enlarges nor diminishes the authority of the states in managing fish and wildlife. As the sovereign entities with the lead role in managing game species, including Greater Sage-Grouse, states play a critical role in conserving the Greater Sage-Grouse and its habitat.

In the 2019 Planning effort, the BLM modified its approach to managing Greater Sage-Grouse habitat in land use plans by (1) enhancing cooperation and coordination with the States of Nevada and California, (2) aligning with the DOI and the BLM policies issued since 2015, and (3) incorporating appropriate management flexibility and adaptation to better align with the state of Nevada's conservation plan and California's management strategies. The BLM achieved these goals while maintaining the majority of Greater Sage-Grouse protections it incorporated into its land use plans in 2015. By implementing these land use plan conservation measures and continuing to exercise its discretion to approve future project proposals under appropriate terms and conditions or deny them where appropriate, the BLM can adequately protect Greater Sage-Grouse and its habitat while meeting its general obligation under FLPMA to manage public lands under principles of multiple use and sustained yield.

On October 16, 2019, the US District Court for the District of Idaho issued an order granting a motion for a preliminary injunction filed by Plaintiffs Western Watersheds Project, WildEarth Guardians, Center for Biological Diversity, and Prairie Hills Audubon Society. The court found that the Plaintiffs were likely to succeed on the merits of their claims that the BLM violated the National Environmental Policy Act (NEPA) when adopting the 2019 Greater Sage-Grouse plans.

The BLM has prepared this FSEIS to review its previous NEPA analysis, clarify and augment it where necessary, and provide the public with additional opportunities to review and comment. The BLM's FSEIS will help the BLM determine whether its 2015 and 2019 land use planning and NEPA processes have sufficiently addressed Greater Sage-Grouse habitat conservation or whether the BLM should initiate a new land use planning process to consider additional alternatives or new information. To inform this decision the BLM has prepared this FSEIS to address four specific issues: the range of alternatives, need to take a hard look at environmental impacts, cumulative effects analysis, and the BLM's approach to compensatory mitigation.

1.3 PLANNING AREA AND CURRENT MANAGEMENT

The planning area boundary includes all lands regardless of jurisdiction in the Nevada and Northeastern California Sub-region (see **Figure 1-1**). **Table 1-1**, Land Management in the Planning Area, outlines the number of surface acres that are administered by specific federal agencies, states, and local governments and lands that are privately owned in the planning area. It includes other BLM-administered lands that are not allocated as Greater Sage-Grouse HMAs (i.e., priority, general, and other) and do not contain habitat for Greater Sage-Grouse. The planning area includes the BLM Nevada District Offices of Battle Mountain, Carson City, Elko, Ely, and Winnemucca and the BLM California Field Offices of Applegate (Alturas and Surprise) and Eagle Lake. The 2015 ARMPA did not establish any additional management for lands that are not identified as Greater Sage-Grouse HMAs, which would continue to be managed according to the existing, underlying land use plan for the areas. BLM-administered lands in HMAs within the planning area are where management direction described in this document would be applied (the decision areas; see **Figures 2-1a** and **2-1b** [**Appendix A**]). **Figures 1-2a** and **1-2b** (**Appendix A**) display where HMAs reside across the planning area for all lands regardless of jurisdiction.

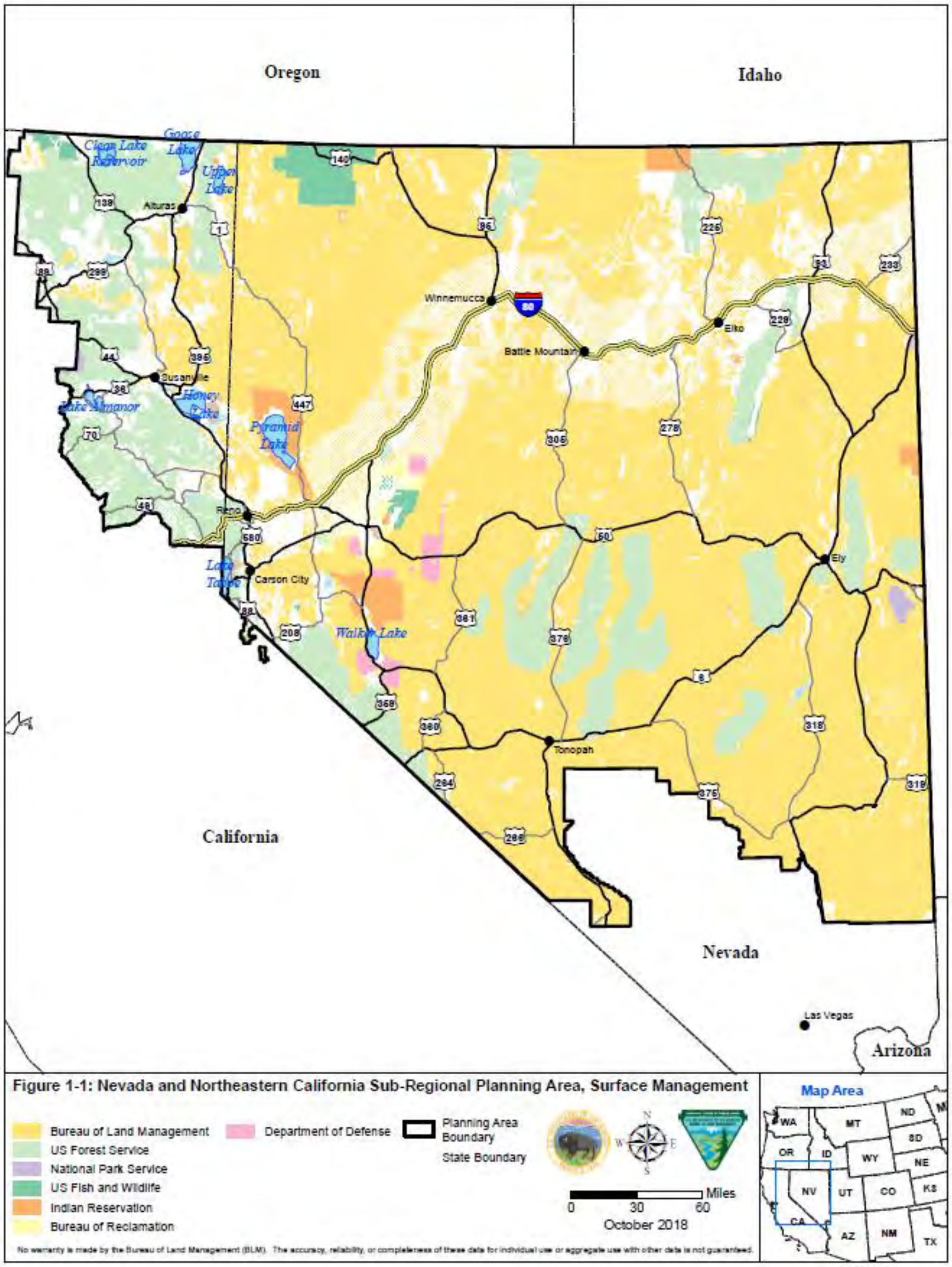
Table 1-1
Land Management in the Planning Area

Surface Land Management	Total Surface Land Management Acres
BLM	45,424,700
Forest Service	9,787,300
Private	12,111,700
Indian reservation	942,600
USFWS	806,700
Department of Energy	2,600
State	232,500
National Park Service	115,000
Bureau of Reclamation	431,000
Local government	17,800
Department of Defense	402,400
Total acres	**70,274,300**

Source: BLM GIS 2015

These broad HMA maps are necessary at the resource management planning scale in order to include a variety of important Greater Sage-Grouse seasonal habitats and movement corridors that are spread across geographically diverse and naturally fragmented landscapes. Greater Sage-Grouse use various habitat types to meet seasonal needs throughout the year and the resulting mosaic of habitats (e.g., breeding, nesting, early brood-rearing, late brood-rearing, and winter) can encompass large areas. Broad habitat maps increase the likelihood that all seasonal habitats (including transition and movement corridors) are included. While areas of non-habitat, in and of themselves, may not provide direct habitat value for Greater Sage-Grouse (e.g., canyons, water bodies, and human disturbances), these areas maybe crossed by birds when moving between seasonal habitats; therefore, these HMAs are not strictly about managing habitat but are about providing those large landscapes that are necessary to meet the life-stage requirements for Greater Sage-Grouse. These areas include habitats that may not meet the Greater Sage-Grouse seasonal habitats described in the Habitat Objectives for Greater Sage-Grouse (Table 2-2) in the 2015 Final EIS. These areas meet Greater Sage-Grouse habitat needs by maintaining large, contiguous expanses of relatively intact sagebrush vegetation community.

Figure 1-1
Planning Area



1.4 2017 TO 2019 ISSUES DEVELOPMENT

1.4.1 Issues and Related Resource Topics Identified Through Scoping as Part of the 2017 to 2019 Planning Process

When deciding which issues to address related to the purpose and need, the BLM considers points of disagreement, debate, or dispute regarding an anticipated outcome from a proposed action. Issues are based on anticipated environmental effects. As such, issues can help shape the proposal and alternatives.

The BLM used internal, agency, and public scoping to identify issues to consider in the environmental analysis. A summary of the scoping process is presented in a report titled "Potential Amendments to Land Use Plans Regarding Greater Sage-Grouse Conservation Scoping Report" (BLM 2018a; https://goo.gl/FopNgW).

When determining whether to retain an issue for more detailed analysis in the 2018 RMPA/Final EIS, the interdisciplinary team considered, among other things, the following:

- The environmental impacts associated with the issue, and the threats to species and habitat associated with the issue, are central to or of critical importance to development of a Greater Sage-Grouse management plan.
- A detailed analysis of environmental impacts related to the issue is necessary to make a reasoned choice between alternatives.
- The environmental impacts associated with the issue are a significant point of contention among the public or other agencies.
- Whether there are potentially significant impacts on resources associated with the issue.

Ultimately, it was important for decision-makers and the public to understand the impacts that each of the alternatives would have on specific resources; therefore, the BLM used resource topics as a heading to indicate which resources would be affected by a potential management change. Importantly, resource topics helped organize the discussions of the affected environment (**Chapter 3**) and environmental consequences (**Chapter 4**).

The sections below lay out how issues raised during scoping, as well as related resource topics, were considered in the 2018 RMPA/Final EIS. Generally, they fell into the following categories:

- Issues and related resource topics retained for further consideration in the 2018 RMPA/Final EIS. These were issues raised during scoping that were retained in the 2018 RMPA/Final EIS and for which alternatives were developed to address the issues. In some cases, the resolution in the alternatives were previously analyzed in the 2015 Final EIS. In other cases, additional analysis was needed in the 2018 RMPA/Final EIS. Because the issues were analyzed under resource topics in 2015, the resource topics corresponding with those retained for further analysis were also considered in the 2018 RMPA/Final EIS. Just like issues, resource topics may have been analyzed in the 2015 Final EIS for those decisions included in the 2018 RMPA/Final EIS.
- Clarification of decisions in the 2015 ARMPA/ROD. These are decisions or frameworks in the 2015 ARMPA/ROD that required clarification as to their application or implementation. No new analysis was required, as the intentions behind the decisions were analyzed in the 2015 Final EIS.

- Issues and resource topics not carried forward for additional consideration or analysis. These are issues brought up during scoping that are were carried forward in the 2018 RMPA/Final EIS. While some of these issues are considered in the 2018 RMPA/Final EIS, they did not require additional analysis because they were analyzed in the 2015 Final EIS. Others were not carried forward in the 2018 RMPA/Final EIS because they did not further the purpose of aligning with the state's conservation plan or management strategies. Similar to issues, there were resource topics that were not retained for further analysis in the 2018 RMPA/Final EIS. This is because either they are not affected by the changes proposed in Chapter 2 of the 2018 RMPA/Final EIS or because the effect was analyzed in the 2015 Final EIS.

Issues and Related Resource Topics Retained for Further Consideration in the 2018 RMPA/EIS

Table 1-2 summarizes those issues identified through scoping for the 2019 planning process that were retained for consideration and additional discussion in **Chapters 3** and **4**.

Based on the issues identified in **Table 1-2** that were not previously analyzed, the resource topics that had the potential to be impacted were: Greater Sage-Grouse, vegetation (including invasives and special status vegetation), land use and realty, renewable energy, minerals and energy, socioeconomics, livestock grazing, and comprehensive travel management. These resource topics, therefore, were carried forward for detailed analysis.

Table 1-2 identifies the corresponding resource topics to which the issues relate. The level of detail in the description of each resource topic and the effects from implementing any of the alternatives also are described in **Chapters 3** and **4**.

Table 1-2
Issues and Related Resource Topics

Issues	Resource Topics Related to the Issues
Modifying Habitat Management Area Designations • Need for adjusting Greater Sage-Grouse Habitat Management Areas (HMAs) so that they reflect the best available science based on updates to habitat data and use modeling (Coates et al. 2016) and are consistent with HMAs identified by the State of Nevada and recommended by CDFW. This would provide consistency in management across jurisdictions and to third parties operating on public and state or private lands in the Nevada and Northeastern California Subregion. • Integration of flexibility into the plans to be able to adjust HMA designations (and their associated allocations), based on the best available science, through plan maintenance or amendment, as appropriate. • Maintaining all HMAs as identified in the 2015 ARMPA/ROD, and SFAs, which should be provided with the most protections.	• Greater Sage-Grouse • Vegetation • Land Use and Realty • Renewable Energy • Minerals and Energy • Socioeconomics • Livestock Grazing • Comprehensive Travel Management

Issues	Resource Topics Related to the Issues
Removing Sagebrush Focal Area Designations • Address eliminating the SFA designation and the cancellation of the proposed withdrawal of SFAs and the reasoning for the cancellation – Analyze the inclusion and removal of SFAs, in response to the March 31, 2017, United States District Court for the District of Nevada court order. • Is this habitat designation (i.e., SFA) needed to adequately maintain conservation of Greater Sage-Grouse HMAs?	• Greater Sage-Grouse • Vegetation • Land Use and Realty • Renewable Energy • Minerals and Energy • Socioeconomics • Livestock Grazing • Comprehensive Travel Management
Adaptive Management • Ensure federal, state, and local partners are part of the causal factor analysis process • Lack of flexibility with implementing and removing hard trigger adaptive management responses • Better alignment with DOI guidance on implementation of the adaptive management process • Incorporate best available science including local data and information into the adaptive management strategy • Utilize collaborative processes with stakeholders, appropriate state and local agencies, and authorized land users when developing and implementing management responses to any trigger met or surpassed	• Greater Sage-Grouse • Vegetation • Land Use and Realty • Renewable Energy • Minerals and Energy • Socioeconomics • Livestock Grazing • Comprehensive Travel Management
Allocation Exception Process • Clarify and make consistent the various exception allocation processes • Verify through ground-truthing (Greater Sage-Grouse habitat suitability assessments, such as Stiver et al. 2015), the utilization of landscape-scale mapping of priority habitat management area (PHMA), general habitat management area (GHMA), and other HMAs (OHMA) in regards to the application of land use plan allocations and stipulations • Address restrictions on actions related to public health and safety, existing infrastructure, and administrative functions that serve a public purpose • Address inconsistencies with existing federal legislation and the 2015 ARMPA/ROD that include land tenure adjustments, including, but not limited to, disposals, exchanges, transfers, and recreation and public purposes actions	• Greater Sage-Grouse • Vegetation • Land Use and Realty • Renewable Energy • Minerals and Energy • Socioeconomics • Livestock Grazing • Comprehensive Travel Management
Mitigation • Alignment with the State of Nevada's mitigation strategy to the extent allowable by federal law on Nevada BLM-administered lands only • Defer to the State of Nevada's mitigation strategy to the extent allowable by federal law and regulation on Nevada BLM-administered lands only • Consider and analyze the State of Nevada's and California's recommendations for project level mitigation in relevant NEPA documentation • Ensure consistency in tracking and reporting changes to Greater Sage-Grouse habitat quality and quantity • Alignment with updated BLM policy regarding compensatory mitigation (IM 2018-093)	• Greater Sage-Grouse • Vegetation • Land Use and Realty • Renewable Energy • Minerals and Energy • Socioeconomics • Livestock Grazing • Comprehensive Travel Management

Issues	Resource Topics Related to the Issues
Seasonal Timing Restrictions • Alignment with State of Nevada's conservation plan and management strategies with the State of California, to the greatest extent possible • Consider exceptions and/or modifications to Greater Sage-Grouse seasonal timing restrictions to allow for beneficial or neutral projects as recommended by the State of Nevada and California consistent with its conservation plan and/or mitigation strategies to occur in a timely manner • Seasonal timing restrictions need to be adjusted to allow for public health and safety concerns and time sensitive administrative functions that serve a public purpose to be addressed without delay	• Greater Sage-Grouse • Vegetation • Land Use and Realty • Renewable Energy • Minerals and Energy • Socioeconomics • Livestock Grazing • Comprehensive Travel Management
Modifying Habitat Objectives • Consideration of site potential, based on such factors as ecological site descriptions, state and transition models, etc. • Consistency with State of Nevada's desired habitat conditions • Incorporation of the best available current science supporting modifications • Clarify that the Greater Sage-Grouse Habitat Objectives (Table 2-2 of the 2015 ARMPA/ROD) are actually desired outcomes expressed as goals consistent with BLM Planning Handbook (H-1601-1)	• Greater Sage-Grouse • Vegetation • Land Use and Realty • Renewable Energy • Minerals and Energy • Socioeconomics • Livestock Grazing • Comprehensive Travel Management

Clarification of Planning Decisions in the 2015 ARMPA/ROD

The following issues identified in existing planning decisions in **Table 1-3** were raised during scoping for the 2019 planning process. These issues required clarification to language in the 2015 ARMPA/ROD but did not require new analysis. The clarifying language for these planning decisions is displayed in this planning document to communicate how these issues were addressed through plan maintenance, policy, or implementation.

Table 1-3
Clarification Issues

Clarification Issue	Clarifications Addressed through Plan Maintenance, Policy, or Implementation
Modifying Lek Buffers Clarification regarding the application of lek buffer-distances	*Plan Maintenance* - Management Decisions SSS 2(D) and SSS 3(C) from the 2015 ARMPA/ROD have been clarified to resolve conflicting statements regarding how the BLM would "apply" lek buffers contained in the USGS Report *Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review, Open File Report 2014-1239* (Mainer et al. 2014). Management Decisions SSS 2(D) and SSS 3(C) have been revised to read as follows: *In undertaking BLM management actions [in PHMA and GHMA], and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM would utilize the lower end of the interpreted range of lek buffer-distances and guidance identified in Mainer et al. (2014) to establish the evaluation area around leks that would be used to analyze impacts during project-specific NEPA, including scientifically justifiable departures based on local data, topography, and other factors, in accordance with **Appendix C**.* **Appendix C** has also been revised to reflect this clarified decision language.

Clarification Issue	Clarifications Addressed through Plan Maintenance, Policy, or Implementation
Changing Requirements for Required Design Features Clarify the application of required design features and opportunities to deviate from them	*Plan Maintenance* - **Appendix D** includes a required design features (RDFs) worksheet that BLM Nevada and Northeastern California field and district offices would complete for all proposed activities authorized in PHMA, GHMA, and OHMA. This worksheet clearly defines the rationale for dismissing certain RDFs when they are not appropriate for specific proposed activities.
Fire and Invasives Provide the necessary prioritization of all three aspects of fire management: pre-suppression, suppression, and rehabilitation and find ways to expedite on-the-ground treatments to address this present and widespread threat in the Nevada and Northeastern California Sub-region	*Policy* - When the Great-Basin-Wide Programmatic Environmental Impact Statements (PEISs) for Fuel Breaks and to Reduce the Threat of Wildfire and Support Rangeland Productivity and any other programmatic analysis associated with vegetation treatments are completed, BLM Nevada and California would issue statewide policies that would instruct BLM field and district offices to incorporate by reference the analysis contained in the PEISs for on-the-ground environmental analysis, in an effort to expedite on-the-ground activities that would address the present and widespread threat of fire and invasives in the Nevada and Northeastern California Sub-region. The Draft PEISs are tentatively scheduled for publication in December 2018, with Final PEISs tentatively scheduled for publication in June/July 2019. The PEISs would not modify any proposed land use plan decisions (including HMA designations) specified in this RMPA/EIS.
Increase Opportunities for Outcome-Based Grazing Identify and complete a number of authorizations to support the development of rigorous and defensible outcome-based grazing	*Implementation* - BLM Nevada and California would continue to pursue outcome-based grazing initiatives that would exhibit a new management paradigm that BLM managers and livestock operators can use to establish management practices that can achieve specific management objectives that respond to changing, on-the-ground conditions such as wildfires, high moisture years, or drought. This would better ensure healthy rangelands, high-quality wildlife habitat, and economically sustainable ranching operations.
Land Health Assessments and Habitat Objectives Management Decisions LG 5 within the existing 2015 ARMPA/ROD is inconsistent with 43 CFR 4160.1. References of this decision contained in Management Decisions LG 6 and LG 10 would be removed and these management decisions would be modified.	*Plan Maintenance* - Management Decision LG 5 (page 2-25 through 2-26, ARMPA), as written, is not consistent with existing BLM grazing regulations (43 CFR 4160.1) or recent policies (WO Instruction Memorandum 2018-023), as it provides direction to implement interim management strategies until appropriate modifications are incorporated through the permit renewal process (if results from a land health assessment indicate that Greater Sage-Grouse habitat objectives are not met and grazing is a causal factor). This management decision, however, does not identify that these interim management strategies need to be within the existing terms and conditions of a grazing permit in order to implement them immediately. Under 43 CFR 4160.1 (existing BLM grazing regulations), the BLM must issue a proposed/final decision on any affected applicant, permittee or lessee, and interested public when modifying a grazing permit. If the interim management strategies are within the existing terms and conditions of a grazing permit, they can be implemented immediately; however, if the selected interim management strategies are outside of the existing terms and conditions, the BLM would need to comply with NEPA and the decision processes provided in 43 CFR 4160. For this reason, Management Decision LG 5 would be removed, and references to Management Decision LG 5 in Management Decisions LG 6 and LG 10 would be removed and these management decisions would be modified.

Issues and Resource Topics Not Carried Forward for Additional Analysis (Scoping Issues Outside the Scope and Scoping Issues Previously Analyzed)

Issues and Related Resource Topics Not Carried Forward for Additional Analysis

The following issues were raised during scoping for the 2019 planning process and are not carried forward in this FSEIS for the same reasons. For example, population-based management is not carried forward for detailed analysis because the BLM does not manage species populations; that authority falls under the jurisdiction of the States of Nevada and California.

Because the following issues were raised during scoping and were already analyzed in the 2015 Final EIS, and no significant new information has emerged, they did not require additional analysis in the 2018 RMPA/EIS. These issues were analyzed under most resource topics in the 2015 Final EIS, and these types of impacts on these resources are described in the range of alternatives in the 2015 Final EIS. The impacts of implementing the alternatives in the 2018 RMPA/EIS were within the range of alternatives previously analyzed.

- Effects of No surface occupancy (NSO) stipulations on Greater Sage-Grouse habitat on non-BLM-administered lands
- Mitigation for oil and gas development
- Prioritization of fluid mineral leases outside of PHMA and GHMA
- Numerical noise limitations within PHMA
- Contribution of disturbance caps toward Greater Sage-Grouse conservation objectives
- Wildfire response to vegetation treatments
- Sage-Grouse Habitat Assessment Framework (Stiver et al. 2015)

Other issues were evaluated as part of the 2015 Final EIS. For the same reasons they were dismissed in the 2015 Final EIS, they were not carried forward for detailed analysis in the 2018 RMPA/EIS:

- Hunting of Greater Sage-Grouse
- Predator control[1]
- Aircraft overflights in PHMA and GHMA[2]

Resource Topics Not Carried Forward for Additional Analysis

The resource topics below are dismissed from detailed analysis. While these resource topics may have impacts related to Greater Sage-Grouse conservation that were analyzed in the 2015 Final EIS, they were dismissed from detailed analysis because they had no potentially significant impacts from actions proposed in the 2018 RMPA/EIS:

[1]While the BLM does not have the authority to carry out certain predator control actions (such as permitting take permits), it is committed to working with partners who do, particularly in degraded habitat, such as recovering burns and areas of pinyon and/or juniper encroachment, where predators are having a disproportionate impact on local Greater Sage-Grouse populations.

[2] Military aircraft operations were outside the scope of the 2018 RMPA/EIS. The 2018 RMPA/EIS did not apply to aircraft activities that are under the jurisdiction of the Federal Aviation Administration or the Department of Defense.

- Geology
- Indian trust resources
- Noise
- Air quality and visibility
- Special designations (e.g., areas of critical environmental concern, research natural areas, wilderness, wilderness study areas, wild and scenic rivers, and national scenic and historic trails)
- Environmental justice
- Wildland fire and fire management
- Wild horses and burros
- Recreation
- Visual resources
- Water resources
- Cultural and heritage resources
- Lands with wilderness characteristics

1.5 Items to be Clarified in this FSEIS

The items considered in this FSEIS are related to the analysis in the 2018 Final EIS. These items are:

- clarifying the range of alternatives (including how the BLM considered the full range of the 2011-2015 alternatives in the 2019 planning process);
- taking a hard look and using the best available science (including clarified effects analysis, how the 2015 and 2019 Final EISs addressed the NTT and COT recommendations and conservation measures) (**Appendix B**);
- clarifying that the cumulative effects analysis was done at the range wide level and organized by WAFWA Management Zone (MZs). Updated language also highlights why WAFWA MZs were used; and,
- updating Reasonably Foreseeable Future Actions (**Appendix G)**

1.6 Relationship to Other Policies, Plans, and Programs

The BLM recognizes the importance of state and local plans. The BLM would work to be consistent with or complementary to the management actions in these plans when possible to the extent consistent with the laws governing the administration of public lands.

1.6.1 State Plans

State plans considered during this planning effort include the following:

- Nevada's 2016-2021 Statewide Comprehensive Outdoor Recreation Plan (SCORP)—Assessment and Policy Plan (Nevada Division of State Parks and Department of Conservation and Natural Resources 2016-2020)
- Nevada Comprehensive Preservation Plan (Nevada State Historic Preservation Office 2012–2020)

- Sustainable Preservation: California's Statewide Historic Preservation Plan, 2013–2017 (California State Parks 2013)
- Nevada Department of Wildlife-Wildlife Action Plan (2013)
- Greater Sage-Grouse Conservation Plan for Nevada and Eastern California (NDOW 2004)
- Nevada Sage-Grouse Conservation Strategy (State of Nevada 2001, 2004, 2012)
- Nevada Sage-Grouse Conservation Plan (State of Nevada 2014, as amended)
- Nevada's Coordinated Invasive Weed Strategy (Nevada Weed Action Committee 2000)
- Nevada Division of State Lands, Lands Identified for Public Acquisition (Nevada Department of Conservation & Natural Resources 1999)
- State of Nevada Drought Plan (Nevada Department of Conservation and Natural Resources 2012)
- Nevada Division of State Lands, Nevada Statewide Policy Plan for Public Lands (Nevada Department of Conservation & Natural Resources 1985)

1.6.2 Local Plans

Local land use plans considered during this planning effort include the following:

- Carson City Comprehensive Master Plan, Nevada (Carson City 2006)
- Churchill County Master Plan, Nevada (Churchill County 2015)
- Churchill County Water Resource Plan, Nevada (Churchill County 2007)
- City of Caliente Master Plan, Nevada (City of Caliente 2011)
- Douglas County Comprehensive Master Plan, Nevada (Douglas County 2012)
- Douglas County Open Space Plan, Nevada (Douglas County 2007)
- Elko County, Nevada Greater Sage-Grouse Management and Conservation Strategy Plan (September 2012)
- Elko County General Open Space Plan, Nevada (Elko County 2003)
- Elko County Public Lands Policy Plan, Nevada (Elko County 2008)
- Elko County Water Resource Management Plan, Nevada (Elko County 2007)
- Esmeralda County Master Plan, Nevada (Esmeralda County 2011)
- Esmeralda County Public Lands Policy Plan, Nevada (Esmeralda County 2013)
- Eureka County Master Plan, Nevada (Eureka County 2010)
- Humboldt County Master Plan, Nevada (Humboldt County 2002)
- Humboldt County Master Plan Open Space Element Amendment, Nevada (Humboldt County 2003)
- Lander County Master Plan, Nevada (Lander County 2010)
- Lander County Policy Plan for Federally Administered Lands, Nevada (Lander County 2005)
- Lander County Water Resources Plan, Nevada (Lander County 2011)
- Lassen County Fire Safe Plan, California (Lassen County 2012)
- Lassen County General Plan, California (Lassen County 1999)
- Lincoln County Master Plan, Nevada (Lincoln County 2007)

- Lincoln County Open Space and Community Lands Plan, Nevada (Lincoln County 2011)
- Lincoln County Public Lands Policy Plan, Nevada (Lincoln County 2015)
- Lyon County Comprehensive Master Plan, Nevada (Lyon County 2010)
- Modoc County General Plan, California (Modoc County 1988)
- Nye County Comprehensive Master Plan, Nevada (Nye County 2011)
- Pershing County Master Plan, Nevada (Pershing County 2002)
- Pershing County Natural Resources Management Plan: Natural Resources and Federal or State Land Use, Nevada (Pershing County 2010)
- Shasta County General Plan, California (Shasta County 2004)
- Siskiyou County General Plan, California (Siskiyou County 2010)
- Storey County Master Plan, Nevada (Storey County 1994)
- Title 7 of the Nye County Code (Comprehensive Land Use and Management Plan for Federal and State Lands within Nye County), Nevada (Nye County 2009)
- Tri-Party Framework for Interactions to Address Public Lands Issues in Nye County, Nevada (includes Nye County, the BLM, and Forest Service), Nevada (Nye County 1996)
- Truckee Meadows Regional Plan (Washoe County Only), Nevada (TMRPA 2007)
- Washoe County Comprehensive Plan, Nevada (Washoe County 2005a)
- Washoe County Open Space & Natural Resource Management Plan, Nevada (Washoe County 2008)
- Washoe County Water Resources Management Plan, Nevada (Washoe County 2005b)
- Washoe County Master Plan with Elements and Area Plans, Nevada (Washoe County, 2010, as amended)
- Washoe County Regional Open Space & Natural Resource Management Plan, Nevada (Washoe County, 2008)
- White Pine County Public Lands Policy Plan, Nevada (White Pine County 2007)
- White Pine County Water Resources Plan, Nevada (White Pine County 2006)

1.7 CHANGES BETWEEN DRAFT AND FINAL SEIS

Based on comments received on the DSEIS, the BLM has updated information pertaining to habitat and population triggers in **Chapter 3** if it was not included in the DSEIS, as well as the list of past, present, and reasonably foreseeable projects considered for cumulative impacts in **Appendix G**. Responses to substantive public comments received on the DSEIS are included in **Appendix M**.

Chapter 2. Proposed Plan Amendment and Alternatives

2.1 INTRODUCTION

This chapter describes the eight alternatives considered during the 2019 planning processes. The 2018 Draft RMPA/Draft EIS and Proposed RMPA/Final EIS analyzed in detail a No-Action Alternative and one action alternative, the Management Alignment Alternative, while incorporating by reference the full range of alternatives evaluated in detail by the BLM in its 2015 EISs. The 2019 ARMPA/ROD also explains how the BLM considered the alternatives evaluated in the BLM's 2015 and 2018 EISs. This FSEIS likewise considers this full range of reasonable alternatives, while adding a greater level of detail about each alternative and giving the public an additional opportunity to review and comment on these eight alternatives. The full range of alternatives considered in the 2018 Final EIS is both summarized and provided in detail in the three tables in **Section 2.6**. NEPA's implementing regulations require materials to be incorporated by reference when the effect will be to cut down on bulk without impeding agency and public review of the action (40 CFR 1502. 21).

Components of Alternatives

Goals are broad statements of desired outcomes and are not quantifiable or measurable. Objectives are specific measurable desired conditions or outcomes intended to meet goals. Goals and objectives can vary across alternatives, resulting in different allowable uses and management actions for some resources and resource uses.

Management actions and allowable uses are designed to achieve goals and objectives. Management actions are measures that guide day-to-day and future activities. Allowable uses delineate uses that are permitted, restricted, or prohibited, and may include stipulations or restrictions. Allowable uses also identify lands where specific uses are excluded to protect resource values, or where certain lands are open or closed in response to legislative, regulatory, or policy requirements. Implementation decisions are site-specific actions and are typically not addressed in RMPs.

2.2 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

2.2.1 Varying Constraints on Land Uses and Development Activities

During scoping, some commenters asked the BLM to consider additional constraints on land uses and ground-disturbing development activities to protect Greater Sage-Grouse habitat. These constraints are beyond those in the current management plan.[1] Other commenters, in contrast, asked the BLM to consider eliminating or reducing constraints on land uses, or incorporating other flexibilities into the BLM's implementation of RMPs, in addition to those issues that were already evaluated in the Management Alignment Alternative. The BLM considered every scoping comment and, where

[1]For example, this 2018 planning process, built upon the 2015 planning process, would continue to ensure that the BLM complies with its special status species policy, including the commitment to "implement measures to conserve [special status] species and their habitats…and promote their conservation and reduce the likelihood and need for such species to be listed pursuant to the ESA" (BLM Manual 6840, Special Status Species Management).

appropriate, incorporated these issues into the Management Alignment Alternative, following coordination with the States. Because the purpose and need for the BLM's action, building off of the 2015 ARMPA/ROD, is to enhance cooperation with the States by seeking to better align the BLM's RMPs with individual state plans and/or conservation measures, the BLM gave great weight to the States' identification of issues that warrant consideration in this planning effort.

This planning process does not revisit every issue that the BLM evaluated in the 2015 ARMPA/ROD. Instead, the BLM now addresses refinements to the 2015 ROD/ARMPA decisions, consistent with the BLM's purpose and need for the action. Accordingly, this SEIS has its foundation in the comprehensive 2015 Final EIS and ARMPA/ROD and incorporates those documents by reference—including the entire range of alternatives evaluated through the 2015 planning process:

- Alternative A would have retained the management goals, objectives, and direction specified in the BLM's and the Forest Service land and resource management plans effective prior to the 2015 ROD/ARMPA.
- Alternative B was based on the conservation measures developed by the National Technical Team planning effort in Washington Office Instruction Memorandum (IM) 2012-044. As directed in the IM, the conservation measures developed by the National Technical Team must be considered and analyzed, as appropriate, through the land use planning process and NEPA by all BLM state and field offices that contain occupied Greater Sage-Grouse habitat. Most management actions included in Alternative B would have been applied to PHMA.
- Alternative C was based on a citizen groups' recommended alternative. This alternative emphasized improvement and protection of habitat for Greater Sage-Grouse and was applied to all occupied Greater Sage-Grouse habitat. Alternative C would have limited commodity development in areas of occupied Greater Sage-Grouse habitat and would have closed or designated portions of the planning area to some land uses.
- Alternative D, which was identified as the Preferred Alternative, balanced opportunities to use and develop the planning area and protects Greater Sage-Grouse habitat based on scoping comments and input from cooperating agencies involved in the alternatives development process. Protective measures would have been applied to Greater Sage-Grouse habitat.
- Alternative E was the alternative provided by the Nevada State or Governor's offices for inclusion and analysis in the EISs. It incorporated guidance from specific state conservation strategies and emphasized management of Greater Sage-Grouse seasonal habitats and maintaining habitat connectivity to support population objectives.
- Alternative F was also based on a citizen group recommended alternative. This alternative emphasized improvement and protection of habitat for Greater Sage-Grouse and defined different restrictions for Priority Habitat Management Areas (PHMA) and General Habitat Management Areas (GHMA). Alternative F would have limited commodity development in areas of occupied Greater Sage-Grouse habitat and would have closed or designated portions of the planning area to some land uses.
- The Proposed LUPA incorporated guidance from specific State Conservation strategies, as well as additional management based on the National Technical Team recommendations. This alternative emphasized management of Greater Sage-Grouse seasonal habitats and maintaining habitat connectivity to support population objectives.

The BLM considered the entire range of alternatives from the 2015 Final EIS to identify issues meriting reconsideration, given the BLM's goal of enhancing alignment with state plans and conservation strategies. In this manner, the BLM would continue to appropriately manage Greater Sage-Grouse and its habitat through this planning effort in tandem with the 2015 ARMPA/ROD.

Further, additional constraints on land uses or development without a documented need would not meet the purpose of SO 3353. The BLM did not discover new information that would indicate that it should increase the level of conservation, management, and protection to achieve its land use plan objective. As part of the consideration of whether to amend the 2015 ARMPA/ROD, the BLM partnered with the USGS to review the best available information published since January 2015, develop an annotated bibliography of that Greater Sage-Grouse science (Carter et al. 2018; see **Section 3.1**), and incorporate the information into this EIS. In addition, SO 3353 directs the BLM to promote habitat conservation, while contributing to economic growth and energy independence. As analyzed in the 2015 Final EIS, all of the previously analyzed alternatives, including one proposing constraints stricter than the current management plan, were predicted to result in a loss of development opportunities on public lands.

2.3 Description of Draft RMPA/EIS Alternatives

2.3.1 No-Action Alternative

Under the No-Action Alternative, the BLM would not amend the current RMPs amended or revised by the 2015 ROD/ARMPA. Greater Sage-Grouse habitat would continue to be managed under current management direction. Goals and objectives for BLM-administered lands and federal mineral estate would not change. Allowable uses and restrictions would also remain the same, as they pertain to such activities as mineral leasing and development, recreation, lands and realty, and livestock grazing. This alternative also includes the designation of Sagebrush Focal Areas (SFA), which is analyzed in **Chapter 4**.

2.3.2 Management Alignment Alternative

This alternative was identified as the Preferred Alternative in the Draft RMPA/EIS and makes modifications to the No-Action Alternative to better align the BLMs management direction with the State of Nevada's Conservation Plan[2] and conservation strategies with the California Department of Fish and Wildlife (CDFW) to reach a "combination of balanced and diverse resource uses," as required by FLPMA. This alternative was also developed in a collaborative process with cooperating agencies to support conservation outcomes based on state recommendations for Greater Sage-Grouse.

The BLM continues to build upon the 2015 planning effort as envisioned in SO 3353 by collaborating with states and stakeholders to improve compatibility between federal management plans and state plans and programs, while ensuring consistency with the BLM's multiple use mission and commitment to protect Greater Sage-Grouse habitat. This enhanced cooperation between the BLM and the States would lead to improved management and coordination with states across the range of Greater Sage-

[2] The process involved in developing the State of Nevada's Greater Sage-grouse Conservation Plan (as amended) is described in pages 5 through 7 of the State plan. The State Plan is part of the State of Nevada's Sagebrush Ecosystem Program (under Nevada Revised Statutes 232.161 and 232.162) and has been approved and amended through the State of Nevada's Sagebrush Ecosystem Council, which includes ex-officio members from the BLM, US Forest Service, NRCS, and the USFWS.

Grouse. These modifications include updating and making adjustments to Greater Sage-Grouse HMA boundaries and including language that would allow the BLM to update, through plan maintenance, when appropriate, based on the most updated best available science and habitat data; removing SFA designations; incorporating new science into the adaptive management strategy and replacing predetermined hard trigger responses with a clear causal factor analysis process to determine the appropriate management responses and to address the decline in Greater Sage-Grouse populations and/or habitat; revising and simplifying an allocation exception process to allow for the consideration of projects or other actions within Greater Sage-Grouse HMA (see **Table 2-1**, Allocation Exceptions, for more detail, in the 2015 Final EIS); solidifying the BLM's commitment to defer to the most current version of the State of Nevada's Habitat Quantification Tool (HQT) to quantify disturbance calculations; and identifying that seasonal timing restrictions and modifying Greater Sage-Grouse Habitat Objectives (Table 2-2 of the 2015 Final EIS) would be addressed in coordination with state wildlife agencies and other partners. At the request of the State of Nevada, the Management Alignment Alternative in the Draft RMPA/EIS included the net conservation gain standard for compensatory mitigation that the BLM incorporated into its plans in 2015.

Consistent with the Notice of Cancellation of the BLM's application to withdraw SFAs from locatable mineral entry (82 *Federal Register* 195, October 11, 2017, p. 47248), this alternative would also remove the recommendation for withdrawal. The effects of these actions are included in **Chapter 4**.

2.3.3 Proposed Plan Amendment

The Proposed Plan Amendment represents the BLM's proposed approach for meeting the purpose and need consistent with the agencies' legal and policy mandates. The Draft RMPA/EIS was issued for a 90-day public review and comment in May 2018. In particular, the BLM asked for comment on the "net conservation gain" compensatory mitigation standard included in the 2015 plans. The BLM assessed and considered public comments, received both individually and collectively, during the public review period of the Draft RMPA/EIS. The BLM has crafted the Proposed Plan Amendment, largely based on the Preferred Alternative (Management Alignment Alternative), which was identified in the May 2018 Draft RMPA/EIS, with modifications based on review of public comments received on the Draft RMPA/EIS. In addition, special expertise input and comments received from cooperating agencies helped shape the Proposed Plan Amendment. Changes in BLM regulations, policy, and guidance were another factor taken into consideration in its development. Key policy and guidance changes center on compensatory mitigation and adaptive management. BLM responded to all substantive comments received on the 2018 Draft RMPA/EIS (Appendix G of the 2018 Draft RMPA/EIS).

At the request of the State of Nevada, the Management Alignment Alternative in the Draft RMPA/EIS included proposed management actions for compensatory mitigation based on the mitigation framework BLM incorporated into its plans in 2015; however, following extensive review of all existing regulations, orders, guidance documents, and policies the BLM has concluded that FLPMA does not explicitly mandate or authorize the BLM to require public land users to implement compensatory mitigation as a condition of obtaining authorization for the use of the public lands (IM 2018-093, Compensatory Mitigation, July 24, 2018). In addition, the Draft RMPA/EIS maintained the net conservation gain standard for compensatory mitigation actions required to offset residual impacts on public lands.

To align BLM's compensatory mitigation policy (IM 2018-093) with the 2019 planning effort, the 2018 Proposed Plan Amendment clarified that at the project level, BLM would consider compensatory mitigation only when offered voluntarily by project proponents or when required by state statutes. Because this correction brought the 2018 Proposed Plan Amendment into alignment with existing policy and regulation, and because compensatory mitigation would be analyzed in site-specific NEPA analysis, there was no additional analysis concerning application of the mitigation standard and compensatory mitigation actions in the 2018 Proposed RMPA/Final EIS. BLM would achieve the planning-level management goals and objectives identified in the 2018 Proposed RMPA/Final EIS including achieving conservation in alignment with State goals and objectives at the landscape-level by ensuring Greater Sage-Grouse habitat impacts are offset through implementing the mitigation hierarchy as analyzed in the 2018 Proposed RMPA/Final EIS.

The BLM recognizes that Greater Sage-Grouse is a State-managed species, and, in accordance with 43 CFR 24.3(a), that State authority regarding fish and resident wildlife guides how the BLM cooperates with the State in the absence of specific, overriding federal law. Further, the BLM recognizes that state governments have established fish and wildlife agencies that are charged with the responsibility and mandate to implement state statutes for effective, appropriate, and efficient conservation and management of fish and resident wildlife species. Accordingly, the BLM coordinated with the State of Nevada to develop a memorandum of agreement (MOA) to guide the application of the mitigation hierarchy and compensatory mitigation actions for future project authorizations in Greater Sage-Grouse habitat on BLM-administered lands in Nevada.

The MOA describes the State of Nevada's policies, authorities, and programs for Greater Sage-Grouse conservation and the process regarding how the BLM would incorporate avoidance, minimization, and other recommendations from the State of Nevada necessary to improve the condition of Greater Sage-Grouse habitat consistent with RMPA goals and objectives, in one or more of the NEPA analysis alternatives. The MOA would be implemented to provide an improvement to Greater Sage-Grouse habitat at a State level (as opposed to a WAFWA Management Zone or a Field Office), in collaboration with applicable partners (e.g., federal, tribal, and state agencies). Generally, and as described in the MOA, when the BLM receives applications for projects in Greater Sage-Grouse habitat on BLM-administered lands in Nevada, the BLM would notify the State of Nevada to determine if the State requires or recommends any additional mitigation—including compensatory mitigation—under State regulations, policies, or programs related to the conservation of Greater Sage-Grouse and its habitat.

2.4 COMPARATIVE SUMMARY OF ALTERNATIVES

Table 2-1 below provides a comparison between acres designated as PHMA, GHMA, and Other Habitat Management Areas (OHMA) (managed by the BLM) between the No-Action Alternative and Management Alignment Alternative in the 2018 Proposed RMPA/Final EIS. The change in acres between these two alternatives is based on the BLM's consideration in the Management Alignment Alternative of new PHMA, GHMA, and OHMA boundaries, from the composite management categories contained within the USGS's Spatially Explicit Modeling of Annual and Seasonal Habitat for Greater Sage-Grouse (*Centrocercus urophasianus*) in Nevada and Northeastern California—an updated decision-support tool for management (Coates et al. 2016) and as adopted and modified by the State of Nevada on December 11, 2015.

Between the two alternatives, no allocation decisions, with the exception of the recommendation for withdrawal in SFAs, would change. Acres of PHMA, GHMA, and OHMA vary between alternatives.

Table 2-1
Comparative Summary of Alternatives in the 2018 Proposed RMPA/Final EIS

		No-Action Alternative	Management Alignment Alternative	Proposed Plan Amendment
Comparative Summary of HMA (Acres)				
PHMA (see Figures 2-1a and 2-1b [Appendix A])		9,309,800 acres (2,797,400 portion of PHMA that is designated as SFA)	9,265,800 acres	9,265,800 acres
GHMA (see Figures 2-1a and 2-1b)		5,720,700 acres	5,748,000 acres	5,748,000 acres
OHMA (see Figures 2-1a and 2-1b)		5,876,500 acres	4,868,900 acres	4,868,900 acres
Comparative Summary of Allocations				
Land Tenure (see Figures 2-12a and 2-12b)	Retain	PHMA, GHMA, OHMA	PHMA, GHMA, OHMA	PHMA, GHMA, OHMA
	Dispose	OHMA	OHMA	OHMA
Solar (see Figures 2-9a and 2-9b)	Open	—	—	—
	Avoidance	—	—	—
	Exclusion	PHMA, GHMA, OHMA	PHMA, GHMA, OHMA	PHMA, GHMA, OHMA
Wind (see Figures 2-8a and 2-8b)	Open	OHMA	OHMA	OHMA
	Avoidance	GHMA	GHMA	GHMA
	Exclusion	PHMA	PHMA	PHMA
Minor ROWs (see Figures 2-11a and 2-11b)	Open	OHMA, GHMA	OHMA, GHMA	OHMA, GHMA
	Avoidance	PHMA	PHMA	PHMA
	Exclusion	—	—	—
Major ROWs (see Figures 2-10a and 2-10b)	Open	OHMA	OHMA	OHMA
	Avoidance	PHMA, GHMA	PHMA, GHMA	PHMA, GHMA
	Exclusion	—	—	—
Fluid Minerals (Oil, Gas, and Geothermal) (see Figures 2-4a and 2-4b)	Open with Standard Stipulations	OHMA	OHMA	OHMA
	Open with Minor Stipulations	GHMA	GHMA	GHMA
	Open with Major Stipulations	PHMA	PHMA	PHMA
Locatable Minerals (see Figures 2-5a and 2-5b)	Open	PHMA, GHMA, OHMA	PHMA, GHMA, OHMA	PHMA, GHMA, OHMA
	Recommended for Withdrawal	Portion of PHMA that is SFA is Recommend for Withdrawal	—	—
Salable Minerals (see Figures 2-6a and 2-6b)	Open	GHMA, OHMA	GHMA, OHMA	GHMA, OHMA
	Closed	PHMA	PHMA	PHMA
Non-Energy Leasable Minerals (see Figures 2-7a and 2-7b)	Open	GHMA, OHMA	GHMA, OHMA	GHMA, OHMA
	Closed	PHMA	PHMA	PHMA

		No-Action Alternative	Management Alignment Alternative	Proposed Plan Amendment
Comprehensive Travel Management (see Figures 2-13a and 2-13b)	Open	OHMA	OHMA	OHMA
	Limited	PHMA, GHMA	PHMA, GHMA	PHMA, GHMA
	Closed	—	—	—
Livestock Grazing (see Figures 2-3a and 2-3b)	Available	PHMA, GHMA, OHMA	PHMA, GHMA, OHMA	PHMA, GHMA, OHMA
	Not Available	—	—	—

*Under the Management Alignment Alternative and the Proposed Plan Amendment, site specific projects would not need to conform to these allocation decisions if they meet one of the criteria outlined under the "Allocation Exception Process" management direction.

2.5 DETAILED DESCRIPTION OF ALTERNATIVES CONSIDERED DURING THE 2019 PLANNING PROCESS

BLM considered a range of alternatives when responding to Secretarial Order 3353 to align BLM's Greater Sage-Grouse management with State plans and management strategies. Six alternatives were analyzed in detail during the 2015 planning process and two were analyzed in detail during the 2019 planning process. BLM incorporated the 2015 alternatives into the 2019 process for a total of eight alternatives evaluated in detail.

The following three tables illustrate the extent of alternatives considered during the 2019 land use planning effort. **Table 2-2a** is a summary of the alternatives considered in detail and considered but not analyzed in detail during the 2019 planning effort. **Table 2-2a** provides a brief description of each alternative for making easy comparisons between alternatives.

Table 2-2b describes in detail the new alternatives developed to address the issues raised during scoping for the 2019 planning effort. Because the 2019 effort was focused on aligning BLM Greater Sage-Grouse management with State plans and management strategies, the issues were more focused and therefore there were only two analyzed in detail.

Table 2-2c describes in detail the alternatives developed during the 2015 planning effort that were also considered in the most recent Greater Sage-Grouse land use planning process. **Table 2-2c** is considerably longer because the 2015 process addressed many more issues than the focused 2019 planning effort.

Table 2-2a
Alternatives Considered during the 2019 Planning Process

Nevada and Northeastern California Planning Document	Document Date	Alternative Title	Analysis Level	Alternative Description
Alternatives Considered During the 2015 and 2019 Planning Processes				
Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS	June 2015	Alternative A	Fully Analyzed	Alternative A would have retained the management goals, objectives and direction specified in the BLM RMPs and the Forest Service land and resource management plans effective prior to the 2015 ROD/ARMPA.
Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS	June 2015	Alternative B	Fully Analyzed	Alternative B was based on the conservation measures developed by the National Technical Team planning effort in Washington Office IM 2012-044. As directed in the IM, the conservation measures developed by the National Technical Team must be considered and analyzed, as appropriate, through the land use planning process and NEPA by all BLM state and field offices that contain occupied Greater Sage-Grouse habitat. Most management actions included in Alternative B would have been applied to PHMA.
Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS	June 2015	Alternative C	Fully Analyzed	Alternative C was based on a citizen group's recommended alternative. This alternative emphasized improvement and protection of habitat for Greater Sage-Grouse and was applied to all occupied Greater Sage-Grouse habitat. Alternative C would have limited commodity development in areas of occupied Greater Sage-Grouse habitat and would have closed or designated portions of the planning area to some land uses.
Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS	June 2015	Alternative D	Fully Analyzed	Alternative D, which was identified as the Preferred Alternative in the Draft RMPA/EIS, balanced opportunities to use and develop the planning area and protects Greater Sage- Grouse habitat based on scoping comments and input from cooperating agencies involved in the alternatives development process. Protective measures would have been applied to Greater Sage-Grouse habitat.

Nevada and Northeastern California Planning Document	Document Date	Alternative Title	Analysis Level	Alternative Description
Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS	June 2015	Alternative E	Fully Analyzed	Alternative E was based on the State of Nevada's Conservation Plan for Greater Sage-Grouse in Nevada and would apply to all BLM and Forest Service administered lands in Nevada. The State of California did not submit a proposal for a complete alternative and as such, Alternative E would only apply to BLM and Forest Service administered lands in Nevada. Key elements of this alternative included: 1) achieving "no net loss" of Greater Sage-Grouse habitat by implementation of a strategy to avoid, minimize, and mitigate impacts on Greater Sage-Grouse ; 2) Establishing the Conservation Credit System; and 3) Establishing the Sagebrush Ecosystem Technical Team.
Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS	June 2015	Alternative F	Fully Analyzed	Alternative F was also based on a citizen group-recommended alternative. This alternative emphasized improvement and protection of habitat for Greater Sage-Grouse and defined different restrictions for PHMA and GHMA. Alternative F would have limited commodity development in areas of occupied Greater Sage-Grouse habitat and would have closed or designated portions of the planning area to some land uses.
Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS	June 2015	Close All or Portions of PHMA or GHMA to Off-Highway Vehicle Use	Considered; Not Analyzed in Detail	Through this LUPA/EIS, the BLM has identified, but has not studied in detail, an alternative to designate new area closures for OHV use within PHMA and GHMA. The BLM has analyzed alternatives to designate all areas within PHMAs and GHMAs as "limited" to existing roads and trails for OHV use, if not already closed by existing planning efforts. Subsequent Travel Management Plans will be developed to identify specific routes within limited areas that will be closed in order to protect and conserve Greater Sage-Grouse and its habitat. The BLM and Forest Service have analyzed existing OHV area closures within PHMAs and GHMAs as part of the No Action alternative and as a decision common to all alternatives.

Nevada and Northeastern California Planning Document	Document Date	Alternative Title	Analysis Level	Alternative Description
Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS	June 2015	Elko County Sage-Grouse Plan	Considered; Not Analyzed in Detail	Elko County, Nevada developed an approach for conserving Greater Sage-Grouse s (Elko County 2012). The plan emphasized the need to maintain the multi-use concept and to avoid further restrictive federal polices to conserve Greater Sage-Grouse s. The Elko Plan identified a suite of action items by program areas to resolve current issues associated with the conservation of the Greater Sage-Grouse . The plan also identified the need for a financial incentive plan to compensate users of public lands for potential adjustments in their management. The Elko Plan was not analyzed as a separate alternative because many of the action items were already contained in either Alternatives A, D, E, or the Proposed Plan from the June 2015 planning effort. In addition, several of the action items within the Elko Plan were outside the scope of the planning effort, such as the following: 1) offering private landowners incentives when and where appropriate to achieve Greater Sage-Grouse habitat objectives; 2) discouraging and preventing additional regulations and prohibitions and limiting and preventing livestock grazing and agricultural uses on federally managed lands and private properties; 3) using Nevada Division of Forestry Conservation Camp Crews for fuels reduction projects and to support a federal grant; 4) expanding authorizations to include fire restoration projects under NEPA categorical exclusion provisions; 5) identifying funding opportunities from federal, state, local, industry, and land users dedicated to implementing prioritized habitat enhancement, restoration, and conservation.

Nevada and Northeastern California Planning Document	Document Date	Alternative Title	Analysis Level	Alternative Description
Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS	June 2015	Increased Grazing Alternative	Considered; Not Analyzed in Detail	During scoping and the alternatives development process, a number of individuals and cooperating agencies requested that the BLM and Forest Service consider an alternative that would increase the amount of livestock grazing in Greater Sage-Grouse habitat. This recommendation was based on empirical evidence that shows there could be a correlation between declines in Greater Sage-Grouse and declines in the amount of livestock grazing on public lands. This alternative was considered but eliminated from detailed analysis due to the fact that alternatives considered in the planning effort were science-based conservation measures that would meet the purpose and need for the project, which aimed to identify and incorporate appropriate conservation measures in LUPs to conserve, enhance, and restore Greater Sage-Grouse habitat by reducing, eliminating, or minimizing threats to that habitat. There are currently no science-based studies that demonstrate that increased livestock grazing on public lands would enhance or restore Greater Sage-Grouse habitat or maintain or increase Greater Sage-Grouse abundance and distribution.
Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS	May 2018	No Action	Fully Analyzed	The No Action would not amend the current RMPs amended by the Nevada and Northeastern California Greater Sage-Grouse Resource Management Plan Amendment (2015 ROD/ARMPA). Greater Sage-Grouse habitat would continue to be managed under current management direction. Goals and objectives for BLM-administered lands and federal mineral estate would not change. Allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, lands and realty, and livestock grazing would also remain the same.

Nevada and Northeastern California Planning Document	Document Date	Alternative Title	Analysis Level	Alternative Description
Nevada and Northeastern California Greater Sage-Grouse Draft Resource Management Plan Amendment and Environmental Impact Statement	May 2018	Management Alignment Alternative	Fully Analyzed	The Management Alignment Alternative made modifications to the No-Action Alternative to better align the BLM's management direction with the State of Nevada's Conservation Plan and conservation strategies with the California Department of Fish and Wildlife (CDFW) to reach a "combination of balanced and diverse resource uses," as required by FLPMA. This alternative was also developed in a collaborative process with cooperating agencies to support conservation outcomes based on state recommendations for Greater Sage-Grouse.

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2.6 DETAILED COMPARISON OF 2019 ALTERNATIVES

Table 2-2b, below, is organized by issue and provides a side-by-side comparison of the No-Action Alternative, the Draft EIS Management Alignment Alternative, and the Final EIS Proposed Plan Amendment. The Management Alignment Alternative attempts to adjust the No-Action Alternative to bring it into alignment with the Nevada and California Governors' Greater Sage-Grouse Plans, while maintaining the format and all parts of the 2015 ARMPA that were not specifically identified as issues.

Table 2-2b
Comparison of Alternatives

Topic	2015 ARMPA Decision Number	No-Action Alternative	Management Alignment Alternative	Proposed Plan Amendment
Issue: Modifying HMA Designations • Need for adjusting HMAs so that they reflect the best available science based on updates to habitat data and use modeling (Coates et al. 2016) and are consistent with HMAs identified by the State of Nevada and recommended by CDFW. This would provide consistency in management across jurisdictions and to third parties operating on public and state or private lands in Nevada and northeastern California. • Integration of flexibility into the plans to be able to adjust habitat management area designations (and their associated allocations), based on the best available science, through plan maintenance or amendment, as appropriate. • Maintaining all HMAs as identified in the 2015 ARMPA/ROD, including SFAs, which should be provided with the most protections.				
Update Management Areas to Incorporate Best Available Science	Appendix A, Maps	PHMA, GHMA, and OHMA boundaries are based on the 2015 Approved Resource Management Plan Amendment HMA maps (see Appendix A, Maps). These boundaries were derived from USGS' *Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California* (Coates et al. 2014) • Manage 9,309,800 acres as PHMA o Including 2,797,400 acres of PHMA as SFA • Manage 5,720,700 acres as GHMA • Manage 5,876,500 acres as OHMA	PHMA, GHMA, and OHMA boundaries are based on composite management categories contained within USGS's *Spatially Explicit Modeling of Annual and Seasonal Habitat for Greater Sage-Grouse (Centrocercus urophasianus)* in Nevada and Northeastern California—an updated decision-support tool for management (Coates et al. 2016), as adopted and modified by the State of Nevada on December 11, 2015 (see Appendix A, Maps). • Manage 9,265,800 acres as PHMA • Manage 5,748,000 acres as GHMA • Manage 4,868,900 acres as OHMA BLM recognizes that landscape level mapping may not accurately reflect on-the-ground conditions. Therefore, the HMAs (**Figure 2-1b**) do not constitute a land use plan decision but rather a landscape level reference of relative habitat suitability. When a proposed project is thought to be in an area that is unsuitable for Greater Sage-Grouse within PHMA, GHMA, and/or OHMA, habitat assessments of the project site and its surrounding areas would be conducted by a qualified biologist with Greater Sage-Grouse experience using BLM-approved methods based on Stiver et al. 2015 and compliant with current BLM Policy, to identify suitable, marginal, or unsuitable Greater Sage-Grouse habitats at multiple scales. This habitat assessment process would then inform criteria (i) under *Issue: Allocation Exception Process, Management Alignment Alternative*. The BLM would track all on-the-ground assessments and would share this information with USGS and the States of Nevada and California to consider when they begin refining the habitat management maps in the future.	PHMA, GHMA, and OHMA boundaries are based on composite management categories contained within USGS's *Spatially Explicit Modeling of Annual and Seasonal Habitat for Greater Sage-Grouse (Centrocercus urophasianus)* in Nevada and Northeastern California—an updated decision-support tool for management (Coates et al. 2016), as adopted and modified by the State of Nevada on December 11, 2015 (see Appendix A: Maps). • Manage 9,265,800 acres as PHMA • Manage 5,748,000 acres as GHMA • Manage 4,868,900 acres as OHMA BLM recognizes that landscape level mapping may not accurately reflect on-the-ground conditions. Therefore, the HMAs (**Figure 2-1b**) do not constitute a land use plan decision but rather a landscape level reference of relative habitat suitability. When a proposed project is thought to be in an area that is unsuitable for Greater Sage-Grouse within PHMA, GHMA, and/or OHMA, habitat assessments of the project site and its surrounding areas would be conducted by a biologist with Greater Sage-Grouse experience using BLM-approved methods such as Stiver et al. 2015 and compliant with current BLM policy, to identify suitable, marginal, or unsuitable Greater Sage-Grouse habitats at multiple scales. This habitat assessment process would then inform criteria (i) under *Issue: Allocation Exception Process, Management Alignment Alternative and Proposed Plan Amendment*. The BLM would track all on-the-ground assessments and would share this information with USGS and the States of Nevada and California to consider when updating HMA maps in the future.

Topic	2015 ARMPA Decision Number	No-Action Alternative	Management Alignment Alternative	Proposed Plan Amendment
Habitat management area designations flexibility	MD SSS 17	As site-specific Greater Sage-Grouse data (habitat assessments, lek counts, telemetry, etc.) is collected, the information will be included into future modeling efforts using the "Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California" (Coates et al. 2014) to reflect the most up-to-date spatial representation of Greater Sage-Grouse habitat categories. Through plan maintenance or plan amendment/revision, as appropriate, and in consultation with the Nevada Department of Wildlife and USFWS, based on the best scientific information, the updated modeling efforts may be adopted and appropriate allocation decisions and management actions will be applied to PHMA, GHMA, and OHMA. Future modeling efforts to incorporate site-specific Greater Sage-Grouse data will utilize the same modeling methods (as described under Methods and Results in Coates et al. 2014) used to develop the current Nevada and Northeastern California Subregions' Greater Sage-Grouse habitat management categories. The addition of site-specific Greater Sage-Grouse data will allow for the refinement of the spatial representation of the Greater Sage-Grouse habitat management categories.	Consistent with the State of Nevada's Greater Sage-Grouse Conservation Plan (2014, as amended) and CDFW's management recommendations, the HMA mapping process would be reviewed and refined every 3 to 5 years, or when new data are incorporated in the model. New or improved spatial data (e.g., additional Greater Sage-Grouse telemetry data, updated or improved vegetation community data) would be incorporated during the refinement process. The review and refinement process would be scientifically based and would include review and input from the Sagebrush Ecosystem Technical Team (SETT), NDOW, BLM, USFS, and USFWS. For refinements in California, this process would also include CDFW. Other stakeholders would be encouraged to participate in the process by submitting relevant information to the listed agencies. The USGS habitat suitability modeling processes (Coates et al. 2016) would be the basis for future refinements. As these habitat management categories are adjusted and approved by the States of Nevada and California, adjustments to PHMA, GHMA, and/or OHMA boundaries (along with the existing allocation decisions and management actions tied to these areas) would be made by the BLM through plan maintenance.	Consistent with the State of Nevada's Greater Sage-Grouse Conservation Plan (2014, as amended) and CDFW's management recommendations, the HMA mapping process would be reviewed and refined every 3 to 5 years, or when new data are incorporated in the model. New or improved spatial data (e.g., additional Greater Sage-Grouse telemetry data, updated or improved vegetation community data) would be incorporated during the refinement process. The review and refinement process would be scientifically based and would include review and input from the Sagebrush Ecosystem Technical Team (SETT), NDOW, BLM, USFS, USFWS, and local agencies as appropriate. For refinements in California, this process would also include CDFW. Other stakeholders would be encouraged to participate in the process by submitting relevant information to the listed agencies. The USGS habitat suitability modeling processes (Coates et al. 2016) would be the basis for future refinements, which may include results of BLM habitat suitability determinations shared with USGS for their consideration. As these habitat management categories are adjusted and approved by the States of Nevada[3] and California, adjustments to BLM's PHMA, GHMA, and/or OHMA boundaries (along with the existing allocation decisions and management actions tied to these areas) would be made by the BLM through plan maintenance or amendment, as appropriate.
Issue: Removing Sagebrush Focal Area Designations • Address cancellation of the proposed SFA withdrawal and the reasons for its cancellation. o Analyze the inclusion and removal of SFAs, in response to the March 31, 2017, United States District Court for the District of Nevada court order. • Is this habitat designation needed to adequately maintain conservation of Greater Sage-Grouse habitat?				
SFA	MD SSS 5 Objective Veg 1 MD Fire 2 Objective Fire 2-4 MD Fire 11-12 MD LG 2 MD LG 3 MD LG 4 MD LG 11 MD WHB 3 through 7 MD MR 3 MD MR 4a MD MR 16 MD LR 24 MD MIT 2	Designate 2,797,400 acres as SFA. SFA will be managed as PHMA, with the following additional management: • Recommended for withdrawal from the General Mining Act of 1872, subject to valid existing rights • Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing • Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration.	No similar action (no areas would be managed as SFA). Lands previously identified as SFA would be managed according to their underlying habitat management area designation (PHMA, GHMA, or OHMA, as identified under this alternative).	Same as Management Alignment Alternative.

[3]The State of Nevada's Greater Sage-Grouse Conservation Plan (2014, as amended) refers to Greater Sage-grouse Management Areas (SGMA) as the spatial extent of Greater Sage-Grouse management in Nevada. For the State of Nevada, the purpose of the SGMA is to initiate consultation with the SETT in regards to the use of the State's Conservation Credit System. The BLM's HMAs are not equivalent to the SGMAs, but rather, are equivalent to the State of Nevada's "Management Categories," which are displayed on Figure 4 of the State Plan. For the State of Nevada, the approval of new iterations of their management categories are approved through the State's Sagebrush Ecosystem Council (SEC). SEC meetings are open to the public and are subject to the State of Nevada's open meeting laws. It is also important to note that the BLM's HMAs are not equivalent to identified biologically significant units (BSUs), as BSUs are one of three scales used to assess adaptive management population triggers. For more information regarding BSUs, see **Appendix E**.

Topic	2015 ARMPA Decision Number	No-Action Alternative	Management Alignment Alternative	Proposed Plan Amendment
Issue: Adaptive Management • Ensure federal, state, and local partners are part of the causal factor analysis process. • Lack of flexibility with implementing and removing hard trigger adaptive management responses. • Better alignment with Department of Interior guidance on implementation of the Adaptive Management Process. • Incorporate best available science including local data and information into the adaptive management strategy. • Utilize collaborative processes with stakeholders, appropriate state and local agencies, and authorized land users when developing and implementing management responses to any trigger met or surpassed.				
Adaptive Management	MD SSS 18 MD SSS 19 MD SSS 20 MD SSS 21 MD SSS 24 Appendix F	A biologically significant unit (see **Appendix A, Figure 2-2**) that has hit a soft trigger due to vegetation disturbance will be a priority for restoration treatments consistent with Fire and Invasives Assessment Tool (FIAT) (**Appendix F**). If a soft trigger is reached, the BLM will identify the causal factor and apply additional project-level adaptive management and/or mitigation measures contained in the authorization (and for future similar authorizations), to alleviate the specific or presumptive causes in the decline of Greater Sage-Grouse populations or its habitats and include the following: The adjustment in management would be based on the causal factor and would affect only the area being impacted in the lek cluster or other appropriate scale (e.g., BSU) • Greater Sage-Grouse populations and habitat would continue to be monitored annually. • If the causal factor were not readily discernable, then an interdisciplinary team, including the BLM, Forest Service (as applicable), and state wildlife agency representatives, would identify the appropriate mitigation or adjusted management actions in a timely manner. Once a hard trigger has been reached, all responses in Tables E-1 and E-2 in Appendix E will be implemented. This includes where soft triggers have been reached for both population and habitat. When a hard trigger is hit in a Priority Area for Conservation (PAC) that has multiple BSUs, including those that cross state lines, the WAFWA Management Zone Greater Sage-Grouse Conservation Team will convene to determine the cause, will put project level responses in place, as appropriate, and will discuss further appropriate actions to be applied. The team will also investigate the status of the hard triggers in other BSUs in the PAC and will invoke the appropriate plan response. Adopting any further actions at the plan level may require initiating a plan amendment process. The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.	The revised soft and hard population triggers (signals) and new BSU and lek cluster boundaries were derived from USGS's *Hierarchical Population Monitoring of Greater Sage-Grouse (*Centrocercus urophasianus*) in Nevada and California— Identifying Populations for Management at the Appropriate Spatial Scale: U.S. Geological Survey Open-File Report 2017–1089*. These triggers (signals), BSU boundaries, and lek cluster boundaries can be found in **Appendix E**. The State of Nevada is currently in the process of incorporating the adaptive management strategy within the State of Nevada's Conservation Plan. BLM would consider alignment with the State's strategy when it is completed. Implement the Adaptive Management Strategy (**Appendix E**). Soft and hard trigger responses would be removed when the criteria for recovery have been met (see **Appendix E**, Longevity of Responses). Removal of the soft and hard trigger responses returns management direction in the affected lek cluster and/or BSU to the management directions that are in force within those lek clusters and/or BSUs that have not tripped a trigger.	The BLM would implement the Adaptive Management Strategy as described in **Appendix E**. The revised soft and hard population triggers, warnings, and new BSU and lek cluster boundaries were derived from USGS's *Hierarchical Population Monitoring of Greater Sage-Grouse* (Centrocercus urophasianus) *in Nevada and California— Identifying Populations for Management at the Appropriate Spatial Scale: U.S. Geological Survey Open-File Report 2017–1089* (Coates et al. 2017). These triggers, warnings, BSU boundaries, and lek cluster boundaries can be found in **Appendix E**. Soft and hard trigger responses would be removed when the criteria for recovery have been met (see **Appendix E**, Longevity of Responses). Removal of the soft and hard trigger responses returns management direction in the affected lek cluster and/or BSU to the management directions that were in place prior to reaching a trigger.

Topic	2015 ARMPA Decision Number	No-Action Alternative	Management Alignment Alternative	Proposed Plan Amendment
Issue: Mitigation • Alignment with the State of Nevada's mitigation strategy to the extent allowable by federal law on Nevada BLM-administered lands only • Defer to the State of Nevada's mitigation strategy to the extent allowable by federal law and regulation on Nevada BLM-administered lands only • Consider and analyze the State of Nevada's and California's recommendation for project level mitigation in relevant NEPA documentation • Ensure consistency in tracking and reporting changes to Greater Sage-Grouse habitat quality and quantity • Alignment with updated BLM policy regarding compensatory mitigation (IM 2018-093)				
Mitigation	MD MIT 1 MD MIT 2 Appendix F [of the 2015 ARMPA] Appendix N [of the 2015 ARMPA]	In PHMA, in undertaking BLM management actions, and consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. The project/activity with associated mitigation (such as the use of the State of Nevada Conservation Credit System) will result in an overall net conservation gain to Greater Sage-Grouse (see Appendix F [of the 2015 ARMPA]). In GHMA, in undertaking BLM management actions, and consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. The project/activity with associated mitigation (such as the use of the State of Nevada Conservation Credit System) in GHMA will result in an overall net conservation gain to Greater Sage-Grouse (see Appendix F, Regional Mitigation Strategy [of the 2015 ARMPA]). In Nevada only, the BLM will consult with the SETT for application of the "avoid, minimize, and compensate" mitigation strategy and the Conservation Credit System developed by the Nevada Department of Conservation and Natural Resources (2014a, 2014b) or other applicable mitigation system such as outlined in Appendix I [of the 2015 ARMPA]. This will be to ensure that a net conservation gain of Greater Sage-Grouse habitat is achieved in mitigating human disturbances in PHMA and GHMA (see Appendix F [of the 2015 ARMPA]) on all agency-authorized activities. The specifics of the coordination will be identified in a Memorandum of Understanding between the agencies. Subject to valid existing rights and applicable law, authorize locatable mineral development activity, by approving plans of operation and apply mitigation and best management practices that minimize the loss of PHMA and GHMA or that enhance Greater Sage-Grouse habitat by applying the "avoid, minimize and compensatory mitigation" process through an applicable mitigation system, such as the Nevada Conservation Credit System and the Barrick Nevada Sage-Grouse Bank Enabling Agreement (March 2015). In Nevada, coordinate with the SETT on the application of a compensatory mitigation program, such as the Nevada	Same as the No-Action Alternative, except Appendix F, Mitigation Strategy [of the 2015 ARMPA], would be updated to include the following clarifying language and concepts: When authorizing third-party actions, the BLM would apply the mitigation hierarchy as described in the CEQ regulations at 40 CFR 1508.20 and in the State of Nevada's Greater Sage-Grouse Conservation Plan, Section 3.1.2 (2014), which is to "avoid, minimize, and compensate," for impacts on Greater Sage-Grouse and its habitat. BLM would consult with the SETT and other state agencies when implementing the avoid, minimize, and mitigate process. The State of Nevada adopted a mitigation standard of net benefit (net conservation gain). Consistent with the State approach, this standard would be retained in the Management Alignment Alternative. In Nevada only, when authorizing third-party actions that would result in direct, indirect, or cumulative impacts on Greater Sage-Grouse or their habitat, the BLM would require those impacts to be quantified using the State of Nevada's Habitat Quantification Tool (HQT) to ensure consistency in tracking/reporting changes to habitat quality and quantity. When adverse impacts on Greater Sage-Grouse and its habitat remain after avoidance and minimization, mitigation would be considered subject to the federal regulations governing the authorization and valid existing rights. When it is determined that an activity requires compensatory mitigation, or a proponent voluntarily offers to conduct compensatory mitigation, the BLM would coordinate with the SETT regarding use of the Conservation Credit System and/or evaluation of other proponent-developed mitigation options. Evaluation of mitigation options would be assessed using the HQT to ensure net benefit (net conservation gain) and that impacts calculated using the HQT would be mitigated with the equivalent number of functional acres regardless of mitigation method.	Revised to align with current BLM policy and guidance regarding mitigation issued on July 24, 2018 through IM 2018-093. • When authorizing third-party actions in designated Greater Sage-Grouse habitat, the BLM will seek to achieve the planning-level Greater Sage-Grouse management goals and objectives through implementation of mitigation and management actions, consistent with valid existing rights and applicable law. Under this Proposed Plan Amendment, management would be consistent with the Greater Sage-Grouse goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management. In accordance with BLM Manual 6840, the BLM will undertake planning decisions, actions and authorizations "to minimize or eliminate threats affecting the status of [Greater Sage-Grouse] or to improve the condition of [Greater Sage-Grouse] habitat" across the planning area. • The BLM has determined that compensatory mitigation must be voluntary unless required by other applicable law and in recognition that state authorities may also require compensatory mitigation (IM 2018-093, *Compensatory Mitigation*, July 24, 2018). Therefore, consistent with valid existing rights and applicable law, when authorizing third-party actions that result in habitat loss and degradation, the BLM would consider voluntary compensatory mitigation actions only as a component of compliance with a state mitigation plan, program, or authority, or when offered voluntarily by a project proponent. • In all Greater Sage-Grouse habitat, before authorizing third-party actions that result in habitat loss and degradation within the State of Nevada, the BLM will complete the following steps, in alignment with the State of Nevada's Greater Sage-Grouse Conservation Plan (2014, as amended), including avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions: 1. Notify the State of Nevada's Sagebrush Ecosystem Technical Team to determine if the State requires or recommends any additional mitigation – including compensatory mitigation – under State regulations, policies, or programs related to the conservation of Greater Sage-Grouse. 2. Incorporate state required or recommended mitigation into the BLM's NEPA decision-making process, if the State of Nevada's Sagebrush Ecosystem Technical determines that there are unacceptable residual impacts on Greater Sage-Grouse or its habitat and compensatory mitigation is required as a part of State policy or authorization, or if a proponent voluntarily offers mitigation.

Topic	2015 ARMPA Decision Number	No-Action Alternative	Management Alignment Alternative	Proposed Plan Amendment
Mitigation (*continued*)	(*see above*)	Conservation Credit System (Appendix N [of the 2015 ARMPA]) for mitigating activities that result in habitat loss and degradation of Greater Sage-Grouse habitat in Nevada, where the application of compensatory mitigation will occur on or the credit will be applied to disturbance on BLM-administered lands. Identify compensatory mitigation areas in PHMA and GHMA with the potential to achieve Greater Sage-Grouse habitat objectives (Habitat Objectives table in the 2015 Final EIS), in accordance with FIAT, the SFA prioritization, and the State of Nevada Strategic Action Plan.	(*see above*)	3. Analyze whether the compensatory mitigation: o achieves measurable outcomes for Greater Sage-Grouse habitat function that are at least equal to the lost or degraded values o provides benefits that are in place for at least the duration of the impacts o accounts for a level of risk that the mitigation action may fail or not persist for the full duration of the impact 4. Verify that the project proponent has coordinated with the State of Nevada's Sagebrush Ecosystem Technical Team to ensure it complies with the State of Nevada's Greater Sage-Grouse Conservation Plan (2014, as amended) and all applicable State requirements relating to it's proposal • Project-specific analysis will be necessary to determine how a compensatory mitigation proposal addresses impacts from a proposed action. The BLM will cooperate with the State to determine appropriate project design and alignment with State policies and requirements, including those regarding compensatory mitigation. When the BLM is considering compensatory mitigation as a component of the project proponent's submission or based on a requirement of or recommendation from the State, the BLM's NEPA analysis would evaluate the need to avoid or minimize impacts of the proposed project and achieve the goals and objectives of this RMPA. The BLM will defer to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action. • The BLM would not deny a proposed authorization in Greater Sage-Grouse habitat solely on the grounds that the proponent has not proposed or agreed to undertake voluntary compensatory mitigation. • The BLM would continue to apply the mitigation hierarchy as described in the CEQ Regulations at 40 CFR 1508.20; however, the BLM would focus on avoiding, minimizing, rectifying or reducing impacts over time. Compensation, which involves replacing or providing substitute resources for the impacts (including payment) would only be considered when voluntarily offered by a proponent, in coordination with the States of Nevada and California. • Appendix F has been removed from the Proposed Plan Amendment. The BLM would ensure project design is aligned with State requirements—including compensatory mitigation—that may be necessary to comply with State policies and programs for the conservation of Greater Sage-Grouse. When the BLM is considering compensatory mitigation as a component of the project proponent's submission or based on a recommendation from the States, the BLM's NEPA analysis would evaluate the need for resolving or eliminating impacts of the proposed project and achieving the goals and objectives of this RMPA. Additional project-specific analysis would be necessary to determine how the compensatory mitigation proposal supports BLM's obligation to evaluate and appropriately implement mitigation to address impacts from a project proposal.

Topic	2015 ARMPA Decision Number	No-Action Alternative	Management Alignment Alternative	Proposed Plan Amendment
Mitigation (*continued*)	(*see above*)	(*see above*)	(*see above*)	• On BLM-administered lands within Nevada and California, when authorizing third-party actions that would result in direct, indirect, or cumulative impacts on Greater Sage-Grouse or their habitat, the BLM would defer to the State of Nevada's most current version of the Habitat Quantification Tool (HQT) to quantify those impacts to ensure consistency in tracking/reporting changes to Greater Sage-Grouse habitat quality and quantity.
Issue: Allocation Exception Process • Clarify and make consistent the various exception allocation processes. • Verify through ground-truthing (Greater Sage-Grouse habitat suitability assessments, such as Stiver et al. 2015), the use of landscape-scale mapping of PHMA, GHMA, and OHMA in regards to the application of allocations and stipulations. • Address restrictions on actions related to public health and safety, existing infrastructure, and administrative functions that serve a public purpose. • Address inconsistencies with existing federal legislation and Approved Resource Management Plans that include land tenure adjustments, including, but not limited to: disposals, exchanges, transfers and Recreation and Public Purpose actions.				
Allocation Exception Process	MD MR 4a MD MR 3 MD MR 21 MD RE 4 MD LR 21 MD REC 3 Appendix G [of the 2015 ARMPA]	(Geothermal) For BLM land in the State of Nevada only, in the portions of the PHMA outside of SFA, geothermal projects may be considered for authorization if all of the following conditions are met: • A team comprised of BLM, USFWS, and NDOW specialists advises the BLM State Director on appropriate mitigation measures for the project and its ancillary facilities, including lek buffer distances using the best available science; • Mitigation actions are consistent with this Plan's mitigation strategy such as the Nevada Conservation Credit System, and • The footprint of the project is consistent with the disturbance management protocols identified in this plan (see MD SSS 2 and Appendix E [of the 2015 ARMPA]) (Salable Minerals) PHMA are closed to new mineral material sales (see **Appendix A**, **Figure 2-6**). However, these areas remain open to free use permits and the expansion of existing active pits, if requirements in MD MR 20 can be met [Objective SSS 4 and apply MDs SSS 1 through SSS 4]. (Oil and Gas) In PHMA outside of SFA, no waivers or modifications to an oil and gas lease no-surface-occupancy stipulation will be granted. In PHMA, the Authorized Officer may grant an exception to an oil and gas lease no-surface-occupancy stipulation only where the proposed action: i. Will 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 will provide a clear conservation gain to Greater Sage-Grouse. Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) Areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid federal oil and gas lease existing as of	In PHMA and GHMA, the State Director may grant an exception to the land use plan allocations and stipulations described in Section 2-5 if one of the following applies (in coordination with NDOW, SETT, and/or CDFW): i. The location of the proposed authorization is determined to be unsuitable (by a qualified biologist with Greater Sage-Grouse experience using methods based on Stiver et al 2015); lacks the ecological potential to become marginal or suitable habitat; and would not result in direct, indirect, or cumulative impacts on Greater Sage-Grouse and its habitat. Management allocation decisions would not apply to those areas determined to be unsuitable because the area lacks the ecological potential to become marginal or suitable habitat; ii. Impacts from the proposed action could be offset through use of the mitigation hierarchy (avoid, minimize, mitigate) to achieve a net conservation gain and demonstrate that the individual and cumulative impacts of the project would not result in habitat fragmentation or other impacts that would cause Greater Sage-Grouse populations to decline. iii. The proposed action would be authorized to address public health and safety concerns, specifically as they relate to local, state, and national priorities. iv. Renewals or re-authorizations of existing infrastructure in previously disturbed sites or expansions of existing infrastructure that have *de minimis* impacts or do not result in direct, indirect, or cumulative impacts on Greater Sage-Grouse and its habitat. v. The proposed action would be determined a routine administrative function conducted by State or local governments, including prior existing uses, authorized uses, valid existing rights and existing infrastructure (i.e. rights-of-way for roads) that serve such a public purpose. vi. Exceptions to lands that are identified for retention in **Figure 2-12b** would be considered for disposal or exchange if they were identified for disposal through previous planning efforts, either as part of the due process of carrying out Congressional Acts (e.g., the respective Lincoln and White Pine County Conservation, Recreation, and Development Acts) and the agency can	In PHMA, GHMA, and OHMA, the State Director may grant an exception to the allocations and stipulations described in **Table 2-1**: Comparative Summary of Alternatives if one of the following applies (in coordination with NDOW, SETT, and/or CDFW): i. The location of the proposed activity is determined to be unsuitable (by a biologist with Greater Sage-Grouse experience using methods such as Stiver et. al. 2015); lacks the ecological potential to become marginal or suitable habitat; and would not result in direct, indirect, or cumulative impacts on Greater Sage-Grouse and its habitat. Management allocation decisions would not apply to those areas determined to be unsuitable because the area lacks the ecological potential to become marginal or suitable habitat; ii. The proposed activity's impacts could be offset to result in no adverse impacts on Greater Sage-Grouse or its habitat, through use of the mitigation hierarchy consistent with Federal law and the state's mitigation policies and programs. In cases where exceptions may be granted for projects with a residual impact, voluntary compensatory mitigation consistent with the State's management goals could be one mechanism by which a proponent achieves the RMPA goals, objectives, and exception criteria. When a proponent volunteer's compensatory mitigation as their chosen approach to address residual impacts, the BLM can incorporate those actions into the rationale used to grant an exception. The final decision to grant a waiver, exception, or modification would be based, in part, on criteria consistent with the state's Greater Sage-Grouse management plans and policies. iii. The proposed activity would be authorized to address public health and safety concerns, specifically as they relate to federal, state, local government and national priorities. iv. Renewals or re-authorizations of existing infrastructure in previously disturbed sites or expansions of existing infrastructure that do not result in direct, indirect, or cumulative impacts on Greater Sage-Grouse and its habitat. v. The proposed activity would be determined a routine administrative function conducted by federal, state or local governments, including prior existing uses, authorized uses,

Topic	2015 ARMPA Decision Number	No-Action Alternative	Management Alignment Alternative	Proposed Plan Amendment
Allocation Exception Process (*continued*)	(*see above*)	the date of this RMP amendment. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts (see **Appendix G** [of the 2015 ARMPA]). Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other Greater Sage-Grouse expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publicly available at least quarterly. (Wind Energy) Within PHMA, wind facilities associated with existing industrial infrastructure (e.g., a mine site) to provide on-site power generation could be considered for approval, subject to a net conservation gain. (Land Tenure) Lands classified as PHMA and GHMA for Greater Sage-Grouse will be retained in federal management, unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to Greater Sage-Grouse or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse (see **Appendix A**, **Figure 2-12**). (Recreation) In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development will have a net conservation gain to Greater Sage-Grouse and its habitat (such as concentrating recreation, diverting use away from critical areas, etc.), or unless the development is required for visitor health and safety or resource protection.	demonstrate that the disposal, including land exchanges, would have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse or can achieve a net conservation gain through the use of compensatory mitigation.	valid existing rights and existing infrastructure (i.e., rights-of-way for roads) that serve a public purpose and would have no adverse impacts on Greater Sage-Grouse and its habitat, consistent with the state's mitigation policies and programs. vi. Exceptions to lands that are identified for retention in **Figure 2-12b** would be considered for disposal or exchange if they were identified for disposal through previous planning efforts, either as part of the due process of carrying out Congressional Acts (e.g., the respective Lincoln and White Pine County Conservation, Recreation, and Development Acts) or the agency can demonstrate that the disposal, including land exchanges, would have no direct, indirect or cumulative impacts on Greater Sage-Grouse and its habitat.

Topic	2015 ARMPA Decision Number	No-Action Alternative	Management Alignment Alternative	Proposed Plan Amendment
Issue: Seasonal Timing Restrictions • Alignment with State of Nevada's conservation plan and management strategies with the State of California, to the greatest extent possible • Consider exceptions and/or modifications to seasonal timing restrictions to allow for beneficial or neutral projects to occur in a timely manner • Seasonal timing restrictions need to be adjusted to allow for public health and safety concerns and time sensitive administrative functions that serve a public purpose to be addressed without delay				
Seasonal Timing Restrictions	MD SSS 2E MD SSS 3D Appendix G [of the 2015 ARMPA]	Seasonal restrictions will be applied during the periods specified below to manage discretionary surface-disturbing activities and uses on public lands (i.e., anthropogenic disturbances) that are disruptive to Greater Sage-Grouse, to prevent disturbances to Greater Sage-Grouse during seasonal life-cycle periods. 1. In breeding habitat within 4 miles of active and pending Greater Sage-Grouse leks from March 1 through June 30: a. Lek—March 1 to May 15 b. Lek hourly restrictions—6 p.m. to 9 a.m. c. Nesting—April 1 to June 30 2. Brood-rearing habitat from May 15 to September 15 a. Early—May 15 to June 15 b. Late—June 15 to September 15 3. Winter habitat from November 1 to February 28 The seasonal dates may be modified due to documented local variations (e.g., higher/lower elevations) or annual climatic fluctuations (e.g., early/late spring, long/heavy winter), in coordination with NDOW and California Department of Fish and Wildlife (CDFW), in order to better protect Greater Sage-Grouse and its habitat. Footnote: The conditions would not be applicable to vegetation treatments being conducted to enhance Greater Sage-Grouse habitat, with exceptions for seasonal restrictions and noise.	Same as the No-Action Alternative, except: The seasonal dates could be modified or waived (in coordination with NDOW and/or CDFW) based on site-specific information that indicates: i. A project proposal's NEPA document and/or project record, and correspondence from NDOW and/or CDFW, demonstrates that any modification (shortening/extending seasonal timeframes or waiving the seasonal timing restrictions all together) is justified on the basis that it serves to better protect or enhance Greater Sage-Grouse and its habitat than if the strict application of seasonal timing restrictions are implemented. Under this scenario modification can occur if: a) A proposed authorization would have beneficial or neutral impacts on Greater Sage-Grouse. b) There are documented local variations (e.g., higher/lower elevations) and/or annual climatic fluctuations (e.g., early/late spring, long/heavy winter) that indicate the seasonal life cycle periods are different than presented, or that Greater Sage-Grouse are not using the area during a given seasonal life cycle period. ii. Modifications are needed to address an immediate public health and safety concern in a timely manner (e.g. maintaining a road impacted by flooding).	Same as the No-Action Alternative, except: The seasonal dates could be modified or waived (in coordination with NDOW and/or CDFW) based on site-specific information that indicates: i. A project proposal's NEPA document and/or project record, and correspondence from NDOW and/or CDFW, demonstrates that any modification (shortening/extending seasonal timeframes or waiving the seasonal timing restrictions all together) is justified on the basis that it serves to better protect or enhance Greater Sage-Grouse and its habitat than if the seasonal timing restrictions are implemented. Under this scenario modification can occur if: a) A proposed activity would have beneficial or neutral impacts on Greater Sage-Grouse. b) Topography or other factors eliminate direct and indirect impacts from visibility and audibility to Greater Sage-Grouse and its habitat. c) There are documented local variations (e.g., higher/lower elevations) and/or annual climatic fluctuations (e.g., early/late spring, long/heavy winter) that indicate the seasonal life cycle periods are different than presented, or that Greater Sage-Grouse are not using the area during a given seasonal life cycle period. ii. Modifications are needed to address an immediate public health and safety concern in a timely manner (e.g., maintaining a road impacted by flooding). iii. The proposed action would be determined a routine administrative function conducted by federal, state or local governments, including prior existing uses, authorized uses, valid existing rights and existing infrastructure (i.e., rights-of-way for roads) that serve a public purpose and would have no adverse impacts on Greater Sage-Grouse or its habitat.

Topic	2015 ARMPA Decision Number	No-Action Alternative	Management Alignment Alternative	Proposed Plan Amendment
ISSUE: Modifying Habitat Objectives • Consideration of site potential based on Ecological Site Descriptions, State and Transition Models, etc. • Consistency with State of Nevada's Desired Habitat Conditions • Incorporation of best available current science supporting modifications. • Clarify that Habitat Objectives are actually desired outcomes expressed as goals consistent with BLM Planning Handbook (H-1601-1).				
Modifying Habitat Objectives	No similar action.	No similar action.	The Habitat Objectives table in the 2015 Final EIS would be revised to incorporate best available science in coordination with representatives from the SETT, USFWS, NDOW, CDFW, USFS, USGS, and BLM. The team would review and incorporate the best available science and would recommend adjustments based on regionally and locally derived data. As these habitat objectives are updated, adjustments would be made by the BLM through plan maintenance. The Habitat Objectives table in the 2015 Final EIS would be implemented following this guidance: The Habitat Objectives table in the 2015 Final EIS are desired habitat conditions that are broad goals based on habitat selection that may not be achievable in all areas. Objectives should be based on sources such as ecological site descriptions, associated state-and-transition models.	The Habitat Objectives table in the 2015 Final EIS would be revised to incorporate best available science in coordination with the SETT, USFWS, NDOW, CDFW, USFS, USGS, University of Nevada, Reno, University of California, and appropriate local agencies, and BLM. The team would review and incorporate the best available science and would recommend adjustments based on locally derived data. As the Habitat Objectives (Table 2-2 of the 2015 Final EIS) are updated, adjustments would be made by the BLM through plan maintenance or amendment, as appropriate. The Habitat Objectives (Table 2-2) in the 2015 Final EIS would be implemented following this guidance: The Habitat Objectives (Table 2-2) in the 2015 Final EIS are desired habitat conditions that are broad goals based on Greater Sage-Grouse habitat selection that may not be achievable in all areas. The ability of a site to achieve the objectives should be based on site potential, ecological site descriptions, state-and-transition models, etc.

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Table 2-2c. Alternatives analyzed in detail during the 2015 planning effort and incorporated into the 2019 process. **Table 2-2c** is in two parts. Part I are the LUP Description of Alternative Goals and Objectives analyzed in 2015 and Part II are the Management Actions analyzed in 2015.

Part I Goals and Objectives

Table 2-2c (Part 1)
Description of Alternative Goals and Objectives

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Special Status Species (Greater Sage-Grouse)					
Goal A-SSS 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-SSS 1: Maintain and/or increase Greater Sage-Grouse abundance and distribution by conserving, enhancing or restoring the sagebrush ecosystem upon which populations depend in cooperation with other conservation partners.	Goal C-SSS 1: Same as Alternative A.	Goal D-SSS 1: Maintain and/or increase abundance and distribution of Greater Sage-Grouse on BLM-administered and National Forest System lands by conserving, enhancing, or restoring the sagebrush ecosystem upon which populations depend, in cooperation with other conservation partners. Manage activities and authorizations on public lands to reduce predation of Greater Sage-Grouse on public lands.	Goal E-SSS 1: The State's goal for the conservation of Greater Sage-Grouse in the State of Nevada is to provide for long-term conservation by protecting the sagebrush ecosystem upon which the species depends. Redundant, representative, and resilient populations of Greater Sage-Grouse will be maintained through amelioration of threats; enhancement and protection of key habitats; mitigation for loss of habitat due to anthropogenic disturbances; and restoration or rehabilitation of habitat degraded or lost due to Acts of Nature.	Goal F-SSS 1: Maintain and increase current Greater Sage-Grouse abundance and distribution by conserving, enhancing or restoring the sagebrush ecosystem.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Goal A-SSS 2: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-SSS 2: —[1]	Goal C-SSS 2: —	Goal D-SSS 2: Manage activities and authorizations on public lands to reduce predation of Greater Sage-Grouse on public lands.	Goal E-SSS 2: TMA-9: Implement a predator control program to reduce transient raven populations for nest protection and increased chick survival throughout the interim period while habitat enhancement and restoration projects become established. Greater Sage-Grouse population, nest success, and recruitment goals should be established for the SGMA (State of Nevada 2014). Focus on a six-point plan that is summarized here and expanded below. 1. Control access to garbage dumps and landfills. 2. Control access to road kill. 3. Control access to abandoned animal carcasses. 4. Control access to artificial nesting and roosting structures. 5. Ensure adequate nesting cover for Greater Sage-Grouse. 6. Increase site-specific take of ravens.	Goal F-SSS 2: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-SSS 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-SSS 1: —	Objective C-SSS 1: —	Objective D-SSS 1: Ensure that authorizations include stipulations and design features to reduce or eliminate opportunities to attract and provide nesting, cover, or perches for predators in PHMA and GHMA.	Objective E-SSS 1: If impacts are not avoided, the adverse effects will need to be both minimized and mitigated. Impacts will be minimized by modifying proposed actions and developing permit conditions with measures to lessen the adverse effects to Greater Sage-Grouse and their habitat. This will be accomplished through Site-Specific Consultation-Based Design Features (see Appendix D [of the 2015 Final EIS]).	Objective F-SSS 1: —	
Objective A-SSS 2: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-SSS 2: —	Objective C-SSS 2: —	Objective D-SSS 2: —	Objective E-SSS 2: —	Objective F-SSS 2: Restore and maintain sagebrush steppe to its ecological potential in PHMA and GHMA.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-SSS 3: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-SSS 3: —	Objective C-SSS 3: —	Objective D-SSS 3: Manage land resource uses to meet Greater Sage-Grouse habitat objectives as described in Table 2-11 in section 2.8.5 of this Chapter.	Objective E-SSS 3: Maintain and manage Greater Sage-Grouse habitat across the sagebrush ecosystem in the state. The habitat objectives (see Table 2-2) will be used to evaluate management actions that are proposed in Greater Sage-Grouse habitat to ensure that habitat conditions are maintained if currently meeting objectives; or habitat conditions are making progress toward these objectives if the current conditions do not meet these objectives.	Objective F-SSS 3: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-SSS 4: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-SSS 4: Protect PHMA from anthropogenic disturbances that will reduce distribution or abundance of Greater Sage-Grouse.	Objective C-SSS 4: Same as Alternative A.	Objective D-SSS 4: Manage land and resource uses to conserve local Greater Sage-Grouse populations, sagebrush communities and landscapes, and protect Greater Sage-Grouse PHMA and GHMA from anthropogenic disturbances that would reduce distribution or abundance of Greater Sage-Grouse.	Objective E-SSS 4: The overarching objective of the State of Nevada's plan is to achieve a net conservation gain to Greater Sage-Grouse habitat within the SGMA in order to stop the decline of Greater Sage-Grouse populations. Net conservation gain is defined as the State's objective to maintain the current quantity and quality of Greater Sage-Grouse habitat within the SGMA at the state-wide level by protecting existing Greater Sage-Grouse habitat or by mitigating for loss due to anthropogenic disturbances. Mitigation requirements are determined by the Conservation Credit System. This objective will be measured by the credit to debit ratio.	Objective F-SSS 4: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Sub-Objective A-SSS 1: No common sub-objective across LUPs within the sub-region. See Section 2.10.1.	Sub-Objective B-SSS 1: Designate Greater Sage-Grouse PHMA for each WAFWA management zone (Stiver et al. 2006) across the current geographic range of Greater Sage-Grouse that are large enough to stabilize populations in the short term and enhance populations over the long term.	Sub-Objective C-SSS 1: —	Sub-Objective D-SSS 1: —	Sub-Objective E-SSS 1: —	Sub-Objective F-SSS 1: —
Sub-Objective A-SSS 2: No common sub-objective across LUPs within the sub-region. See Section 2.10.1.	Sub-Objective B-SSS 2: To maintain or increase current populations, manage or restore priority areas so that at least 70% of the land cover provides adequate sagebrush habitat to meet Greater Sage-Grouse needs.	Sub-Objective C-SSS 2: —	Sub-Objective D-SSS 2: Manage for no net unmitigated loss of PHMA and maintain or improve current habitat conditions to meet Greater Sage-Grouse life history needs.	Sub-Objective E-SSS 2: The overarching objective of the State of Nevada's plan is to achieve a net conservation gain to Greater Sage-Grouse habitat within the SGMA in order to stop the decline of Greater Sage-Grouse populations.	Sub-Objective F-SSS 2: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Sub-Objective A-SSS 3: No common sub-objective across LUPs within the sub-region. See Section 2.10.1.	Sub-Objective B- SSS 3: Develop quantifiable habitat and population objectives with WAFWA and other conservation partners at the management zone and/or other appropriate scales. Develop a monitoring and adaptive management strategy to track whether these objectives are being met, and allow for revisions to management approaches if they are not.	Sub-Objective C-SSS 3: —	Sub-Objective D-SSS 3: —	Sub-Objective E-SSS 3: —	Sub-Objective F-SSS 3: —
Sub-Objective A-SSS 4: No common sub-objective across LUPs within the sub-region. See Section 2.10.1.	Sub-Objective B-SSS 4: Manage Greater Sage-Grouse PHMA so that discrete anthropogenic disturbances cover less than 3% of the total Greater Sage-Grouse habitat regardless of ownership. Anthropogenic features include but are not limited to paved highways, graded gravel roads, transmission lines, substations, wind turbines, oil and gas wells, geothermal wells and associated facilities,	Sub-Objective C-SSS 4: —	Sub-Objective D-SSS 4: Implement program specific management actions to eliminate or minimize anthropogenic disturbances that threaten Greater Sage-Grouse and its habitat.	Sub-Objective E-SSS 4: The State of Nevada's overriding policy for all management actions within the SGMA is to "avoid, minimize, and mitigate" impacts on Greater Sage-Grouse habitat. This is a fundamental hierarchical decision process that seeks to: <u>Avoid</u> – Eliminate conflicts by relocating disturbance activities outside of Greater Sage-Grouse habitat in order to conserve Greater Sage-Grouse and their habitat. Avoidance of a disturbance within Greater Sage-Grouse	Sub-Objective F-SSS 4: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	pipelines, landfills, homes, and mines. • In PHMA where the 3% disturbance cap is already exceeded from any source, no further anthropogenic disturbances will be permitted by BLM or Forest Service until enough habitat has been restored to maintain the area under this threshold (subject to valid existing rights). • In this instance, an additional objective will be designated for the priority area to prioritize and reclaim/restore anthropogenic disturbances so that 3% or less of the total PHMA is disturbed within 10 years.	(*see above*)	(*see above*)	habitat is the preferred option. <u>Minimize</u> –If impacts are not avoided, the adverse effects will need to be both minimized and mitigated. Impacts will be minimized by modifying proposed actions and/ or developing permit conditions to include measures that lessen the adverse effects to Greater Sage-Grouse and their habitat. This will be accomplished through Site-Specific Consultation-Based Design Features, such as reducing the disturbance footprint, seasonal use limitations, and co-location of structures. Minimization does not preclude the need for mitigation of a disturbance. Any disturbance in habitat within the SGMA will require both minimization and mitigation. <u>Mitigate</u> – If impacts are not avoided, after required minimization measures are specified, residual adverse effects on designated Greater Sage-Grouse habitat are required to be offset by implementing mitigation actions that will result in replacement or enhancement	(*see above*)

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	(*see above*)	(*see above*)	(*see above*)	of the Greater Sage-Grouse habitat to balance the loss of habitat from the disturbance activity. This will be accomplished through the Conservation Credit System.	(*see above*)
Sub-Objective A-SSS 5: No common sub-objective across LUPs within the sub-region. See Section 2.10.1.	Sub-Objective B-SSS 5: Quantify and delineate GHMA for capability to provide connectivity among priority areas (Knick and Hanser 2011).	Sub-Objective C-SSS 5: —	Sub-Objective D-SSS 5: Maintain or improve connectivity to and within PHMA to promote movement and genetic diversity for population persistence and expansion.	Sub-Objective E-SSS 5: —	Sub-Objective F-SSS 5: —
Sub-Objective A-SSS 6: No common sub-objective across LUPs within the sub-region. See Section 2.10.1.	Sub-Objective B-SSS 6: Conserve, enhance or restore Greater Sage-Grouse habitat and connectivity (Knick and Hanser 2011) to promote movement and genetic diversity, with emphasis on those Greater Sage-Grouse occupied habitat.	Sub-Objective C-SSS 6: —	Sub-Objective D-SSS 6: Maintain or improve connectivity to and within GHMA to promote movement and genetic diversity for population persistence and expansion.	Sub-Objective E-SSS 6: —	Sub-Objective F-SSS 6: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Sub-Objective A-SSS 7: No common sub-objective across LUPs within the sub-region. See Section 2.10.1.	Sub-Objective SSS 7: Assess GHMA to determine potential to replace lost PHMA caused by perturbations and/or disturbances and provide connectivity (Knick and Hanser 2011) between priority areas. • These habitats should be given some priority over other GHMA that provide marginal or substandard Greater Sage-Grouse habitat. • Restore historical habitat functionality to support Greater Sage-Grouse populations guided by objectives to maintain or enhance connectivity. Total area and locations will be determined at the LUP level. • Enhance GHMA such that population declines in one area are replaced elsewhere within the habitat.	Sub-Objective C-SSS 7: —	Sub-Objective D-SSS 7: —	Sub-Objective E-SSS 7: —	Sub-Objective F-SSS 7: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Adaptive management					
Goal A-SSS-AM 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-SSS-AM 1: —	Goal C-SSS-AM 1: —	Goal D-SSS-AM 1: Ensure additional PHMA and GHMA is identified based upon new science, monitoring of PHMA and GHMA.	Goal E-SSS-AM 1: The Nevada Sagebrush Ecosystem Council, through field verifications and recommendations from the Nevada Sagebrush Ecosystem Technical Team based on the best available science, will further refine the area identified as suitable habitat. The Council will also refine the management categories within the SGMA.	Goal F-SSS-AM 1: —
Goal A-SSS-AM 2: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B- SSS-AM 2: —	Goal C-SSS-AM 2: —	Goal D-SSS-AM 2: Promote a collaborative and integrated approach to Greater Sage-Grouse conservation among federal, tribal, state, and county agencies, as well as private landowners and organizations, permit holders and other public land users.	Goal E-SSS-AM 2: Due to the broad reach of Greater Sage-Grouse habitat, effective management and implementation of Greater Sage-Grouse conservation actions must be conducted through a collaborative, interagency approach that engages private, non-governmental, local, state, tribal, and federal stakeholders to achieve sufficient conservation of the Greater Sage-Grouse and their habitat.	Goal F-SSS-AM 2: —
Objective A-SSS-AM 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-SSS-AM 1: —	Objective C-SSS-AM 1: —	Objective D-SSS-AM 1: In PHMA where large scale disturbance has occurred, manage adjoining GHMA as PHMA.	Objective E-SSS-AM 1: —	Objective F-SSS-AM 1: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Objective A-SSS-AM 2: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-SSS-AM 2: —	Objective C-SSS-AM 2: —	Objective D-SSS-AM 2: Identify and implement additional Greater Sage-Grouse conservation actions that can augment, enhance, and/or integrate program conservation measures established in agency and state land use and policy plans.	Objective E-SSS-AM 2: —	Objective F-SSS-AM 2: —
Disease					
Goal A-SSS-D 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-SSS-D 1: —	Goal C-SSS-D 1: —	Goal D-SSS-D 1: Manage activities and authorizations on public lands to minimize opportunities to establish or enable disease vectors that could affect Greater Sage-Grouse populations.	Goal E-SSS-D 1: —	Goal F-SSS-D 1: —
Objective A-SSS-D 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B- SSS-D 1: —	Objective C-SSS-D 1: —	Objective D-SSS-D 1: Monitor trends in West Nile Virus spread within the sub-region to determine if mitigation or additional RDFs need to be applied (consistent with applicable law) to use authorizations.	Objective E-SSS-D 1: —	Objective F- SSS-D 1: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Administrative Collaboration and decision making						
Goal A-SSS-ACDM 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-SSS-ACDM 1: —	Goal C-SSS-ACDM 1: —	Goal D-SSS-ACDM 1: —	Goal E-SSS-ACDM 1: The overarching objective of the State of Nevada's plan is to achieve a net conservation gain to Greater Sage-Grouse habitat within the SGMA in order to stop the decline of Greater Sage-Grouse populations.	Goal F-SSS-ACDM 1: —	
Objective A-SSS-ACDM 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-SSS-ACDM 1: —	Objective C-SSS-ACDM 1: —	Objective D-SSS-ACDM 1: —	Objective E-SSS-ACDM 1: The State of Nevada's overriding policy for all management actions within the SGMA is to "avoid, minimize, and mitigate" impacts on Greater Sage-Grouse habitat.	Objective F-SSS-ACDM 1: —	
Objective A-SSS-ACDM 2: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-SSS-ACDM 2: —	Objective C-SSS-ACDM 2: No similar objective.	Objective D-SSS-ACDM 2: —	Objective E-SSS-ACDM 2: —	Objective F-SSS-ACDM 2: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Opportunities for Proactive Measures						
Goal A-SSS-OPM 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-SSS-OPM 1: —	Goal C-SSS-OPM 1: —	Goal D-SSS-OPM 1: Promote a collaborative and integrated approach to Greater Sage-Grouse conservation among federal, tribal, state, and county agencies, as well as private landowners and organizations, permit holders and other public land users.	Goal E-SSS-OPM 1: Due to the broad reach of Greater Sage-Grouse habitat, effective management and implementation of Greater Sage-Grouse conservation actions must be conducted through a collaborative, interagency approach that engages private, non-governmental, local, state, tribal, and federal stakeholders to achieve sufficient conservation of the Greater Sage-Grouse and their habitat.	Goal F-SSS-OPM 1: —	
Objective A-SSS-OPM 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-SSS-OPM 1: —	Objective C-SSS-OPM 1: —	Objective D-SSS-OPM 1: Identify and implement additional Greater Sage-Grouse conservation actions that can augment, enhance, and/or integrate program conservation measures established in agency and state land use and policy plans.	Objective E-SSS-OPM 1: —	Objective F-SSS-OPM 1: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Habitat Restoration/Vegetation Management					
Goal A-VEG 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-VEG 1: —	Goal C-VEG 1: —	Goal D-VEG 1: Establish and maintain a resilient sagebrush vegetative community and restore sagebrush vegetation communities to reduce Greater Sage-Grouse habitat fragmentation and maintain or re-establish Greater Sage-Grouse habitat connectivity over the long-term.	Goal E-VEG 1: (Long-term Goal) Maintain an ecologically healthy and intact sagebrush ecosystem that is resistant to the invasion of non-native species and resilient after disturbances such as wildfire.	Goal F-VEG 1: —
Goal A-VEG 2: —	Goal B-VEG 2: —	Goal C-VEG 2: —	Goal D-VEG 2: —	Goal E-VEG 2: (Long-term Goal) Restore wildfire return intervals to within a spatial and temporal range of variability that supports sustainable populations of Greater Sage-Grouse and other sagebrush obligate species.	Goal F-VEG 2: —
Goal A-VEG 3: —	Goal B-VEG 3: —	Goal C-VEG 3: —	Goal D-VEG 3: —	Goal E-VEG 3: (Short-term Goal) Reduce the amount of Greater Sage-Grouse habitat loss due to large acreage wildfires and invasion by non-native species.	Goal F-VEG 3: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-VEG 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-VEG 1: N—	Objective C-VEG 1: —	Objective D-VEG 1: In PHMA and GHMA including riparian, manage for vegetation composition and structure consistent with ecological site potential and to achieve Greater Sage-Grouse seasonal habitat objectives (see Table 2-11 in section 2.8.5 of this Chapter).	Objective E-VEG 1: In Core, Priority, and General Management Areas, including riparian areas, manage for vegetation composition and structure consistent with ecological site potential and where possible to achieve Greater Sage-Grouse seasonal habitat objectives (see Table 2-2).	Objective F-VEG 1: —	
Objective A-VEG 2: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-VEG 2: —	Objective C-VEG 2: —	Objective D-VEG 2: Focus and prioritize habitat restoration to address identified threats at the Sub-Population and Population scale.	Objective E-VEG 2: —	Objective F-VEG 2: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-VEG 3: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-VEG 3: —	Objective C-VEG 3: —	Objective D-VEG 3: Focus rehabilitation efforts on re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential.	Objective E-VEG 3: Ecological site descriptions and associated state and transition models will be used to identify target areas for resiliency enhancement and restoration. Maintaining and enhancing resilience should be given top priority. In the Great Basin sagebrush-bunchgrass communities, invasion resistance and successional resilience following disturbance are functions of a healthy perennial bunchgrass component. A combination of active and passive management will be required to ensure this functionality. Areas that are in an invaded state that will likely transition to an annual grass monoculture if a disturbance occurs and are located within or near Greater Sage-Grouse habitat should be prioritized for restoration efforts to increase resistance and resilience.	Objective F-VEG 3: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-VEG 4: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-VEG 4: —	Objective C-VEG 4: —	Objective D-VEG 4: Restore native (or desirable) plants and create landscape patterns (e.g., seral stage and spatial distribution) which most benefit Greater Sage-Grouse .	Objective E-VEG 4: —	Objective F-VEG 4: —	
Objective A-VEG 5: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-VEG 5: —	Objective C-VEG 5: —	Objective D-VEG 5: Within PHMA and GHMA manage lotic and lentic riparian areas to maintain a component of perennial forbs with diverse species richness and maintain suitable cover; manage associated upland habitat to promote adjacent cover relative to site potential to facilitate brood rearing (See Table 2-11 in section 2.8.5 of this Chapter).	Objective D-VEG 5: Within Core, Priority, and General Management Areas, manage lotic and lentic riparian areas to maintain a component of perennial forbs with diverse species richness and maintain suitable cover. Manage associated upland habitat to promote adjacent cover relative to site potential to facilitate brood rearing (See Table 2-2).	Objective F-VEG 5: —	
Objective A-VEG 6: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-VEG 6: —	Objective C-VEG 6: —	Objective D-VEG 6: Manage lentic riparian (i.e. seeps, springs, and wet meadows) to meet Greater Sage-Grouse cover and food objectives in PHMA and GHMA.	Objective D-VEG 6: Manage lentic riparian (e.g. seeps, springs, and wet meadows) to meet or be trending toward Greater Sage-Grouse cover and food objectives (see Table 2-2) in Core, Priority, and General Management Areas.	Objective F-VEG 6: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Integrated Invasive Species Management						
Objective V A-EG-ISM 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-VEG-ISM 1: —	Objective C-VEG-ISM 1: —	Objective D-VEG-ISM 1: —	Objective E-VEG-ISM 1: Restore ecologically functioning sagebrush ecosystems in Greater Sage-Grouse habitat already compromised by invasion. Restoration may include revegetating sites with native plants cultivated locally or locally adapted, non-native plant species where appropriate.	Objective F-VEG-ISM 1: Develop and implement methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants.	
Objective A-VEG-ISM 2: —	Objective B-VEG-ISM 2: —	Objective C-VEG-ISM 2: —	Objective D-VEG-ISM 2: —	Objective E-VEG-ISM 2: Prevent the establishment of invasive species in uninvaded Greater Sage-Grouse habitat. This will be achieved by conducting systematic and strategic detection surveys, data collection, and mapping of these areas and engaging in early response efforts if invasion occurs. This will be achieved by further developing federal and state partnerships and working with local groups, such as Weed Control Districts, Cooperative Weed Management Areas, and Conservation Districts. This is the highest priority for the State of Nevada.	Objective F-VEG-ISM 2: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-VEG-ISM 3: —	Objective B-VEG-ISM 3: —	Objective C-VEG-ISM 3: —	Objective D-VEG-ISM 3: —	Objective E-VEG-ISM 3: Control invasive species infestations in Greater Sage-Grouse habitat already compromised by invasion. Control techniques may include: biomass removal by means such as strategic and targeted grazing, mowing, or using herbicides. In addition, the state will continue to support research in the development of biological control agents and deploy emerging technologies in Nevada as they become available.	Objective F-VEG-ISM 3: —	
Objective A-VEG-ISM 4: —	Objective B-VEG-ISM 4: —	Objective C-VEG-ISM 4: —	Objective D-VEG-ISM 4: —	Objective E-VEG-ISM 4: Monitor and adaptively manage to ensure effectiveness of efforts to prevent, control, and restore.	Objective F-VEG-ISM 4: —	
Climate Change						
Goal A-VEG-CC 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-VEG-CC 1: —	Goal C-VEG-CC 1: —	Goal D-VEG-CC 1: Use the landscape approach and promote landscape scale, ecosystem based actions to enhance resiliency and sustainability of Greater Sage-Grouse habitat to climate stress.	Goal E-VEG-CC 1:—	Goal F-VEG-CC 1: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-VEG-CC 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-VEG-CC 1: —	Objective C-VEG-CC 1: —	Objective D-VEG-CC 1: Focus treatments to restore connectivity and habitat in fragmented areas where natural recovery or restoration treatments have a moderate to high record of success and have a stable bio-climate forecast.	Objective E-VEG-CC 1: —	Objective F-VEG-CC 1: —	
Objective A-VEG-CC 2: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-VEG-CC 2: —	Objective C-VEG-CC 2: —	Objective D-VEG-CC 2: Manage risks associated with landscape stressors of drought, invasive species, and wildfire exacerbated by climate change to maintain existing Greater Sage-Grouse habitat.	Objective E-VEG-CC 2: —	Objective F-VEG-CC 2: —	
Drought						
Goal A-VEG-D 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-VEG-D 1: —	Goal C-VEG-D 1: —	Goal D-VEG-D 1: Manage sagebrush ecosystems in a manner that maintains adequate forage and water for wildlife species during periods of drought.	Goal E-VEG-D 1: —	Goal F-VEG-D 1: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Objective A-VEG-D 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-VEG-D 1: —	Objective C-VEG-D 1: —	Objective D-VEG-D 1: Ensure authorized activities and uses do not result in degradation or net loss of PHMA during periods of drought through application of appropriate drought mitigation measures, such as ensuring adequate residual cover is available for nesting birds.	Objective E-VEG-D 1: —	Objective F-VEG-D 1: —
Wild Horses and Burros					
Goal A- WHB 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-WHB 1: —	Goal C-WHB 1: —	Goal D-WHB 1: Manage active HMAs and HAs and WHBTs to achieve Greater Sage-Grouse habitat objectives in PHMA and GHMA.	Goal E-WHB 1: Support, promote, and facilitate: • Full implementation of the Wild Free-Roaming Horses and Burros Act of 1971 as amended, including preserving and maintaining a thriving natural ecological balance and multiple-use relationship, without alternation of its implementation by subsequent Congresses or Presidential administrations. • Maintaining healthy and diverse wild horse and burro populations in the State of Nevada in a manner that meets or is trending toward Greater Sage-Grouse habitat objectives (see Table 2-2).	Goal F-WHB 1: Reduce AMLs within HMAs and WHBTs within occupied Greater Sage-Grouse habitat by 25% to meet habitat objectives. —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	(*see above*)	(*see above*)	(*see above*)	• Focusing expenditures of appropriated funds on management of wild horses and burros on public lands over care in captivity. • Acknowledging that, if action is not taken until herd health has become an issue, the range and water resources are likely to be in a highly degraded and potentially irreversible state. Non-active management (e.g., let nature take its course, wait until horse health or resource conditions are critical) is not acceptable management. • Recognizing that non-management is not acceptable, avoid negative or potentially irreversible consequences that will occur within the SGMA due to non-active management. Use all tools available and actively manage wild horses and burros within HMAs and WHBTs.	(*see above*)

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Goal A-WHB 2: —	Goal B-WHB 2: —	Goal C-WHB 2: —	Goal D-WHB 2: —	Goal E-WHB 2: As authorized in the Wild Free-Roaming Horses and Burros Act of 1971 achieve and maintain wild horses and burros at or below established AMLs within the SGMA and mange for zero horse populations in non-designated areas within the SGMA to reduce impacts on Greater Sage-Grouse habitat.	Goal F-WHB 2: —
Goal A-WHB 3: —	Goal B-WHB 3: —	Goal C-WHB 3: —	Goal D-WHB 3: —	Goal E-WHB 3: Strive to resolve the conflicts between the Endangered Species Act and the implementation of the Wild and Free Roaming Horse and Burro Act to ensure maintenance of Greater Sage-Grouse habitat.	Goal F-WHB 3: —
Objective A-WHB 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-WHB 1: —	Objective C-WHB 1: —	Objective D-WHB 1: Establish or adjust AML within HMAs, HAs, and Forest Service WHBTs within PHMA and GHMA that consider the life cycle requirements for Greater Sage-Grouse populations in terms of forage and nesting cover.	Objective E-WHB-1: Meet established AML levels in all HMAs and WHBTs in Core, Priority, and General Management Areas within 5 years.	Objective F-WHB 1: Reduce AMLs within HMAs, HAs, and WHBTs within occupied Greater Sage-Grouse habitat by 25% to meet habitat objectives.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Objective A-WHB 2: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-WHB 2: Manage wild horse and burro population levels within established AMLs.	Objective C-WHB 2: Same as Alternative A.	Objective D-WHB 2: Manage wild horse and burro population levels in PHMA and GHMA within established AMLs to maintain or enhance Greater Sage-Grouse habitat objectives.	Objective E-WHB 2: TMA-11.2: Evaluate conflicts with HMA designations within the State's Core, Priority and General Management Areas and modify LUPs to avoid negative impacts on Greater Sage-Grouse .	Objective F-WHB 2: Reduce AMLs within HMAs, HAs, and WHBTs within occupied Greater Sage-Grouse habitat by 25% to meet habitat objectives.
Objective A-WHB 3: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-WHB 3: Prioritize gathers in PHMA, unless removals are necessary in other areas to prevent catastrophic environmental issues, including herd health impacts.	Objective C-WHB 3: Same as Alternative A.	Objective D-WHB 3: Prioritize gathers in HMAs, HAs and WHBTs to meet established AMLs in PHMA and GHMA, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts.	Objective E-WHB 3: Prioritize gathers for removal and population growth suppression techniques in HMAs, HAs, and WHBTs first within the State's Core, Priority and General Management Areas. Additional prioritization should be given for HMAs and WHBTs that are near AML or where a reduction would serve the most beneficial purpose. Proactively and adaptively manage herd sizes taking into consideration climate variability and other natural phenomena, similar to the restrictions placed on livestock managers.	Objective F-WHB 3: Same as Alternative B.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Fire and Fuels Management					
Goal A-FFM 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-FFM 1: —	Goal C-FFM 1: —	Goal D-FFM 1: Fire, pre-/post-fire suppression and fuels management would contribute to the protection of large, contiguous blocks of sagebrush habitat that support interconnecting Greater Sage-Grouse populations.	Goal E-FFM 1: (Long-term Goal) Restore wildfire return intervals to within a spatial and temporal range of variability that supports sustainable populations of Greater Sage-Grouse and other sagebrush obligate species.	Goal F-FFM 1: —
Goal A-FFM 2: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-FFM 2: —	Goal C-FFM 2: —	Goal D-FFM 2: Pre-suppression activities would provide conservation actions that identify and prioritize Greater Sage-Grouse habitats that are vulnerable to wildfire events and prescribe actions important for their protection.	Goal E-FFM 2: (Long-term Goal) Maintain an ecologically healthy and intact sagebrush ecosystem that is resistant to the invasion of non-native species and resilient after disturbances, such as wildfire.	Goal F-FFM 2: —
Goal A-FFM 3: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-FFM 3: —	Goal C-FFM 3: —	Goal D-FFM 3: Pre-suppression and suppression efforts would reduce the size and impact of wildfires on Greater Sage-Grouse and their habitat.	Goal E-FFM 3:—	Goal F-FFM 3: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Goal A-FFM 4: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-FFM 4: —	Goal C-FFM 4: —	Goal D-FFM 4: In PHMA and GHMA, design and implement emergency stabilization and rehabilitation treatments with an emphasis on restoring existing sagebrush ecosystems damaged by wildfires, including the control of invasive species.	Goal E-FFM 4:—	Goal F-FFM 4: —	
Goal A-FFM 5: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-FFM 5: —	Goal C-FFM 5: —	Goal D-FFM 5: In PHMA, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems and strategically and effectively reduce wildfire threats in the greatest area.	Goal E-FFM 5: Continue the construction of targeted, well designed fuel breaks and "green strips" to break up fuel continuity, reduce fire size, and create safe areas for fire suppression activities. Use the best adapted plant materials to revegetate green strips with fire resistant species. Fund and schedule regular maintenance activities of green strips as needed. Avoid locating fuel breaks in Greater Sage-Grouse habitat unless no other options are available that will result in the same level of habitat protection.	Goal F-FFM 5: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Objective A-FFM 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-FFM 1: —	Objective C-FFM 1: —	Objective D-FFM 1: Prioritize post-fire treatments in PHMA and GHMA to maximize benefits to Greater Sage-Grouse . Restoration focuses on restoring burned sagebrush areas with the appropriate cover and structure to support Greater Sage-Grouse populations.	Objective E-FFM 1: TMA-4.4: Continue identifying and obtaining funding opportunities from federal, state, local, industry and land users dedicated to implementing prioritized habitat enhancement, restoration, and conservation activities.	Objective F-FFM 1: —
Objective A-FFM 2: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-FFM 2: —	Objective C-FFM 2: —	Objective D-FFM 2: In PHMA and GHMA, minimize threats from invasive species.	Objective E-FFM 2: Prevent, Control, Restore, and Monitor invasive species within the SGMA.	Objective F-FFM 2: —
Objective A-FFM 3: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-FFM 3: —	Objective C-FFM 3: —	Objective D-FFM 3: Protect post-fire treatments in PHMA and GHMA from subsequent wildfires.	Objective E-FFM 3: —	Objective F-FFM 3: —
Objective A-FFM 4: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-FFM 4: —	Objective C-FFM 4: —	Objective D-FFM 4: Retain, protect, and improve intact, unburned sagebrush communities within burned areas.	Objective E-FFM 4: TMA-3.7: Within the State's Core, Priority and General Management Areas eliminate the tactic of "burning out," including backfiring unless there are direct life safety threats.	Objective F-FFM 4: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Objective A-FFM 5: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-FFM 5: —	Objective C-FFM 5: —	Objective D-FFM 5: Make progress toward desired future condition (DFC) in the low elevation shrub, mountain shrubs and pinyon and/or juniper vegetation types.	Objective E-FFM 5: TMA-2.2: Continue successful landscape level habitat assessments in, and in proximity to, the State's Core, Priority and General Management Areas to identify those habitat areas that are at the highest risk of wildland fire.	Objective F-FFM 5: —
Objective A-FFM 6: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-FFM 6: —	Objective C-FFM 6: —	Objective D-FFM 6: Design post-fuels management projects to ensure long-term persistence of seeded fuel breaks and green strips protecting native vegetation.	Objective E-FFM 6: TMA-2.8: Continue to successfully treat existing areas of invasive vegetative that pose a threat to within the State's Core, Priority and General Management Areas through the use of herbicides, fungicides or bacteria to control cheatgrass and medusahead infestations.	Objective F-FFM 6: —
Objective A-FFM 7: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-FFM 7: —	Objective C-FFM 7: —	Objective D-FFM 7: Provide for sufficient Unit staffing for initial attack response to wild land fires in PHMA and GHMA.	Objective E-FFM 7: TMA-3.4: Increase initial attack capability by training and equipping volunteer firefighters, as well as agricultural and other industry work forces for assignment during periods of high fire activity. Trained volunteers who are remotely located will serve as first responders when necessary and appropriate.	Objective F-FFM 7: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-FFM 8: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-FFM 8: —	Objective C-FFM 8: —	Objective D-FFM 8: Fire Management Plans reflect guidance for wildland fire suppression in PHMA and GHMA and take into consideration Greater Sage-Grouse sub-population areas.	Objective E-FFM 8: TMA-3.8: Designate Greater Sage-Grouse habitat in the SGMA as a "high priority value" for suppression resource allocation in the Geographical Area Coordination Centers and within the FEMA Fire Management Assistance Grant criteria.	Objective F-FFM 8: —	
Livestock Grazing						
Goal A-LG 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-LG 1: —	Goal C-LG 1: —	Goal D-LG 1: Manage livestock grazing to maintain and/or enhance PHMA and GHMA to meet all life cycle requirements of the Greater Sage-Grouse during permit administration.	Goal E-LG 1: Ensure that existing grazing permits maintain or enhance Greater Sage-Grouse habitat. Utilize livestock grazing when appropriate as a management tool to improve Greater Sage-Grouse habitat quantity, quality, or to reduce wildfire threats. Based on a comprehensive understanding of seasonal Greater Sage-Grouse habitat requirements, and in conjunction with the need for flexibility in livestock operations, cooperatively make timely, seasonal range management decisions to meet vegetation management objectives, including fuels reduction.	Goal F-LG 1: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Objective A-LG 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-LG 1: —	Objective C-LG 1: —	Objective D-LG 1: In PHMA and GHMA, manage for vegetation composition and structure consistent with ecological site potential to achieve Greater Sage-Grouse seasonal habitat objectives (see Table 2-11 in section 2.8.5 of this Chapter).	Objective E-LG 1: In Greater Sage-Grouse habitat, manage for vegetation composition and structure that achieves Greater Sage-Grouse seasonal habitat objectives (see Table 2-2), enhancing resilience and resistance based on the ability of the ecological site to respond to management. This objective recognizes spatial and temporal variations across seral stages.	Objective F -LG 1: —
Objective A-LG 2: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-LG 2: —	Objective C-LG 2: —	Objective D-LG 2: Manage lentic and lotic riparian areas in PHMA and GHMA to maintain a component of perennial forbs with diverse species richness and maintain suitable cover; manage adjacent upland habitat to promote adjacent cover relative to site potential to facilitate brood rearing (see Table 2-11 in section 2.8.5 of this Chapter).	Objective: E-LG 2: In Greater Sage-Grouse habitat, manage for vegetation composition and structure that achieves Greater Sage-Grouse seasonal habitat objectives (see Table 2-2), enhancing resilience and resistance based on the ability of the ecological site to respond to management. This objective recognizes spatial and temporal variations across seral stages.	Objective F-LG 2: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Objective A-LG 3: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B- LG 3: —	Objective C-LG 3: —	Objective D-LG 3: —	Objective E-LG 3: —	Objective F-LG 3: Encourage partners to monitor effects of retiring grazing permits in Greater Sage-Grouse habitat.
Recreation and Visitor Services					
Goal A-REC 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-REC 1: —	Goal C-REC 1: —	Goal D-REC 1: In PHMA and GHMA, manage recreation and visitor services in a manner that provides for quality visitor experience on public lands while minimizing human disturbance to Greater Sage-Grouse and its life cycle requirements.	Goal E-REC 1: Within the SGMA, achieve no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances, including recreational activities, in order to stop the decline of Greater Sage-Grouse populations. This will be achieved by the overriding policy for all management actions within the SGMA to "avoid, minimize, and mitigate" impacts on Greater Sage-Grouse habitat.	Goal F-REC 1: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-REC 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-REC 1: —	Objective REC 1: —	Objective D-REC 1: In PHMA and GHMA, manage commercial and noncommercial motorized and nonmotorized recreation uses on public lands in a manner compatible with the life-cycle requirements for Greater Sage-Grouse .	Objective E-REC 1: Within the SGMA, achieve no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances, including commercial and noncommercial motorized and nonmotorized recreation uses on public lands in order to stop the decline of Greater Sage-Grouse populations. This will be achieved by the overriding policy for all management actions within the SGMA to "avoid, minimize, and mitigate" impacts on Greater Sage-Grouse habitat.	Objective F-REC 1: —	
Comprehensive Travel and Transportation Management (CTTM)						
Goal A-CTTM 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-CTTM 1: —	Goal C-CTTM 1: —	Goal D-CTTM 1: Manage travel and transportation in a manner that maintains healthy and intact PHMA and GHMA, minimizes disturbance to Greater Sage-Grouse populations, and provides for reasonable access to public lands.	Goal E-CTTM 1: Within the SGMA, achieve no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances, including travel and transportation, in order to stop the decline of Greater Sage-Grouse populations. This will be achieved by the overriding policy for all management actions within the SGMA to "avoid, minimize, and mitigate" impacts on Greater Sage-Grouse habitat.	Goal F-CTTM 1: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Objective A-CTTM 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-CTTM 1: —	Objective C-CTTM 1: N—	Objective D-CTTM 1: Prioritize and complete transportation planning in PHMA and GHMA that provides for reasonable access to public lands for administrative and recreational purposes and that minimizes proliferation of user-created routes (roads, primitive roads, and trails).	Objective E-CTTM 1: —	Objective F-CTTM 1: —
Objective A-CTTM 2: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-CTTM 2: —	Objective C-CTTM 2: —	Objective D-CTTM 2: Manage motorized travel on public lands by designating routes in PHMA and GHMA that are compatible with the life-cycle requirements for Greater Sage-Grouse .	Objective E-CTTM 2: Within the SGMA, achieve no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances including motorized travel through the application of "avoid, minimize and mitigate", in the SGMA in order to stop the decline of Greater Sage-Grouse populations.	Objective F-CTTM 2: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Lands and Realty					
Goal A-LR 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-LR 1: —	Goal C-LR 1: —	Goal D-LR 1: Manage land tenure adjustments and land uses to maintain or enhance PHMA and GHMA and connectivity.	Goal E-LR 1: Within the SGMA, achieve no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances, including land tenure adjustments and land uses, in order to stop the decline of Greater Sage-Grouse populations. This will be achieved by the overriding policy for all management actions within the SGMA to "avoid, minimize, and mitigate" impacts on Greater Sage-Grouse habitat.	Goal F-LR 1: —
Objective A-LR 1: —	Objective B-LR 1: —	Objective C-LR 1: —	Objective D-LR 1: —	Objective E-LR 1: *Avoid* - Eliminate conflicts by relocating disturbance activities outside of Greater Sage-Grouse habitat in order to conserve Greater Sage-Grouse and their habitat. Avoidance of a disturbance within Greater Sage-Grouse habitat is the preferred option.	Objective F-LR 1: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-LR 2: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-LR 2: —	Objective C-LR 2: —	Objective D-LR 2: Manage and minimize effects of land use authorizations on PHMA and GHMA through grant stipulations and terms and conditions.	Objective E-LR 2: *Minimize* –If impacts are not avoided, the adverse effects will need to be both minimized and mitigated. Impacts will be minimized by modifying proposed actions and/or developing permit conditions to include measures that lessen the adverse effects to Greater Sage-Grouse and their habitat. This will be accomplished through Site-Specific Consultation-Based Design Features (see Appendix D [of the 2015 Final EIS]), such as reducing the disturbance footprint, seasonal use limitations, and co-location of structures. Minimization does not preclude the need for mitigation of a disturbance. Any disturbance in habitat within the SGMA will require both minimization and mitigation.	Objective F-LR 2: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-LR 3: —	Objective B-LR 3: —	Objective C-LR 3: —	Objective D-LR 3: —	Objective E -LR 3: *Mitigate* – If impacts are not avoided, after required minimization measures are specified, residual adverse effects on designated Greater Sage-Grouse habitat are required to be offset by implementing mitigation actions that will result in replacement or enhancement of the Greater Sage-Grouse habitat to balance the loss of habitat from the disturbance activity. This will be accomplished through the Conservation Credit System.	Objective F-LR 3: —	
Fluid Minerals						
Goal A-Lease-FM 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-Lease-FM 1: —	Goal C-Lease-FM 1: —	Goal D-Lease-FM 1: Manage the Federal Fluid Mineral Estate to meet National energy needs in a development framework that gives priority consideration to maintaining or increasing Greater Sage-Grouse populations and distribution.	Goal E-Lease-FM 1: Within the SGMA, achieve no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances, including Fluid Minerals, in order to stop the decline of Greater Sage-Grouse populations. Apply the hierarchical decision process of "avoid, minimize, mitigate" to achieve this goal.	Goal F-Lease-FM 1: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-Lease-FM 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-Lease-FM 1: —	Objective C-Lease-FM 1: Any oil, gas, geothermal activity will be conducted to maximize avoidance of impacts, based on evolving scientific knowledge of impacts.	Objective D-Lease-FM 1: —	Objective E-Lease-FM 1: *Avoid* - Eliminate conflicts by relocating disturbance activities, including Fluid Minerals, outside of Greater Sage-Grouse habitat in order to conserve Greater Sage-Grouse and their habitat. Avoidance of a disturbance within Greater Sage-Grouse habitat is the preferred option.	Objective F-Lease-FM 1: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-Lease-FM 2: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-Lease-FM 2: —	Objective C-Lease-FM 2: N—	Objective D-Lease-FM 2: Conserve and maintain the quality and distribution of PHMA and GHMA through application of lease stipulations, COAs, and RDFs (consistent with applicable law) on existing and future leases.	Objective E-Lease-FM 2: *Minimize* –If impacts from Fluid Minerals are not avoided, the adverse effects will need to be both minimized and mitigated. Impacts will be minimized by modifying proposed actions and developing permit conditions with measures that lessen the adverse effects to Greater Sage-Grouse and their habitat. This will be accomplished through Site-Specific Consultation-Based Design Features (see Appendix D [of the 2015 Final EIS]), such as reducing the disturbance footprint, seasonal use limitations, and co-location of structures. Minimization does <u>not</u> preclude the need for mitigation of a disturbance. Any disturbance in habitat within the SGMA will require both minimization and mitigation.	Objective F-Lease-FM 2: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-Lease-FM 3: —	Objective B-Lease-FM 3: —	Objective C-Lease-FM 3: —	Objective D-Lease-FM 3: —	Objective E-Lease-FM 3: *Mitigate* – If impacts from Fluid Minerals are not avoided, after required minimization measures are specified, residual adverse effects on designated Greater Sage-Grouse habitat are required to be offset by implementing mitigation actions that will result in replacement or enhancement of the Greater Sage-Grouse habitat to balance the loss of habitat from the disturbance activity. This will be accomplished through the Conservation Credit System.	Objective F-Lease-FM 3: —	
Locatable Minerals						
Goal A-LOC 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-LOC 1: —	Goal C-LOC 1: —	Goal D-LOC 1: Manage locatable mineral development to consider effects on PHMA.	Goal E-LOC 1: Within the SGMA, achieve no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances, including Locatable Minerals, in order to stop the decline of Greater Sage-Grouse populations. Apply the hierarchical decision process of "avoid, minimize, mitigate" to achieve this goal.	Goal F-LOC 1: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Objective A-LOC 1: —	Objective B-LOC 1: —	Objective C-LOC 1: —	Objective D-LOC 1: —	Objective E-LOC 1: *Avoid* - Eliminate conflicts by relocating disturbance activities, including Locatable Minerals, outside of Greater Sage-Grouse habitat in order to conserve Greater Sage-Grouse and their habitat. Avoidance of a disturbance within Greater Sage-Grouse habitat is the preferred option.	Objective F-LOC 1: —
Objective A-LOC 2: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-LOC 2: —	Objective C-LOC 2: —	Objective D-LOC 2: Authorize Plans of Operation per 43 CFR 3809 regulations that minimize impacts on Greater Sage-Grouse PHMA and GHMA.	Objective E-LOC 2: *Minimize* –If impacts from Locatable Minerals (including Plans of Operation per 43 CFR 3809 regulations) are not avoided, the adverse effects will need to be both minimized and mitigated. Impacts will be minimized by modifying proposed actions and/ or developing permit conditions to include measures that lessen the adverse effects to Greater Sage-Grouse and their habitat. This will be accomplished through Site-Specific Consultation-Based Design Features (see Appendix D [of the 2015 Final EIS]), such as reducing the disturbance footprint, seasonal use limitations, and co-location of structures. Minimization does not preclude the need for	Objective F-LOC 2: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	mitigation of a disturbance. Any disturbance in habitat within the SGMA will require both minimization and mitigation.	(*see above*)	
Objective A-LOC 3: —	Objective B-LOC 3: —	Objective C-LOC 3: —	Objective D-LOC 3: —	Objective LOC 3: *Mitigate* – If impacts from Locatable Minerals are not avoided, after required minimization measures are specified, residual adverse effects on designated Greater Sage-Grouse habitat are required to be offset by implementing mitigation actions that will result in replacement or enhancement of the Greater Sage-Grouse habitat to balance the loss of habitat from the disturbance activity. This will be accomplished through the Conservation Credit System.	Objective F-LOC 3: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Objective A-LOC 4: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-LOC 4: —	Objective C-LOC 4: —	Objective D-LOC 4: Provide reasonable access and development opportunity to claimants in PHMA, consistent with rights provided under the General Mining Act of 1872, as amended, and the need to conserve, maintain, or enhance PHMA through prevention of undue or unnecessary degradation for activities not reasonably incident to explore and develop the resource.	Objective E-LOC 4:—	Objective F-LOC 4: —
Objective A-LOC 5: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-LOC 5: —	Objective C-LOC 5: —	Objective D-LOC 5: Manage disturbances associated with notice level activity in PHMA on a landscape basis by encouraging operators and claimants to consolidate exploration activities into exploration plans of operation to reduce proliferation of discrete mining notices per 43 CFR 3809.21(b).	Objective E-LOC 5: Anthropogenic disturbances, including mineral exploration, are subject to the hierarchical decision process of avoid, minimize, and mitigate described above.	Objective F-LOC 5: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Salable Minerals					
Goal A-SAL 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-SAL 1: —	Goal C-SAL 1: —	Goal D-SAL 1: Manage salable minerals to meet the State's demand for sand, gravel, and rock materials while providing for conservation and maintenance or enhancement of PHMA.	Goal E-SAL 1: Within the SGMA, achieve no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances, including Salable Minerals, in order to stop the decline of Greater Sage-Grouse populations. Apply the hierarchical decision process of "avoid, minimize, mitigate" to achieve this goal.	Goal F-SAL 1: —
Objective A-SAL 1: —	Objective B-SAL 1: —	Objective C-SAL 1: —	Objective D-SAL 1: —	Objective E-SAL 1: *Avoid* - Eliminate conflicts by relocating disturbance activities, including Salable Minerals, outside of Greater Sage-Grouse habitat in order to conserve Greater Sage-Grouse and their habitat. Avoidance of a disturbance within Greater Sage-Grouse habitat is the preferred option.	Objective F-SAL 1: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-SAL 2: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-SAL 2: —	Objective C-SAL 2: —	Objective D-SAL 2: Minimize disturbances from salable mineral activities in PHMA and GHMA.	Objective E-SAL 2: *Minimize* – If impacts from Salable Minerals are not avoided, the adverse effects will need to be both minimized and mitigated. Impacts will be minimized by modifying proposed actions and developing permit conditions with measures that lessen the adverse effects on Greater Sage-Grouse and their habitat. This will be accomplished through Site-Specific Consultation-Based Design Features (see Appendix D [of the 2015 Final EIS]), such as reducing the disturbance footprint, seasonal use limitations, and co-location of structures. Minimization does not preclude the need for mitigation of a disturbance. Any disturbance in habitat within the SGMA will require both minimization and mitigation.	Objective F-SAL 2: —	
Objective A-SAL 3: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-SAL 3: —	Objective C-SAL 3: —	Objective D-SAL 3: Provide reasonable access and development opportunity to Federal Highway Administration, NDOT, and Counties and the public for existing mineral materials pits in PHMA and GHMA.	Objective E-SAL 3: TMA-15.1: —	Objective F-SAL 3: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-SAL 4: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-SAL 4: —	Objective C-SAL 4: —	Objective D-SAL 4: Conserve and maintain the quality and distribution of Greater Sage-Grouse habitat through on-site and off-site mitigation to achieve no net un-mitigated loss of PHMA or provide for the enhancement of PHMA within the WAFWA management zone.	Objective SAL 4: *Mitigate* – If impacts from Salable Minerals are not avoided, after required minimization measures are specified, residual adverse effects on designated Greater Sage-Grouse habitat are required to be offset by implementing mitigation actions that will result in replacement or enhancement of the Greater Sage-Grouse habitat to balance the loss of habitat from the disturbance activity. This will be accomplished through the Conservation Credit System.	Objective F-SAL 4: —	
Nonenergy Leasable Minerals						
Goal A-NEL 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-NEL 1: —	Goal C-NEL 1: —	Goal D-NEL 1: Manage nonenergy leasable minerals to maintain or increase Greater Sage-Grouse populations and distribution.	Goal E-NEL 1: Within the SGMA, achieve no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances, including Nonenergy Leasable Minerals, in order to stop the decline of Greater Sage-Grouse populations. Apply the hierarchical decision process of "avoid, minimize, mitigate" to achieve this goal.	Goal F-NEL 1: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Objective A-NEL 1: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-NEL 1: —	Objective C-NEL 1: —	Objective D-NEL 1: Conserve and maintain the quality and distribution of PHMA and GHMA.	Objective E-NFL 1: *Avoid* - Eliminate conflicts by relocating disturbance activities, including Nonenergy Leasable Minerals, outside of Greater Sage-Grouse habitat in order to conserve Greater Sage-Grouse and their habitat. Avoidance of a disturbance within Greater Sage-Grouse habitat is the preferred option.	Objective F-NEL 1: —
Objective A-NEL 2: —	Objective B-NEL 2: —	Objective C-NEL 2: —	Objective D-NEL 2: —	Objective E-NEL 2: *Minimize* – If impacts from Nonenergy Leasable Minerals (including Plans of Operation per 43 CFR 3809) are not avoided, the adverse effects will need to be both minimized and mitigated. Impacts will be minimized by modifying proposed actions and developing permit conditions with measures that lessen the adverse effects to Greater Sage-Grouse and their habitat. This will be accomplished through Site-Specific Consultation-Based Design Features (see Appendix D [of the 2015 Final EIS]), such as reducing the disturbance footprint, seasonal use limitations, and co-location of structures. Minimization does not preclude the need for	Objective F-NEL 2: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	mitigation of a disturbance. Any disturbance in habitat within the SGMA will require both minimization and mitigation.	(*see above*)	
Objective A-NEL 3: —	Objective B-NEL 3: —	Objective C-NEL 3: —	Objective D-NEL 3: —	Objective E-NEL 3: *Mitigate* – If impacts from Nonenergy Leasable Minerals are not avoided, after required minimization measures are specified, residual adverse effects on designated Greater Sage-Grouse habitat are required to be offset by implementing mitigation actions that will result in replacement or enhancement of the Greater Sage-Grouse habitat to balance the loss of habitat from the disturbance activity. This will be accomplished through the Conservation Credit System.	Objective F-NEL 3: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Mineral Split Estate					
Goal A-MSE 1: No common goal across LUPs within the sub-region. See Section 2.10.1.	Goal B-MSE 1: —	Goal C-MSE 1: —	Goal D-MSE 1: Manage federal split estate to provide for the conservation, maintenance and enhancement of PHMA and GHMA.	Goal E-MSE 1: Within the SGMA, achieve no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances, including federal split estate, in order to stop the decline of Greater Sage-Grouse populations. Apply the hierarchical decision process of "avoid, minimize, mitigate" to achieve this goal.	Goal F-MSE 1: —
Objective A-MSE 1: —	Objective B-MSE 1: —	Objective C-MSE 1: —	Objective D-MSE 1: —	Objective E-MSE 1: *Avoid* - Eliminate conflicts by relocating disturbance activities, including federal split estate, outside of Greater Sage-Grouse habitat in order to conserve Greater Sage-Grouse and their habitat. Avoidance of a disturbance within Greater Sage-Grouse habitat is the preferred option.	Objective F-MSE 1: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Objective A-MSE 2: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-MSE 2: —	Objective C-MSE 2: —	Objective D-MSE 2: For federal mineral estate, minimize surface disturbance in PHMA and GHMA to the maximum extent practicable on private surface.	Objective E-MSE 2: *Minimize* – If impacts from federal split estate are not avoided, the adverse effects will need to be both minimized and mitigated. Impacts will be minimized by modifying proposed actions and developing permit conditions with measures that lessen the adverse effects to Greater Sage-Grouse and their habitat. This will be accomplished through Site-Specific Consultation-Based Design Features (see Appendix D [of the 2015 Final EIS]), such as reducing the disturbance footprint, seasonal use limitations, and co-location of structures. Minimization does not preclude the need for mitigation of a disturbance. Any disturbance in habitat within the SGMA will require both minimization and mitigation.	Objective F-MSE 2: —	
Objective A-MSE 3: No common objective across LUPs within the sub-region. See Section 2.10.1.	Objective B-MSE 3: —	Objective C-MSE 3: —	Objective D-MSE 3: For federal surface estate, minimize surface disturbance in PHMA and GHMA to the maximum extent practicable consistent with use rights to the private mineral estate.	Objective E-MSE 3: see Objective E-MSE 2	Objective F-MSE 3: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Objective A-MSE 4: —	Objective B-MSE 4: —	Objective C-MSE 4: —	Objective D-MSE 4: —	Objective E-MSE 4: *Mitigate* – If impacts from federal split estate are not avoided, after required minimization measures are specified, residual adverse effects on designated Greater Sage-Grouse habitat are required to be offset by implementing mitigation actions that will result in replacement or enhancement of the Greater Sage-Grouse habitat to balance the loss of habitat from the disturbance activity. This will be accomplished through the Conservation Credit System.	Objective F-MSE 4: —

*Alternative E was submitted by the State of Nevada's Governor's office and only covers land within the decision area in the State of Nevada. The State of California lands will follow Alternative A.

[1]The use of "**—**" indicates that there is no similar goal or objective, or that the similar goal or objective is reflected in another management action in the alternative.

Table 2-2c (Part 2)
Description of Alternative Actions

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Special Status Species (Greater Sage-Grouse)					
Action A-SSS 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS 1: —[1]	Action C-SSS 1: —	Action D-SSS 1: Identify seasonal habitat areas where an array of conservation actions can be completed to improve habitat conditions.	Action E-SSS 1: PMA-2.2: Identify and prioritize landscape-scale enhancement, restoration, fuel reduction, and mitigation projects based upon ecological site potential, state, and transition models, and other data that will contribute to decision making informed by science to increase rangeland resiliency prior to and following wildfire.	Action F-SSS 1: —
Action A-SSS 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS 2: —	Action C-SSS 2: —	Action D-SSS 2: Work cooperatively to establish and maintain a Greater Sage-Grouse telemetry database to help prioritize habitat conservation actions.	Action E-SSS 2: TMA-22.12: Satellite telemetry data shall be compiled and provided to the Nevada Sagebrush Ecosystem Technical Team for local plan revisions and updates, and coordinated statewide to determine seasonal habitats such as breeding, nesting, brood rearing; movement patterns; and survival rates.	Action F-SSS 2: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-SSS 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS 3: —	Action C-SSS 3 —	Action D-SSS 3: —	Action E-SSS 3: TMA 9.4: Address and eliminate conflicting regulations between the Migratory Bird Treaty Act and the ESA. Pursue additional take permits in excess of the current 2,000 bird limit from the USFWS for raven I. If necessary, pursue additional raven take in excess of the current 2,000 bird limit from the USFWS for raven control.	Action F-SSS 3: —	
Action A-SSS 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS 4: —	Action C-SSS 4: —	Action D-SSS 4: —	Action E-SSS 4: TMA 9.6: Monitor effects of predator control to determine causal relations with Greater Sage-Grouse survivability and adapt control strategies accordingly.	Action F-SSS 4: —	
Action A-SSS 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS 5: —	Action C-SSS 5: —	Action D-SSS 5: —	Action E-SSS 5: TMA 9.6: When downward population trends and nesting success are detected in the SGMAs initiate predator surveys and identify responsible predator species to target and implement an effective predator control effort.	Action F-SSS 5: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-SSS 6: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS 6: —	Action C-SSS 6: —	Action D-SSS 6: —	Action E-SSS 6: Implement a predator control program to reduce transient raven populations for nest protection and increased chick survival throughout the interim period while habitat enhancement and restoration projects become established. Greater Sage-Grouse population, nest success and recruitment goals should be established within the SGMA.	Action F-SSS 6: —	
Action A-SSS 7: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS 7: —	Action C-SSS 7: —	Action D-SSS 7: Implement the RDFs, consistent with applicable law, in areas outside of mapped PHMA and GHMA where Greater Sage-Grouse use has been observed or suspected, areas and habitats which may be necessary to maintain viability of Greater Sage-Grouse , or where the activity would affect Greater Sage-Grouse or their habitat in PHMA or GHMA.	Action E-SSS 7: Site-Specific Consultation Based Design Features apply to anthropogenic disturbances in the SGMA, including the Non-Habitat Management Category.	Action F-SSS 7: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Adaptive management					
Action A-SSS-AM 1: No common action across LUPs within the sub-region. See **Section 2.10.1**.	Action B-SSS-AM 1: —	Action C-SSS-AM 1: —	Action D-SSS-AM 1: Establish a protocol for incorporating new science and changes over time, to update and keep State-wide habitat maps current.	Action E-SSS-AM 1: See Role of Sagebrush Ecosystem Technical Team.	Action F-SSS-AM 1: —
Action A-SSS-AM 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-AM 2: —	Action C-SSS-AM 2: —	Action D-SSS-AM 2: Continue to consult with the NDOW for all development or habitat restoration proposals in PHMA and GHMA. Also, coordinate with the Nevada Sagebrush Ecosystem Council, the CDFW and tribes on projects proposed within sagebrush ecosystems	Action E-SSS-AM 2: *<u>SETT Consultation</u>* – Proposed anthropogenic disturbances within the SGMA will trigger consultation with the SETT for assessment of impacts on Greater Sage-Grouse and their habitat and compliance with SEC and other relevant agency policies. SETT consultation is designed to provide a regulatory mechanism to ensure that Greater Sage-Grouse conservation policies are applied consistently throughout the state and streamline the federal permitting process. Anthropogenic disturbance is defined here as any human-caused activity or action and/ or human-created physical structures that may have adverse impacts on Greater Sage-Grouse or	Action F-SSS-AM 2: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	their habitat. The term anthropogenic disturbance and its associated conservation policies will include, but not limited to the following project categories: mineral development and exploration and its associated infrastructure; renewable and non-renewable energy production, transmission, and distribution and its associated infrastructure; paved and unpaved roads and highways; cell phone towers; landfills; pipelines; residential and commercial subdivisions; special use permits; ROW applications; and other large-scale infrastructure development. Livestock operations and agricultural activities and infrastructure related to small-scale ranch and farm businesses (e.g. water troughs, and fences) are not included in this definition.	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-SSS-AM 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-AM 3: —	Action C-SSS-AM 3: —	Action D-SSS-AM 3: Identify off-site mitigation areas within GHMA with reasonable potential to achieve vegetation objectives and meet the seasonal habitat needs of Greater Sage-Grouse . These are areas where mitigation would occur for application of off-site mitigation actions.	Action E-SSS-AM 3: Options for mitigation will be identified in the State's Strategic Action Plan. The State's Strategic Action Plan will identify prioritized areas on public and private lands to implement a landscape scale restoration effort. This will spatially identify where the primary threats to Greater Sage-Grouse habitat are located throughout the state and provide management guidance for how to ameliorate these based on local area conditions and ecological site descriptions. The prioritization includes efforts to use mitigation funding in areas where Greater Sage-Grouse will derive the most benefit, even if those areas are not adjacent to or in the vicinity of impacted populations. This Strategic Action Plan will be updated at least every 5 years to reflect improvements in understanding and technology for mitigation activities.	Action F-SSS-AM 3: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-SSS-AM 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-AM 4: —	Action C-SSS-AM 4: —	Action D-SSS-AM 4: Natural Resources Conservation Service (NRCS), BLM, and Forest Service will engage private landholders to improve habitat conditions.	Action E-SSS-AM 4: —	Action F-SSS-AM 4: —	
Action A-SSS-AM 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-AM 5: —	Action C-SSS-AM 5: —	Action D-SSS-AM 5: —	Action E-SSS-AM 5: Through the Nevada Sagebrush Ecosystem Council, and its Nevada Sagebrush Ecosystem Technical Team, utilizing the avoid, minimize, and mitigate strategy, the following will occur: • Develop consistent monitoring protocols and methods to be used across all land jurisdictions and agencies. Compile all project monitoring data into one Greater Sage-Grouse database managed by the Nevada Sagebrush Ecosystem Technical Team for use in adaptive management and reporting. • Monitoring of mitigation sites must be included in all plans, with consistent protocols to assess specific metrics and determine trends for	Action F-SSS-AM 5: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	habitat quantity/quality and Greater Sage-Grouse populations. • All statewide monitoring data will be accessible to the Nevada Sagebrush Technical Team through a centralized geographic database. The team will compile annual reports of habitat trends. All monitoring plans must include specific objectives and detailed procedures. • Monitor Greater Sage-Grouse activity and demographics with annual assessments and intensive levels of investigation to answer questions about the effectiveness of conservation strategies in terms of measured responses of key demographic parameters (e.g. nest success, chick survival, and movement) associated with sites where management activities have been implemented. • Conduct annual lek counts across most Population Management Units. Train volunteers	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	who provide additional manpower in assisting with additional lek counts. Volunteers must be qualified by attending a day-long training session that includes actual field training each year. • Population demographic data is determined from the Greater Sage-Grouse harvest. Hunters shall deposit one wing from each bird harvested in wing barrels located on primary hunting access roads, check stations, or to be delivered to a NDOW Field or Regional Office. Wings shall be separated by geographic locations (county or hunt area). Wings shall be used to identify sex, age, nest success, and number of chicks per hen. • Monitor harvest through the use of the 10% Hunter Questionnaire that randomly polls license holders and through the collection of Greater Sage-Grouse wings from hunter harvested birds.	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	• Regulate harvest by season length and bag limit as set forth by the Nevada Board of Wildlife Commissioners and, consulting recommendations made by the NDOW. • In areas that are closed to hunting, wing data are not available for monitoring population demographics such as the number of chicks per hen. For these areas, conduct brood counts along established routes. Brood surveys shall be conducted mid-summer when Greater Sage-Grouse are concentrated on meadow habitats. Established brood count routes shall be surveyed to record average brood size and the number of chicks per hen. • Satellite telemetry data shall be compiled and provided to the Nevada Sagebrush Ecosystem Technical Team for local plan revisions and updates, and coordinated statewide to determine seasonal	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	habitats such as breeding, nesting, brood rearing; movement patterns; and survival rates. • Appropriate state and federal agencies will continue to coordinate with the US Geological Survey, Biological Resources Division and associated National Wildlife Health Center to conduct investigations into the effects of West Nile virus and other disease pathogens on Greater Sage-Grouse.	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-SSS-AM 6: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-AM 6: —	Action C-SSS-AM 6: —	Action D-SSS-AM 6: —	Action E-SSS-AM 6: When population, nesting success, and recruitment goals are not met, implement an effective predator control effort for ravens, badgers, and coyotes as needed, based on biological assessments appropriate to local conditions. Conduct predator control to coincide with the life stage impacted by predation. The SGMA should be prioritized for predator control. If the SGMA meets or exceeds the reproductive and population objectives, move predator control to the next lower SGMA priority.	Action F-SSS-AM 6: —	
Action A-SSS-AM 7: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-AM 7: —	Action C-SSS-AM 7: —	Action D-SSS-AM 7: The agencies would coordinate with the Nevada Sagebrush Technical Team on all proposed disturbances within the state of Nevada to meet the mutual goal of no unmitigated loss.	Action E-SSS-AM 7: See SETT Consultation (Action E-SSS-AM 2).	Action F-SSS-AM 7: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-SSS-AM 8: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-AM 8: —	Action C-SSS-AM 8: —	Action D-SSS-AM 8: The BLM and Forest Service would coordinate with the Nevada Sagebrush Technical Team on the application of the Conservation Credit System (once it is established) for mitigation of activities that disturb Greater Sage-Grouse habitat within Nevada where the application of the mitigation would occur on or the credit would be applied to disturbance on Public or National Forest Lands.	Action E-SSS-AM 8: Consult with the SETT per Action E-SSS-AM 2.	Action F-SSS-AM 8: —	
Action A-SSS-AM 9: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-AM 9: —	Action C-SSS-AM 9: —	Action D-SSS-AM 9: Greater Sage-Grouse habitat categorization and use management boundaries would be evaluated and adjusted based on continuing inventory and monitoring results every five years. Adjustments up to plus or minus ten percent of the mapped habitat within the population management zone would be made without further analysis.	Action E-SSS-AM 9: Greater Sage-Grouse management categories must be evaluated every 3-5 years, based on new or improved spatial data through a scientifically based, peer-reviewed process. Adjustments of the mapped management categories within the population management zone would be made without further analysis.	Action F-SSS-AM 9: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Climate Change						
Action A-SSS-CC 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-CC 1: —	Action C-SSS-CC 1: —	Action D-SSS-CC 1: As climate change data become available through REAs or other ecological studies, identify areas of unfragmented Greater Sage-Grouse habitat and key habitat linkages that provide the life-cycle and genetic transfer needs for Greater Sage-Grouse . Manage the identified areas as PHMA.	Action E-SSS-CC 1: —	Action F-SSS-CC 1: —	
Action A-SSS-CC 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-CC 2: —	Action C-SSS-CC 2: —	Action D-SSS-CC 2: Work cooperatively with multiple agencies and stakeholders to establish and maintain a network of climate monitoring sites and stations.	Action E-SSS-CC 2: —	Action F-SSS-CC 2: —	
Disease						
Action A-SSS-DIS 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-DIS 1: —	Action C-SSS-DIS 1: —	Action D-SSS-DIS 1: When developing or modifying water developments on public lands in PHMA and GHMA, use RDFs consistent with applicable law to mitigate potential impacts from West Nile virus.	Action E-SSS-DIS 1: When developing or modifying water developments on BLM-administered lands in the SGMA, use Site-Specific Consultation-Based Design Features to mitigate potential impacts from West Nile virus.	Action F-SSS-DIS 1: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Mitigation					
Action A-SSS-MIT 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-MIT 1: No similar action	Action C-SSS-MIT 1: No similar action	Action D-SSS-MIT 1: —	Action E-SSS-MIT 1: PMA-3: TBD	Action F-SSS-MIT 1: —
Action A-SSS-MIT 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-MIT 2: —	Action C-SSS-MIT 2: —	Action D-SSS-MIT 2: —	Action E-SSS-MIT 2: PMA-3.1: TBD	Action F-SSS-MIT 2: —
Action A-SSS-MIT 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-MIT 3: —	Action C-SSS-MIT 3: —	Action D-SSS-MIT 3: —	Action E-SSS-MIT 3: PMA-3.2: TBD	Action F-SSS-MIT 3: —
Action A-SSS-MIT 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-MIT 4: —	Action C-SSS-MIT 4: —	Action D-SSS-MIT 4: —	Action E-SSS-MIT 4: PMA-3.3: TBD	Action F-SSS-MIT 4: —
Action A-SSS-MIT 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-MIT 5: —	Action C-SSS-MIT 5: —	Action D-SSS-MIT 5: —	Action E-SSS-MIT 5: PMA-3.4: TBD	Action F-SSS-MIT 5: —
Action A-SSS-MIT 6: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-MIT 6: —	Action C-SSS-MIT 6: —	Action D-SSS-MIT 6: —	Action E-SSS-MIT 6: PMA-3.5: TBD	Action F-SSS-MIT 6: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-SSS-MIT 7: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-MIT 7: —	Action C-SSS-MIT 7: —	Action D-SSS-MIT 7: —	Action E-SSS-MIT 7: MA-3.6: TBD	Action F-SSS-MIT 7: —	
Action A-SSS-MIT 8: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-MIT 8: —	Action C-SSS-MIT 8: —	Action D-SSS-MIT 8: —	Action E-SSS-MIT 8: TMA-21: TBD	Action F-SSS-MIT 8: —	
Administrative Collaboration and decision making						
Action A-SSS-ACDM 1: —	Action B-SSS-ACDM 1: —	Action C-SSS-ACDM 1: —	Action D-SSS-ACDM 1: —	Action E-SSS-ACDM 1: *SETT Consultation* – Proposed anthropogenic disturbances within the SGMA will trigger consultation with the SETT for assessment of impacts on Greater Sage-Grouse and their habitat and compliance with SEC and other relevant agency policies. SETT consultation is designed to provide a regulatory mechanism to ensure that Greater Sage-Grouse conservation policies are applied consistently throughout the state and streamline the federal permitting process. This is the mechanism to apply the hierarchical "avoid, minimize, mitigate" policy described below.	Action F-SSS-ACDM 1: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	Anthropogenic disturbance is defined here as any human-caused activity or action or human-created physical structures that may have adverse impacts on Greater Sage-Grouse and their habitat. The term anthropogenic disturbance and its associated conservation policies will include, but not limited to the following project categories: mineral development and exploration and its associated infrastructure; renewable and non-renewable energy production, transmission, and distribution and its associated infrastructure; paved and unpaved roads and highways; cell phone towers; landfills; pipelines; residential and commercial subdivisions; special use permits; right-of-way applications; and other large-scale infrastructure development. Livestock operations and agricultural activities and infrastructure related to small-scale ranch and farm businesses (e.g. water troughs and fences) are	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	not included in this definition, though Appendix D [of the 2015 Final EIS] (Site-Specific Consultation-Based Design Features) addresses how to minimize impacts on Greater Sage-Grouse and their habitat from these activities.	(*see above*)	
Action A-SSS-ACDM 2: —	Action B-SSS-ACDM 2: —	Action C-SSS-ACDM 2: —	Action D-SSS-ACDM 2: —	Action E-SSS-ACDM 2: Determination of Greater Sage-Grouse habitat will be based on the USGS Habitat Suitability Map (Figure XX). At the onset of a proposed project, habitat evaluations or "ground-truthing" of the project site and its surrounding areas shall be conducted by a qualified biologist with Greater Sage-Grouse experience using methods as defined in Stiver et al (2010) to confirm habitat type. Evaluations can be conducted by the SETT or NDOW at the request of the project proponent.	Action F-SSS-ACDM 2: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-SSS-ACDM 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-ACDM 3: —	Action C-SSS-ACDM 3: —	Action D-SSS-ACDM 3: —	Action E-SSS-ACDM 3: <u>*Avoid*</u> – Project proponents must first seek to avoid disturbance in Greater Sage-Grouse habitat within the SGMA. If the project is located entirely outside of habitat, but within the SGMA it will still be analyzed for indirect effects, such as noise and visual impacts. A project will only be considered to have avoided impacts if it is physically located in non-habitat and it is determined to have no indirect impacts effecting designated habitat within the SGMA. If this is determined, no further consultation with the SETT is required. Anthropogenic disturbances should be avoided within the SGMA. If avoidance is not possible, the project proponent must demonstrate why it is not possible in order for the SETT to consider minimization and mitigation alternatives. The process to demonstrate that avoidance is not possible (the "avoid process") is determined by	Action F-SSS-ACDM 3: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	four management categories, which consider both Greater Sage-Grouse breeding population density and habitat suitability within the SGMA. The burden of proof to demonstrate that avoidance is not possible within the SGMA will be on the project proponent and will require the project proponent to demonstrate the specified criteria listed below as determined by the management categories the proposed project is located in. Exemptions to the avoid policy will be granted if all the criteria below is met. A higher burden of proof is set for project proponents to demonstrate that avoidance is not possible in areas that have higher densities of Greater Sage-Grouse populations and suitable habitat. *<u>Core Management Areas</u>* Project proponents must seek to avoid disturbances within the SGMA. If the project proponent wishes to demonstrate that	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	avoidance is not possible within these areas, exemptions will be granted to this restriction as part of the SETT consultation. The project proponent must demonstrate that all of the following criteria listed below are met as part of the SETT consultation process in order to be granted an exemption: • Demonstrate that the project cannot be reasonably accomplished elsewhere – the purpose and need of the project could not be accomplished in an alternative location. • Demonstrate that the individual and cumulative impacts of the project would not result in habitat fragmentation or other impacts that would cause Greater Sage-Grouse populations to decline through consultation with the SETT. • Demonstrate that Greater Sage-Grouse population trends within the PMU are stable or increasing over a 10-	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	year rolling average. • Demonstrate that project infrastructure will be co-located with existing disturbances to the greatest extent possible. • Develop Site-Specific Consultation-Based Design Features to minimize impacts through consultation with the SETT. • Mitigate unavoidable impacts through compensatory mitigation via the Conservation Credit System. Mitigation rates will be higher for disturbances within this category. *Priority Management Areas* Management in these areas provide more flexibility to project proponents, though avoidance in these areas is still the preferred option and project proponents are encouraged to develop outside of these areas whenever possible. Anthropogenic disturbances will be permitted in these areas if the criteria listed below are met as part of the	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(see *above*)	(see *above*)	(see *above*)	(see *above*)	SETT consultation process: • Demonstrate that the project cannot be reasonably or feasibly accomplished elsewhere – the purpose and need of the project could not be accomplished in an alternative location. • Demonstrate that project infrastructure will be co-located with existing disturbances to the greatest extent possible. If co-location is not possible, siting should reduce individual and cumulative impacts on Greater Sage-Grouse and their habitat. • Demonstrate that the project should not result in unnecessary and undue habitat fragmentation that may cause declines in Greater Sage-Grouse populations within the PMU through consultation with the SETT. • Develop Site-Specific Consultation-Based Design Features to minimize impacts through consultation	(see *above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	with the SETT. • Mitigate for unavoidable impacts through compensatory mitigation via the Conservation Credit System. *General Management Areas* Management of these areas provides the greatest flexibility to project proponents. Anthropogenic disturbances will be permitted in these areas if the criteria listed below are met as part of the SETT consultation process: • Demonstrate that the project cannot be reasonably or feasibly accomplished elsewhere – the purpose and need of the project could not be accomplished in an alternative location. • Demonstrate that project infrastructure will be co-located with existing disturbances to the greatest extent possible. • Develop Site-Specific Consultation-Based Design Features to minimize impacts	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	(*see above*)	(*see above*)	(*see above*)	through consultation with the SETT. • Mitigate for unavoidable impacts through compensatory mitigation via the Conservation Credit System. *Non-Habitat Management Areas* All proposed projects within the SGMA, including in non-habitat within the SGMA must conduct habitat evaluation or ground-truthing to confirm presence or absence of Greater Sage-Grouse habitat. If areas are confirmed by habitat evaluations to be non-habitat, an analysis for indirect impacts on Greater Sage-Grouse within their habitat in the SGMA will be required to determine if Site-Specific Consultation-Based Design Features to minimize impacts and compensatory mitigation are necessary as part of the SETT consultation process.	(*see above*)

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-SSS-ACDM 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-ACDM 4: —	Action C-SSS-ACDM 4: —	Action D-SSS-ACDM 4: —	Action E-SSS-ACDM 4: ***Minimize*** - If a project cannot avoid adverse effects (direct or indirect) to Greater Sage-Grouse habitat within the SGMA, the project proponent will be required to implement Site-Specific Consultation-Based Design Features that minimize the project's adverse effects on Greater Sage-Grouse habitat. Minimization will include consultation with the SETT to determine which Site-Specific Consultation-Based Design Features would be most applicable to the project when considering site conditions and types of disturbance. Some general examples could include: reducing the footprint of the project, siting infrastructure in previously disturbed locations with low habitat values, noise restrictions near leks during breeding season, and washing vehicles and equipment to reduce the spread of invasive species. Land use specific Site-Specific Consultation-Based Design Features are included in Appendix D [of the 2015	Action F-SSS-ACDM 4: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	Final EIS]. A list of Site-Specific Consultation-Based Design Features for the project must be specified and agreed upon by the SETT and project proponent prior to the start of the project and will become part of the permit/ contract requirements issued for the project. The project proponent will be required to implement, maintain, and monitor the RDFs (consistent with applicable law) in good working order throughout the duration of the project.	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-SSS-ACDM 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-ACDM 5: —	Action C-SSS-ACDM 5: —	Action D-SSS-ACDM 5: —	Action E-SSS-ACDM 5: ***Mitigate*** – Mitigation involves the successful restoration or enhancement of Greater Sage-Grouse habitat and is designed to offset the negative impacts caused by an anthropogenic disturbance. Mitigation will be required for all anthropogenic disturbances impacting Greater Sage-Grouse habitat within the SGMA. Mitigation requirements will be determined by the State's Conservation Credit System.	Action F-SSS-ACDM 5: —	
Action A-SSS-ACDM 6: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-ACDM 6: —	Action C-SSS-ACDM 6: —	Action D-SSS-ACDM 6: —	Action E-SSS-ACDM 6: Through the Nevada Sagebrush Ecosystem Council, a Governor-appointed, broad spectrum stakeholder forum, the following will occur: • Review and approval of a process to coordinate development activities in the SGMA. • Provision of a forum for participation from industry, state and federal resource management agencies, and the general public. • Oversight of the Nevada	Action F-SSS-ACDM 6: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	Conservation Credit System • Development, review and approval of region-wide policies - in a transparent, consistent process - that respond to sagebrush ecosystem threats. • Setting and clarifying policies and management criteria for the SGMA and establishment of well-defined decision thresholds for threat assessments and mitigation (regulatory process). • Revision of the SGMA through field verifications and recommendations from the Nevada Sagebrush Ecosystem Technical Team based on the best available science. • Establishment of policies for the identification and prioritization of landscape-scale enhancement, restoration, fuel reduction, and mitigation projects based upon ecological site potential, state and transition models, and	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(see *above*)	(see *above*)	(see *above*)	(see *above*)	other data that will contribute to decision making informed by science to increase resiliency. • Secure and consolidated funding and the direction of major expenditures for Greater Sage-Grouse conservation. • Facilitation and the resolution of conflicts between industry, landowners, and resource agencies when there is disagreement regarding Greater Sage-Grouse management. • Receipt and approval of an annual report from the Nevada Sagebrush Ecosystem Technical Team that includes compiled and summarized data on development, enhancement, and restoration activities in the SGMA, Greater Sage-Grouse population trends, and Nevada Sagebrush Ecosystem Conservation Credit System (PMA-3) progress. The Nevada Sagebrush Ecosystem Council will submit the	(see *above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	annual report to the Governor, USFWS, BLM, Forest Service, local and tribal governments and the general public. • Development of standards and protocols to propose to the BLM and Forest Service in order to facilitate expedited NEPA review for restoration activities in the SGMA. • Encourage and facilitate land management education and training for all SGMA user groups.	(*see above*)	
Action A-SSS-ACDM 7: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-ACDM 7: —	Action C-SSS-ACDM 7: —	Action D-SSS-ACDM 7: —	Action E-SSS-ACDM 7: The Nevada Sagebrush Ecosystem Technical Team, a multidisciplinary team with representatives from the Nevada Department of Agriculture, the Nevada Department of Conservation and Natural Resources Divisions of Forestry and State Lands, and the NDOW will: • In accordance with the Nevada Sagebrush Ecosystem Council's policy, oversee administration and	Action F-SSS-ACDM 7:	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(see *above*)	(see *above*)	(see *above*)	(see *above*)	operation of the Nevada Sagebrush Ecosystem Conservation Credit System (PMA-3). • Identify and prioritize landscape-scale enhancement, restoration, fuel reduction, and mitigation projects based upon ecological site potential, state and transition models, and other data that will contribute to decision making informed by science to increase rangeland resiliency prior to and following wildfire. • Foster and maintain collaborative processes with State, local and Federal agencies to expedite permitting. As deemed appropriate by the Nevada Sagebrush Ecosystem Council, decision-making will be extended to the Nevada Sagebrush Ecosystem Technical Team such that permitting will be expedited rather than extended by an added layer of bureaucracy. • Provide consultation for project proponents who	(see *above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	want to conduct activities in the SGMA to incorporate "avoid, minimize, and mitigate "practices into project designs. Project applicants will have the opportunity to conduct "ground-truthing" for the presence or absence of habitat. • Assist the BLM and Forest Service as appropriate to evaluate the cumulative effects of individual small projects (less than five acres) to avoid exceeding a tolerable level of disturbance in the SGMA and to determine if additional mitigation is required. • Acquire data to refine the habitat categories in the SGMA using best available science. • Solicit grants and private contributions for sagebrush ecosystem conservation and restoration projects. • Establish a repository to maintain the inventory of development and mitigation projects, population data, and monitoring results.	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(see *above*)	(see *above*)	(see *above*)	(see *above*)	• Compile and summarize data annually, and submit an annual progress report to the Nevada Sagebrush Ecosystem Council. • Conduct regular adaptive management evaluations to make management and policy recommendations to the Nevada Sagebrush Ecosystem Council. • Engage and coordinate activities with Local Area Working Groups through existing State Conservation Districts. Coordinate continued engagement of proven collaborative successes by charging LAWGs with responsibilities such as a) developing and implementing site-specific plans to accomplish enhancement and restoration projects on federal lands that are identified by the Nevada Sagebrush Ecosystem Council as areas of high importance to Greater Sage-Grouse ; b) updating SGMA maps; c) monitoring; d) identifying potential habitat enhancement and	(see *above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(see *above*)	(see *above*)	(see *above*)	(see *above*)	restoration projects; and e) other tasks where local, site-specific expertise can provide added value.	(see *above*)
Action A-SSS-ACDM 8: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-ACDM 8: —	Action C-SSS-ACDM 8: —	Action D-SSS-ACDM 8: —	Action E-SSS-ACDM 8: —	Action F-SSS-ACDM 8: —
Opportunities for Proactive Measures					
Action A-SSS-OPM 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-OPM 1	Action C-SSS-OPM 1—	Action D-SSS-OPM 1: Identify seasonal habitat areas where an array of conservation actions can be completed to improve habitat conditions.	Action E-SSS-OPM 1: See Role of Sagebrush Ecosystem Technical Team (Action E-SSS-ACDM 7).	Action F-SSS-OPM 1: —
Action A-SSS-OPM 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-OPM 2: —	Action C-SSS-OPM 2: —	Action D-SSS-OPM 2: Consider the use of a Greater Sage-Grouse telemetry database to help prioritize habitat conservation actions.	Action E-SSS-OPM 2: See Role of Sagebrush Ecosystem Technical Team (Action E-SSS-ACDM 7). TMA-22.12: Satellite telemetry data shall be compiled and provided to the Nevada Sagebrush Ecosystem Technical Team for local plan revisions and updates, and coordinated statewide to determine seasonal habitats such as breeding, nesting, brood rearing; movement patterns; and survival rates.	Action F-SSS-OPM 2: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-SSS-OPM 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-OPM 3: —	Action C-SSS-OPM 3: —	Action D-SSS-OPM 3: Establish a protocol for incorporating new science and changes over time, to update and keep State-wide habitat maps current.	Action E-SSS-OPM 3: Establish a protocol for incorporating new science and changes over time, to update and keep state-wide habitat maps current.	Action F-SSS-OPM 3: —	
Action A-SSS-OPM 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-OPM 4: —	Action C-SSS-OPM 4: —	Action D-SSS-OPM 4: Continue to consult with the NDOW for all development or habitat restoration proposals in PHMA and GHMA. Also, coordinate with the Nevada Sagebrush Ecosystem Council and the CDFW on projects proposed within sagebrush ecosystems.	Action E-SSS-OPM 4: See SETT Consultation (Action E-SSS-ACDM 1)	Action F-SSS-OPM 4: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-SSS-OPM 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SSS-OPM 5: —	Action C-SSS-OPM 5: —	Action D-SSS-OPM 5: Identify areas within GHMA where off-site mitigation should occur to ensure Greater Sage-Grouse habitat goals are met. When providing guidance to applicants, ensure project proponents that may be contributing to potential mitigation are aware of such areas.	Action E-SSS-OPM 5: Options for mitigation will be identified in the State's Strategic Action Plan. The State's Strategic Action Plan will identify prioritized areas on public and private lands to implement a landscape scale restoration effort. This will spatially identify where the primary threats to Greater Sage-Grouse habitat are located throughout the state and provide management guidance for how to ameliorate these based on local area conditions and ecological site descriptions. The prioritization includes efforts to use mitigation funding in areas where Greater Sage-Grouse will derive the most benefit, even if those areas are not adjacent to or in the vicinity of impacted populations. This Strategic Action Plan will be updated at least every 5 years to reflect improvements in understanding and technology for mitigation activities.	Action F-SSS-OPM 5: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Habitat Restoration/Vegetation Management					
Action A-VEG 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 1: —	Action C-VEG 1: —	Action D-VEG 1: In PHMA and GHMA, coordinate, plan, design, and implement vegetation treatments (e.g., juniper removal, fuels treatments, and green stripping) and associated effectiveness monitoring between Resources, Vegetation Management, Emergency Stabilization, and Burned Area Rehabilitation programs to: • Promote the maintenance of large intact sagebrush communities; • Limit the expansion or dominance of invasive species and noxious weeds, including conifers, cheatgrass and medusa head; • Maintain or improve soil site stability, hydrologic function, and biological integrity; and • Enhance the native plant community with appropriate shrub, grass, and forb composition identified in the applicable Ecological Site Description (ESD) where available.	Action E-VEG 1: Identify and prioritize landscape-scale enhancement, restoration, fuel reduction, and mitigation projects based upon ecological site potential, state and transition models, and other data that will contribute to decision making informed by science to increase rangeland resiliency prior to and following wildfire.	Action F-VEG 1: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 2: Prioritize implementation of restoration projects based on environmental variables that improve chances for project success in areas most likely to benefit Greater Sage-Grouse (Meinke et al. 2009). Prioritize restoration in seasonal habitats that are thought to be limiting Greater Sage-Grouse distribution and/or abundance.	Action C-VEG 2: Same as Alternative A.	Action D-VEG 2: Utilize BLM and Forest Service agency Greater Sage-Grouse habitat maps to prioritize habitat restoration projects (see Table 2-11 in section 2.8.5 of this Chapter) with emphasis in PHMA, and to connect seasonal ranges regardless of habitat designation. Habitat restoration would include but is not limited to: • Restoration of sagebrush canopy in areas within Greater Sage-Grouse nesting and brood-rearing habitat. • Re-establishment of perennial grasses and native forbs in areas within Greater Sage-Grouse nesting, early and late-brood rearing habitat. • Reduce or remove pinyon and/or juniper in areas to enhance seasonal range connectivity, improve security at leks, and to maintain sagebrush canopy and understory integrity in nesting and	Action E-VEG 2: Restore ecologically functioning sagebrush ecosystems in Greater Sage-Grouse habitat already compromised by invasion. Restoration may include revegetating sites with native plants cultivated locally or locally adapted, non-native plant species where appropriate. Control of invasive species must be accompanied by ecosystem restoration. • Ecological site descriptions and associated state and transition models will be used to identify target areas for resiliency enhancement and/ or restoration. Maintaining and/or enhancing resilience should be given top priority. In the Great Basin sagebrush-bunchgrass communities, invasion resistance and successional resilience following disturbance are functions of a healthy perennial bunchgrass component. Therefore a combination of active and passive management	Action F-VEG 2: Prioritize implementation of restoration projects based on environmental variables that improve chances for project success in areas most likely to benefit Greater Sage-Grouse (Meinke et al. 2009). Prioritize restoration in seasonal habitats that are thought to be limiting Greater Sage-Grouse distribution and/or abundance and where factors causing degradation have already been addressed (e.g., changes in livestock management).	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	brood-rearing habitats. • Restoration of all Greater Sage-Grouse habitat objectives in areas affected by wildfire and the continuing cheat-grass fire cycle. • Priority would be on restoration areas that have not crossed an ecological threshold.	will be required to ensure this functionality. Areas that are in an invaded state that will likely transition to an annual grass monoculture if a disturbance occurs and are located within or near Greater Sage-Grouse habitat should be prioritized for restoration efforts to increase resistance and resilience. TMA-7: Initiate landscape level treatments in the SGMA to reverse the effects of Pinyon and/or Juniper encroachment and restore healthy, resilient sagebrush ecosystems. (2012 Plan) TMA-7.1: Inventory and prioritize areas for treatment of Phase I and Phase II encroachment in the SGMA to restore habitat resiliency, reduce avian predator perches, and increase forb and grass cover. (2012 Plan)	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 3: Include Greater Sage-Grouse habitat parameters as defined by Connelly et al. (2000a), Hagen et al. (2007) or if available, state Greater Sage-Grouse plans and appropriate local information in habitat restoration objectives. Make meeting these objectives within PHMA the highest restoration priority.	Action C-VEG 3: Same as Alternative A.	Action D-VEG 3: Incorporate Greater Sage-Grouse habitat objectives (as described in Table 2-11 in section 2.8.5 of this Chapter) in the design of habitat restoration projects in PHMA and GHMA.	Action E-VEG 3: Incorporate Greater Sage-Grouse habitat objectives as described in Table 2-2 in the design of habitat restoration projects in PHMA and GHMA.	Action F-VEG 3: Include Greater Sage-Grouse habitat objectives in habitat restoration. Make meeting these objectives within PHMA and GHMA the highest restoration priority.	
Action A-VEG 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 4: —	Action C-VEG 4: Composition, function, and structure of native vegetation communities will be consistent with the reference state of the appropriate ESD and will provide for healthy, resilient, and recovering Greater Sage-Grouse habitat components.	Action D-VEG 4: —	Action E-VEG 4: —	Action F-VEG 4: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 5: Require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success (Richards et al. 1998). Where probability of success or adapted seed availability is low, nonnative seeds may be used as long as they support Greater Sage-Grouse habitat objectives (Pyke 2011).	Action C-VEG 5: Seed local native ecotypes in areas of more intensive disturbance.	Action D-VEG 5: In order to determine effectiveness of actions within PHMA and GHMA, encourage seeding and planting research and demonstration plots on public lands for restoration and conservation of key vegetation communities, including but not limited to low, gray, and black sagebrush, and riparian areas, with academia, Tribes, public agencies and approved private companies or individuals.	Action E-VEG 5: TMA-4.2: Continue the expansion of, and improvements to, the Nevada Division of Forestry Seedbank & Plant Material program in conjunction with Federal partners. Utilize Nevada Division of Forestry conservation camp crews for native seed collection and rehabilitation activities. Improve storage capabilities for native seed and desirable species that provide a competitive advantage over invasive species and improve storage capabilities to promote longevity of available seed.	Action F-VEG 5: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG 6: —	Action B-VEG 6: —	Action C-VEG 6: —	Action D-VEG 6: Within PHMA and GHMA, prioritize and implement seeding and planting treatments in low sage communities that have been affected by wildfire. To the extent feasible or available, use local seed collected from intact stands or greenhouse cultivation. To increase seeding success, consider the use of specialized seed drills to ensure effective soil and seed contact.	Action E-VEG 6: TMA-4.2: Continue the expansion of, and improvements to, the Nevada Division of Forestry Seedbank & Plant Material program in conjunction with Federal partners. Utilize Nevada Division of Forestry conservation camp crews for native seed collection and rehabilitation activities. Improve storage capabilities for native seed and desirable species that provide a competitive advantage over invasive species and improve storage capabilities to promote longevity of available seed.	Action F-VEG 6: —	
Action A-VEG 7: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 7: Design post restoration management to ensure long-term persistence. This could include changes in livestock grazing management, wild horse and burro management, and travel management, to achieve and maintain the desired condition of the restoration effort that benefits Greater Sage-Grouse (Eiswerth and Shonkwiler 2006).	Action C-VEG 7: Same as Alternative A.	Action D-VEG 7: —	Action E-VEG 7: —	Action F-VEG 7: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG 8: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 8: Consider potential changes in climate (Miller et al. 2011) when proposing restoration seedings when using native plants. Consider collection from the warmer component of the species current range when selecting native species (Kramer and Havens 2009).	Action C-VEG 8: Same as Alternative A.	Action D-VEG 8: Same as Alternative A.	Action E-VEG 8: —	Action F-VEG 8: Same as Alternative B.	
Action A-VEG 9: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 9: Restore native (or desirable) plants and create landscape patterns which most benefit Greater Sage-Grouse .	Action C-VEG 9: Exotic seedings will be rehabbed, interseeded, restored to recover sagebrush in areas to expand PHMA.	Action D-VEG 9: Same as Alternative A.	Action E-VEG 9: —	Action F-VEG 9: —	
Action A-VEG 10: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 10: Make re-establishment of sagebrush cover and desirable understory plants (relative to ecological site potential) the highest priority for restoration efforts.	Action C-VEG 10: Same as Alternative A.	Action D-VEG 10: Same as Alternative A.	Action E-VEG 10: —	Action F-VEG 10:	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Action A-VEG 11: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 11: In fire prone areas where sagebrush seed is required for Greater Sage-Grouse habitat restoration, consider establishing seed harvest areas that are managed for seed production (Armstrong 2007) and are a priority for protection from outside disturbances.	Action C-VEG 11: Same as Alternative A.	Action D-VEG 11: —	Action E-VEG 11: —	Action F-VEG 11: Same as Alternative B.
Action A-VEG 12: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 12: —	Action C-VEG 12: Active restoration practices: • Removal of livestock water troughs, pipelines, and wells. • Where possible, without further damage to springs/water sources, remove waterline piping and maximize water at spring/stream sources supporting diverse riparian and meadow vegetation. • Promote natural healing of headcuts to the maximum extent possible by	Action D-VEG 12: —	Action E-VEG 12: —	Action F-VEG 12: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	limiting disturbance throughout the watershed. At times, a combination of methods may need to be used – but gabions and structural devises and boulder dumping should be limited, and restoration should strive for a functioning system. • Ripping/ recontouring of roads and seeding with native local ecotypes of shrubs and grasses.	(*see above*)	(*see above*)	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG 13: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 13: —	Action C-VEG 13: Active restoration of crested wheatgrass seedings. This can be accomplished, following targeted restoration planning to expand, reconnect or recover habitats required by Greater Sage-Grouse by: • Inter-seeding sagebrush seed or seedlings. • Remove crested wheatgrass through plowing while minimizing use of herbicides. Subsequent re-seeding with local native ecotypes. • Active restoration of cheatgrass infestation areas. In all cases, local native plant ecotype seeds and seedlings must be used.	Action D-VEG 13: —	Action E-VEG 13: —	Action F-VEG 13: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG 14: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 14: —	Action C-VEG 14: —	Action D-VEG 14: —	Action E-VEG 14: —	Action F-VEG 14: Avoid sagebrush reduction/treatments to increase livestock or big game forage in PHMA and GHMA and include plans to restore high-quality habitat in areas with invasive species. (Audubon)	
Action A-VEG 15: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 15: —	Action C-VEG 15: —	Action D-VEG 15: No new roads (temporary or permanent) would be constructed or created during project implementation for vegetation treatments. Administrative access including off-road travel with heavy equipment and vehicles would occur during implementation. Loading and unloading of all equipment would occur on existing roads to minimize disturbance to vegetation and soil.	Action E-VEG 15: Allow temporary road access to vegetation treatment areas. Construct temporary access roads where access is needed with minimum design standards to avoid and minimize impacts. Remove and restore temporary roads upon completion of treatment. (2012 Plan)	Action F-VEG 15: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG 16: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 16: —	Action C-VEG 16: —	Action D-VEG 16: Within PHMA and GHMA, when closing and reseeding roads, primitive roads, and trails not designated in travel management plans, evaluate the location for strategic protection of the overall habitat and consider using fire resistant species to provide for fire break on a case-by-case basis.	Action E-VEG 16: Conduct rehabilitation of roads, primitive roads, and trails not designated in travel management plans where such plans exist and have been approved for implementation. This also includes primitive route/roads that were not designated in wilderness study areas and within lands managed for wilderness characteristics that have been selected for protection, with due consideration given to any historical significance of existing trails. When reseeding roads, primitive roads, and trails, use appropriate seed mixes and consider the use of transplanted sagebrush in order to meet Greater Sage-Grouse habitat restoration objectives. Where invasive annual grasses are present, herbicides may be used to enhance the effectiveness of any seeding and to also establish islands of desirable species for dispersion. (See Appendix D [of the 2015 Final EIS]).	Action F-VEG 16: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG 17: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 17:	Action C-VEG 17	Action D-VEG 17: Evaluate vegetation treatments (including Greater Sage-Grouse habitat treatments) in a landscape-scale context to address habitat fragmentation, effective patch size, invasive species presence, and protection of intact sagebrush communities. Coordinate vegetation treatments with adjacent land owners and agencies to avoid any unintended negative landscape effects on Greater Sage-Grouse .	Action E-VEG 17: —	Action F-VEG 17: —	
Action A-VEG 18: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 18: —	Action C-VEG 18: —	Action D-VEG 18: Establish restoration areas where reseeding can be applied to improve impaired Greater Sage-Grouse habitat.	Action E-VEG 18: See role of Sagebrush Ecosystem Technical Team (Action E-SSS-ACDM 7).	Action F-VEG 18: —	
Action A-VEG 19: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 19: —	Action C-VEG 19: —	Action D-VEG 19: In PHMA and GHMA, rest allotments or pastures for one growing season year prior to initiating vegetation treatments, as needed, to increase resiliency of vegetation communities prior to treatment, unless grazing is part of the vegetation treatment design.	Action E-VEG 19: See role of Sagebrush Ecosystem Technical Team.	Action F-VEG 19: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Action A-VEG 20: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 20: —	Action C-VEG 20: —	Action D-VEG 20: In PHMA and GHMA, rest treated areas from livestock grazing for a minimum of two full growing seasons following treatment or until vegetation or habitat objectives are met.	Action E-VEG 20: —	Action F-VEG 20: —
Action A-VEG 21: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 21: —	Action C-VEG 21: —	Action D-VEG 21: In PHMA and GHMA, monitor and control noxious weeds and invasive annual grasses post-treatment to meet and sustain Greater Sage-Grouse habitat and vegetation objectives (see Table 2-11 in section 2.8.5 of this Chapter).	Action E-VEG 21: In the Core, Priority, and General Management areas, monitor and control noxious weeds and invasive annual grasses post-treatment to meet and sustain Greater Sage-Grouse habitat and vegetation objectives (see Table 2-2).	Action F-VEG 21: —
Action A-VEG 22: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 22: —	Action C-VEG 22: —	Action D-VEG 22: Where winter range has been identified as a limiting factor, emphasize vegetation treatments in known winter range to enhance habitat quality or reduce wildfire risk around or within winter range habitat.	Action E-VEG 22: —	Action F-VEG 22: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG 23: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 23: —	Action C-VEG 23: —	Action D-VEG 23: Manage lotic riparian habitats in conjunction with adjacent terraces and/or valley bottoms as natural fuel breaks to reduce size and frequency of wildfires in PHMA and GHMA.	Action E-VEG 23: —	Action F-VEG 23: —	
Action A-VEG 24: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 24: —	Action C-VEG 24: —	Action D-VEG 24: In lentic and lotic riparian systems, conserve or enhance these systems to maintain or increase amount of edge and cover.	Action E-VEG 24: —	Action F-VEG 24: —	
Action A-VEG 25: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 25: —	Action C-VEG 25: —	Action D-VEG 25: In PHMA and GHMA, in riparian and wet meadows, inventory, monitor for, and control invasive species. When treating invasive species, use the standard operating procedures and BMPs[2] outlined in the 2007 Vegetation Treatments Using Herbicides on BLM Lands in 17 States EIS and ROD, and for the Forest Service administered lands adhere to the Humboldt-Toiyabe Forest Directive for Herbicide Application and applicable practices found in its	Action E-VEG 25: 1. ***Prevent*** the establishment of invasive species into uninvaded Greater Sage-Grouse habitat. This will be achieved by conducting systematic and strategic detection surveys, data collection, and mapping of these areas and engaging in early response efforts if invasion occurs. This will be achieved by further developing federal and state partnerships and working with local groups, such as Weed Control Districts, Cooperative Weed Management Areas, and Conservation	Action F-VEG 25: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	accompanying Biological Assessment.	Districts. This is the highest priority for the state of Nevada. 2. ***Control*** invasive species infestations in Greater Sage-Grouse habitat already compromised by invasion. Control techniques may include: biomass removal by means such as strategic and targeted grazing, mowing, or using herbicides. In addition, the state will continue to support research in the development of biological control agents and deploy emerging technologies in Nevada as they become available. 3. ***Restore*** ecologically functioning sagebrush ecosystems in Greater Sage-Grouse habitat already compromised by invasion. Restoration may include revegetating sites with native plants cultivated locally or locally adapted, non-native plant species where appropriate. Control of invasive species must be accompanied by ecosystem restoration. a. Ecological site descriptions and	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(see *above*)	(see *above*)	(see *above*)	(see *above*)	associated state and transition models will be used to identify target areas for resiliency enhancement and/ or restoration. Maintaining and/or enhancing resilience should be given top priority. In the Great Basin sagebrush-bunchgrass communities, invasion resistance and successional resilience following disturbance are functions of a healthy perennial bunchgrass component. Therefore a combination of active and passive management will be required to ensure this functionality. Areas that are in an invaded state that will likely transition to an annual grass monoculture if a disturbance occurs and are located within or near Greater Sage-Grouse habitat should be prioritized for restoration efforts to increase resistance and resilience. 4. ***Monitor*** and adaptively manage to ensure effectiveness of efforts to prevent, control and restore.	(see *above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG 26: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 26: —	Action C-VEG 26: —	Action D-VEG 26: In PHMA and GHMA, design water developments to maintain ecological integrity of lentic riparian habitats. See management actions in the Range section.	Action E-VEG 26: Implement Site-Specific Consultation Based Design Features as appropriate. See Appendix D [of the 2015 Final EIS].	Action F-VEG 26: —	
Action A-VEG 27: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 27: —	Action C-VEG 27: —	Action D-VEG 27: In PHMA and GHMA, design and implement vegetation treatments to restore, enhance, and maintain riparian areas to meet seasonal life history requirements (e.g. late summer brood rearing habitat) for Greater Sage-Grouse .	Action E-VEG 27: —	Action F-VEG 27: —	
Action A-VEG 28: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 28: —	Action C-VEG 28: —	Action D-VEG 28: In PHMA and GHMA, where riparian extent is limited by shrub encroachment consider fuels treatments including prescribed burning or other means to increase edge and expand mesic areas to improve late summer brood-rearing habitat (see Table 2-11 in section 2.8.5 of this Chapter).	Action E-VEG 28: —	Action F-VEG 28: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG 29: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 29: —	Action C-VEG 29: —	Action D-VEG 29: For Wyoming, Mountain, and Basin Big Sage Communities in PHMA and GHMA: • Priority for treatment would focus on enhancing, reestablishing or maintaining the most limiting habitat component. • Reestablish sagebrush to meet habitat objectives (see Table 2-11 in section 2.8.5 of this Chapter). • Manipulate sagebrush communities to achieve age-class, structure, cover, and species composition objectives in Greater Sage-Grouse habitat (see Table 2-11 in section 2.8.5 of this Chapter). • Restore herbaceous understory in brush dominated areas to meet habitat objectives (see Table 2-11 in section 2.8.5 of this Chapter). • Establish and maintain fuel breaks to limit fire size and mitigate fire behavior to increase	Action E-VEG 29: —	Action F-VEG 29: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	suppression effectiveness. When possible, establish fuel breaks adjacent to roads or other previously disturbed areas. • Treat areas with cheatgrass, other invasive and noxious species presence to minimize competition and favor establishment of desired species. • Treat disturbed areas as soon as possible but within one year of the disturbance. • Select the appropriate treatment method(s) that meets the vegetative objective per the decisions identified in the Vegetation Treatments on BLM Lands in 17 Western States Programmatic EIS and Associated ROD (BLM 2007a).	(*see above*)	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG 30: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 30: —	Action C-VEG 30: —	Action D-VEG 30: Where pinyon and/or juniper trees are encroaching on sagebrush plant communities, design treatments to decrease conifer encroachment, and increase cover of sagebrush and/or understory to (1) improve habitat for Greater Sage-Grouse ; and (2) minimize avian predator perches and predation opportunities on Greater Sage-Grouse .	Action E-VEG 30: TMA-7: Initiate landscape level treatments in the SGMA to reverse the effects of Pinyon and/or Juniper encroachment and restore healthy, resilient sagebrush ecosystems.	Action F-VEG 30: —	
Action A-VEG 31: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 31: —	Action C-VEG 31: —	Action D-VEG 31: For Low Sage/Black Sage Communities monitor and treat cheatgrass and other invasive species in low sage vegetation communities in PHMA and GHMA before it becomes a dominant species.	Action E-VEG 31: —	Action F-VEG 31: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG 32: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG 32: —	Action C-VEG 32: —	Action D-VEG 32: For existing nonnative seeding: Allow natural establishment of sagebrush to occur in nonnative seedings within or adjacent to Greater Sage-Grouse habitat. Manage seedings to allow succession toward sagebrush canopy cover more favorable for Greater Sage-Grouse nesting and early brood-rearing needs.	Action E-VEG 32: —	Action F-VEG 32: —	
Integrated Invasive Species Management						
Action A-VEG-ISM 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-ISM 1: —	Action C-VEG-ISM 1: —	Action D-VEG-ISM 1: Assess invasive annual grass presence/distribution prior to implementing vegetation restoration projects to determine if additional treatments are required to treat invasive annual grasses. Prioritize treatments to remove invasive annual grasses to provide most benefit to Greater Sage-Grouse habitat conditions.	Action E-VEG ISM 1: See Action E-VEG 25 – Prevent, Control, Restore, and Monitor.	Action F-VEG-ISM 1: In Greater Sage-Grouse habitat, ensure that soil cover and native herbaceous plants are at their ESD potential to help protect against invasive plants. In areas without ESDs, reference sites would be utilized to identify appropriate vegetation communities and soil cover.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Additional Management - Invasive Species and Conifer Encroachment					
Action A-VEG-ISCE 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-ISCE 1: —	Action C-VEG- ISCE 1: —	Action D-VEG- ISCE 1: Treat sites within PHMA and GHMA that are dominated by invasive species through an IVM approach using fire, chemical, mechanical and biological methods based on site potential.	Action E-VEG- ISCE 1: <u>TMA-6.1:</u> Continue Nevada Department of Agriculture statewide surveys for the detection of incipient invasive and noxious plants in conjunction with USDA-APHIS and the Nevada Department of Transportation. • Conducts and attends numerous workshops, field days, booth and other events to promote education, awareness, and outreach to limit introduction and spread of invasive and noxious plants on public lands and natural habitat. Statewide CWMAs support program: • Provide technical assistance, project success monitoring and financial support to CWMAs through federal and state funding for projects performing the following tasks: • Noxious weed and invasive plant treatments on lands	Action F-VEG- ISCE 1: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	degraded by infestations. • Early Detection, Rapid Response (EDRR) surveying for new noxious weed species that are not already established in the state and pose new threats to healthy native plant ecosystems. • Native planting and reseeding on previously treated sites or in areas susceptible to invasion in order to improve habitat and/or the overall health of lands. • Educational activities directed toward local communities regarding the negative impacts of noxious weeds and the importance of infestation spread prevention and the implementation of integrated weed management plans. • Provide technical assistance, project success monitoring and financial support to areas across the state that were previously burned and currently threatened by fires due to noxious weed infestations and/or fire	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	fuels. Nonfederal land tasks include: o Fuels reduction through noxious weed decadent material removal, noxious weed and invasive plant treatments, and other forested and riparian area fire fuel load thinning. o Native planting and reseeding in cleared areas and degraded riparian habitat areas. o Private landowner assistance in fire and invasive plant invasion prevention and land management plans.	(*see above*)	
Action A-VEG-ISCE 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-ISCE 2: —	Action C-VEG-ISCE 2: —	Action D-VEG-ISCE 2: Targeted early season grazing would be allowed to suppress cheatgrass (*Bromus tectorum*) or other vegetation that are hindering achieving Greater Sage-Grouse objectives in PHMA and GHMA. Sheep, cattle, or goats (where permitted) may be used as long as the animals are intensely managed and removed when the utilization of desirable species reaches 35%.	Action E-VEG-ISCE 2: <u>TMA-12.1:</u> Expand the promotion of proper livestock grazing practices that promote the health of perennial grass communities as this condition has been found to suppress the establishment of cheatgrass	Action F-VEG-ISCE 2: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG-ISCE 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-ISCE 3: —	Action C-VEG-ISCE 3: —	Action D-VEG-ISCE 3: In perennial grass, invasive annual grass, and conifer-invaded cover types, restore sagebrush steppe with sagebrush seedings where feasible.	Action E-VEG-ISCE 3: See Role of Sagebrush Ecosystem Technical Team (Action E-SSS-ACDM 5).	Action F-VEG-ISCE 3: —	
Action A-VEG-ISCE 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-ISCE 4: —	Action C-VEG-ISCE 4: —	Action D-VEG-ISCE 4: Pinyon and/or juniper treatment in PHMA and GHMA would focus on enhancing, reestablishing, or maintaining habitat components (e.g. cover, security, and food) in order to achieve habitat objectives identified in Table 2-11 in section 2.8.5 of this Chapter. Treatment design should focus on addressing the most limiting habitat component.	Action E-VEG-ISCE 4: <u>TMA-7:</u> Initiate landscape level treatments in the SGMA to reverse the effects of Pinyon and/or Juniper encroachment and restore healthy, resilient sagebrush ecosystems. <u>TMA-7.5:</u> Allocate sufficient resources to fully address habitat loss and degradation in the next ten years.	Action F-VEG-ISCE 4: —	
Action A-VEG-ISCE 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-ISCE 5: —	Action C-VEG-ISCE 5: —	Action D-VEG-ISCE 5: —	Action E-VEG-ISCE 5: Inventory and prioritize areas for treatment of Phase I and Phase II encroachment in the SGMA to restore habitat resiliency, reduce avian predator perches, and increase forb and grass cover.	Action F-VEG-ISCE 5: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG-ISCE 6: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-ISCE 6: —	Action C-VEG-ISCE 6: —	Action D-VEG-ISCE 6: —	Action E-VEG-ISCE 6: Aggressively implement plans to remove Phase I and Phase II encroachment and treat Phase III encroachment to reduce the threat of severe conflagration and restore the SGMA where possible, especially in areas in close proximity to Occupied and Suitable Habitat.	Action F-VEG-ISCE 6: —	
Action A-VEG-ISCE 7: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-ISCE 7: —	Action C-VEG-ISCE 7: —	Action D-VEG-ISCE 7: Manage pinyon and/or juniper stands in encroached sagebrush vegetation communities to meet Greater Sage-Grouse habitat objectives as described in Table 2-11 in section 2.8.5 of this Chapter. In areas with a sagebrush component, select treatment methods that maintain sagebrush and shrub cover and composition.	Action E-VEG-ISCE 7: <u>TMA-7.1:</u> Inventory and prioritize areas for treatment of Phase I and Phase II encroachment in the SGMA to restore habitat resiliency, reduce avian predator perches, and increase forb and grass cover.	Action F-VEG-ISCE 7: —	
Action A-VEG-ISCE 8: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-ISCE 8: —	Action C-VEG-ISCE 8: —	Action D-VEG-ISCE 8: In Phase II and III pinyon and/or juniper stands in PHMA and GHMA: • Remove or reduce biomass to meet fuel and Greater Sage-Grouse habitat objectives (see Table 2-11 in section 2.8.5 of	Action E-VEG-ISCE 8: <u>TMA-7.2:</u> Aggressively implement plans to remove Phase I and Phase II encroachment and treat Phase III encroachment to reduce the threat of severe conflagration and restore the SGMA where possible, especially in areas	Action F-VEG-ISCE 8: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	this Chapter). • Take appropriate action to establish desired understory species composition, including seeding and invasive species treatments. • In areas with a sagebrush component, select a treatment method that maintains or improves sagebrush and shrub cover and composition.	in close proximity to Core and Priority Management Areas (State of Nevada 2012). <u>TMA-7.3:</u> Prioritize areas for treatment of Phase III Pinyon and/or Juniper encroachment in strategic areas to break up continuous, hazardous fuel beds. Treat areas that have the greatest opportunity for recovery in the SGMA based on ecological site potential. Old growth trees should be protected on woodland sites (State of Nevada 2012). <u>TMA-7.4:</u> Allow temporary road access to Phase I, Phase II, and Phase III treatment areas. Construct temporary access roads where access is needed with minimum design standards to avoid and minimize impacts. Remove and restore temporary roads upon completion of treatment.	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG-ISCE 9: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-ISCE 9: —	Action C-VEG-ISCE 9: —	Action D-VEG-ISCE 9: —	Action E-VEG-ISCE 9: Allow temporary road access to Phase I, Phase II, and Phase III treatment areas. Construct temporary access roads where access is needed with minimum design standards to avoid and minimize impacts. Remove and restore temporary roads upon completion of treatment.	Action F-VEG-ISCE 9: —	
Action A-VEG-ISCE 10: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-ISCE 10: —	Action C-VEG-ISCE 10: —	Action D-VEG-ISCE 10: —	Action E-VEG-ISCE 10: Allocate sufficient resources to fully address habitat loss and degradation in the next ten years.	Action F-VEG-ISCE 10: —	
Action A-VEG-ISCE 11: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-ISCE 11: —	Action C-VEG-ISCE 11: —	Action D-VEG-ISCE 11: —	Action E-VEG-ISCE 11: TMA-7.7: Continue to incentivize and assist in the development of bio-fuels and other commercial uses of Pinyon and/or Juniper resources.	Action F-VEG-ISCE 11: —	
Action A-VEG-ISCE 12: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-ISCE 12: —	Action C-VEG-ISCE 12: —	Action D-VEG-ISCE 12: —	Action E-VEG-ISCE 12: TMA-7.8: Increase the incentives for private industry investment in biomass removal, land restoration, and renewable energy development by authorizing stewardship contracts for up to 20 years.	Action F-VEG-ISCE 12: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG-ISCE 13: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-ISCE 13: —	Action C-VEG-ISCE 13: —	Action D-VEG-ISCE 13: —	Action E-VEG-ISCE 13: TMA-7.9: The Nevada Sagebrush Ecosystem Council will establish a goal for the number of acres to be treated annually and work to accomplish that goal over time.	Action F-VEG-ISCE 13: —	
Action A-VEG-ISCE 14: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-ISCE 14: —	Action C-VEG-ISCE 14: —	Action D-VEG-ISCE 14: —	Action E-VEG-ISCE 14: Maintain a mosaic of shrub cover conditions ranging from twenty percent to forty percent in nesting habitat to provide both habitat resiliency and preferred nesting conditions for Greater Sage-Grouse in areas with high raven populations. Where this amount of shrub cover is not available (<25%), then perennial grass cover should exceed 10% (Coates et al. 2011) and annual grass cover should not exceed 5% (Blomberg et al. 2012).	Action F-VEG-ISCE 14: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Habitat conservation for agriculture						
Action A-VEG-HCA 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-HCA 1: —	Action C-VEG-HCA 1: —	Action D-VEG-HCA 1: —	Action E-VEG-HCA 1: TMA-10: Implement a best practices certification program for ranch management and forage production in consultation with the US Department of Agriculture, Natural Resource Conservation Service, and the Nevada Department of Agriculture.	Action F-VEG-HCA 1: —	
Climate Change						
Action A-VEG-CC 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-CC 1: —	Action C-VEG-CC 1: —	Action D-VEG-CC 1: As climate change data become available through REAs or other ecological studies, identify areas of unfragmented Greater Sage-Grouse habitat and key habitat linkages that provide the life-cycle and genetic transfer needs for Greater Sage-Grouse .	Action E-VEG-CC 1: —	Action F-VEG-CC 1: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG-CC 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-CC 2: —	Action C-VEG-CC 2: —	Action D-VEG-CC 2: Implement prevention and suppression actions to prevent additional loss to wildlife and cheatgrass domination in areas that are progressing towards recovery to build resiliency to climate change. Also, implement various treatments, such as seeding and shrub plantings, to restore Greater Sage-Grouse habitat.	Action E-VEG-CC 2: —	Action F-VEG-CC 2: —	
Action A-VEG-CC 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-CC 3: —	Action C-VEG-CC 3: —	Action D-VEG-CC 3: Implement juniper removal treatments in areas with high potential to restore Greater Sage-Grouse habitat. Priority for treatments area: Highest Priority - Phase 2 Pinyon and/or Juniper Stands to prevent long-term loss of Greater Sage-Grouse habitat due to the area crossing a restoration threshold. Second Priority – Phase 1 Pinyon and/or Juniper stands to prevent the spread of the woodlands into Greater Sage-Grouse habitat.	Action E-VEG-CC 3: TMA-7: Initiate landscape level treatments in the SGMA to reverse the effects of Pinyon and/or Juniper encroachment and restore healthy, resilient sagebrush ecosystems. (2012 Plan) TMA-7.1: Inventory and prioritize areas for treatment of Phase I and Phase II encroachment in the SGMA to restore habitat resiliency, reduce avian predator perches, and increase forb and grass cover. (2012 Plan) TMA-7.2: Aggressively implement plans to remove Phase I and Phase II encroachment and treat	Action F-VEG-CC 3: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	Phase III encroachment to reduce the threat of severe conflagration and restore SGMAs where possible, especially in areas in close proximity to Occupied and Suitable Habitat. (2012 Plan) TMA-7.3: Prioritize areas for treatment of Phase III Pinyon and/or Juniper encroachment in strategic areas to break up continuous, hazardous fuel beds. Treat areas that have the greatest opportunity for recovery in the SGMA based on ecological site potential. Old growth trees should be protected on woodland sites. (2012 Plan)	(*see above*)	
Action A-VEG-CC 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-CC 4: —	Action C-VEG-CC 4: —	Action D-VEG-CC 4: Implement treatments to reduce the presence of cheatgrass and restore sagebrush and native forbs and grasses in fragmented habitat with high potential for success. Also implement fuel treatments to protect these areas for wildlife.	Action E-VEG-CC 4: Restore ecologically functioning sagebrush ecosystems in Greater Sage-Grouse habitat already compromised by invasion. Restoration may include revegetating sites with native plants cultivated locally or locally adapted, non-native plant species where appropriate. Control of invasive species must be accompanied by ecosystem restoration.	Action F-VEG-CC 4: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG-CC 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-CC 5: —	Action C-VEG-CC 5: —	Action D-VEG-CC 5: Implement hazardous fuels, noxious weed, and cheatgrass treatments as well as adjusting uses to protect native vegetation communities that provide high quality Greater Sage-Grouse habitat. Priorities for treatments are: Highest priority – Areas of high quality habitat where forecasted bioclimatic conditions are predicted to persist through at least 2050. Second Priority – Areas of high to moderate value for Greater Sage-Grouse habitat in lower elevations that are susceptible to cheatgrass domination and less likely to recover naturally from disturbance. Third Priority – Areas of high to moderate value for Greater Sage-Grouse in higher elevations as that are more resistant to cheatgrass domination and more likely to recover naturally from disturbance.	Action E-VEG-CC 5: —	Action F-VEG-CC 5: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG-CC 6: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-CC 6: —	Action C-VEG-CC 6: —	Action D-VEG-CC 6: Build resiliency into restoration and enhancement seed mixes to ensure high value habitat persistence in light of anticipated climate change effects.	Action D-VEG-CC 6: Ecological site descriptions and associated state and transition models will be used to identify target areas for resiliency enhancement and/ or restoration. Maintaining and/or enhancing resilience should be given top priority. In the Great Basin sagebrush-bunchgrass communities, invasion resistance and successional resilience following disturbance are functions of a healthy perennial bunchgrass component. Therefore a combination of active and passive management will be required to ensure this functionality. Areas that are in an invaded state that will likely transition to an annual grass monoculture if a disturbance occurs and are located within or near Greater Sage-Grouse habitat should be prioritized for restoration efforts to increase resistance and resilience.	Action F-VEG-CC 6: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG-CC 7: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-CC 7: —	Action C-VEG-CC 7: —	Action D-VEG-CC 7: Work cooperatively with multiple agencies and stakeholders to establish and maintain a network of climate monitoring sites and stations.	Action E-VEG-CC 7: —	Action F-VEG-CC 7: —	
Drought						
Action A-VEG-D 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-D 1: During drought periods, prioritize evaluating effects of the drought in PHMA relative to their needs for food and cover. Since there is a lag in vegetation recovery following drought (Thurow and Taylor 1999; Cagney et al. 2010), ensure that post-drought management allows for vegetation recovery that meets Greater Sage-Grouse needs in PHMA.	Action C-VEG-D 1: —	Action D-VEG-D 1: —	Action E-VEG-D 1: —	Action F-VEG-D 1: During drought periods, prioritize evaluating effects of drought in Greater Sage-Grouse habitat areas relative to their biological needs, as well as drought effects on ungrazed reference areas. Since there is a lag in vegetation recovery following drought (Thurow and Taylor 1999; Cagney et al. 2010), ensure that post-drought management allows for vegetation recovery that meets Greater Sage-Grouse needs in Greater Sage-Grouse habitat areas based on Greater Sage-Grouse habitat objectives.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-VEG-D 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-D 2: —	Action C-VEG-D 2: —	Action D-VEG-D 2: In sagebrush ecosystems containing PHMA and GHMA, follow guidance in the Resource Management During Drought Handbook H-1730-1 (BLM 2011c). Apply appropriate drought mitigation measures to authorized uses and activities to reduce impacts on Greater Sage-Grouse habitat and populations.	Action E-VEG-D 2: —	Action F-VEG-D 2: —	
Action A-VEG-D 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-VEG-D 3: —	Action C-VEG-D 3: —	Action D-VEG-D 3: Initiate emergency management measures during times of drought to protect Greater Sage-Grouse PHMA and GHMA. Implement post-drought management to allow for vegetation recovery that meets Greater Sage-Grouse life cycle needs in PHMA and GHMA.	Action E-VEG-D 3: —	Action F-VEG-D 3: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Wild Horses and Burros						
Action A-WHB 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-WHB 1: —	Action C-WHB 1: —	Action D-WHB 1: For all HMAs, HAs and WHBTs within or that contain PHMA and GHMA, manage wild horse and burro populations within established AML to meet Greater Sage-Grouse habitat objectives. In HMAs, HAs, and WHBTs not meeting standards due to degradation that can be at least partially contributed to wild horse or burro populations, consider adjustments to AML through the NEPA process. Adjustments would be based on monitoring data and would seek to protect and enhance PHMA and GHMA and establish a thriving ecological balance.	Action E-WHB 1: Even if current AML is not being exceeded, yet habitat within the SGMA continues to become degraded, at least partially due to wild horses or burros, established AMLs within the HMA or WHBT should be reduced through the NEPA process and monitored annually to help determine future management decisions. Unless already meeting the lowest established AML level, during periods of drought, AMLs should be reduced to a level that is consistent with maintaining Greater Sage-Grouse habitat objectives (see Table 2-2).	Action F-WHB 1: Reduce AMLs within HMAs and reduce WHBTs within occupied Greater Sage-Grouse habitat by 25% to meet habitat objectives. —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Action A-WHB 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-WHB 2: Within PHMA, develop or amend BLM Herd Management Area Plans (HMAPs) and Forest Service WHBT Plans to incorporate Greater Sage-Grouse habitat objectives and management considerations for all BLM HMAs and Forest Service WHBTs.	Action C-WHB 2: Same as Alternative A.	Action D-WHB 2: —	Action E-WHB 2: Ensure that Herd Management Area Plans (HMAP) and WHBT plans are developed and/or amended within the Core, Priority, and General management areas, identified in the State's management areas map, taking into consideration the Greater Sage-Grouse habitat objectives (see Table 2-2).	Action F-WHB 2: Same as Alternative B, except reduce AMLs within HMAs and reduce WHBTs within occupied Greater Sage-Grouse habitat by 25% to meet habitat objectives.
Action A-WHB 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-WHB 3: For all BLM HMAs and Forest Service WHBTs within PHMA, prioritize the evaluation of all AMLs based on indicators that address structure/condition/composition of vegetation and measurements specific to achieving Greater Sage-Grouse habitat objectives.	Action C-WHB 3: Same as Alternative A.	Action D-WHB 3: —	Action E-WHB 3: Methods that were used to initially establish AMLs should be reevaluated to determine if they are still sufficient to achieve Greater Sage-Grouse habitat objectives (see Table 2-2).	Action F-WHB 3: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-WHB 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-WHB 4: Coordinate with other resources (Range, Wildlife, and Riparian) to conduct land health assessments to determine existing structure/condition/composition of vegetation within all BLM HMAs and Forest Service WHBTs.	Action C-WHB 4: Same as Alternative A.	Action D-WHB 4: —	Action E-WHB 4: Use professionals (e.g., botanists, rangeland ecologists, wildlife biologists, and hydrologists) from diverse backgrounds to conduct land health assessments, proper functioning condition, site-specific wild horse and burro grazing response indices assessments, and habitat objective assessments.	Action F-WHB 4: Same as Alternative B.	
Action A-WHB 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-WHB 5: When conducting NEPA analysis for wild horse and burro management activities, water developments or other rangeland improvements for wild horses in PHMA, address the direct and indirect effects on Greater Sage-Grouse populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock identified above in PHMA.	Action C-WHB 5: Same as Alternative A.	Action D-WHB 5: —	Action E-WHB 5: When implementing management activities, water developments, or rangeland improvements for wild horses or burros, consider both direct and indirect effects on Greater Sage-Grouse and use the applicable Site-Specific Consultation Based Design Features (SSCBDF) (see Appendix D [of the 2015 Final EIS]) to minimize potential impacts or disturbances.	Action F-WHB 5: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-WHB 6: —	Action B-WHB 6: —	Action C-WHB 6: —	Action D-WHB 6: —	Action E-WHB 6: Given their capability to increase their numbers by 18%-25% annually, resulting in the doubling in population every 4-5 years (Wolfe et al. 1989; Garrott et al. 1991), wild horse gathers should be conducted to attain the lowest levels of AML. This in combination with continued and expanded use and development of effective forms of population growth suppression techniques will enable AML to be maintained for longer periods and reduce the frequency of gathers and associated cost and effort.	Action F-WHB 6: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-WHB 7: —	Action B-WHB 7: —	Action C-WHB 7: —	Action D-WHB 7: —	Action E-WHB 7: In order to expedite recovery time and enhance restoration efforts following wildfire or Greater Sage-Grouse habitat enhancement projects , consider a significant reduction and temporary removal or exclusion of all wild horses and burros within or from burned areas where HMAs and WHBT overlap with Greater Sage-Grouse Core, Priority, and General Management Areas. Wild horse grazing behaviors and specialized physiological requirements make unmanaged grazing on recently burned/ treated areas problematic for reestablishment of burned and/or seeded vegetation. (Arnold and Dudzinski 1978; Rittenhouse et al. 1982; Duncan et al. 1990; Hanley 1982; Wagner 1983; Menard et al. 2002; Stoddart et al. 1975; Symanski1994).	Action F-WHB 7: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Action A-WHB 8: —	Action B-WHB 8: —	Action C-WHB 8: —	Action D-WHB 8: —	Action E-WHB 8: If current AML is being exceeded, consider emergency short-term measures to reduce or avoid degradation of Greater Sage-Grouse habitat from HMAs or WHBT that are in excess of established AML levels within the SGMA.	Action F-WHB 8: —
Action A-WHB 9: —	Action B-WHB 9: —	Action C-WHB 9: —	Action D-WHB 9: —	Action E-WHB 9: If monitored sites are not meeting Greater Sage-Grouse habitat objectives in Table 2-2, even if AML is being met, and it is determined that wild horses or burros are the primary causal factor, then implement protective measures as applicable in addressing similar emergencies (e.g. fire, flood, and drought). Consider exclusionary fencing of riparian or other mesic sites and implement water developments (following the SSCBDF as described in Appendix D [of the 2015 Final EIS]) to ensure dispersal or avoidance of sites heavily impacted by wild horses (Feist 1971; Pellegrini 1971; Ganskopp	Action F-WHB 9: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	and Vavra 1986; Naiman et al. 1992). A water source that meets the SSCBDF should be provided, as horses traditionally do not leave known water sources just because they are fenced. Plan for and implement an immediate reduction in herd size to a level that would enable the area to recover to trend toward meeting the habitat objectives in Table 2-2 and to preserve and maintain a thriving natural ecological balance and multiple-use relationship in that area. Consider lowering the AML levels to prevent future damage.	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-WHB 10: —	Action B-WHB 10: —	Action C-WHB 10: —	Action D-WHB 10: —	Action E-WHB 10: Implement a telemetry monitoring program for wild horses. Research regarding the direct interactions between, and in indirect effects of wild horses and Greater Sage-Grouse is identified as a need and could further assist the agencies in the development of habitat selection maps (Beever and Aldridge et al. 2011) as well as offer a general understanding of the intensity, timing, and duration of use by wild horses within the SGMA.	Action F-WHB 10: —	
Action A-WHB 11: —	Action B-WHB 11: —	Action C-WHB 11: —	Action D-WHB 11: —	Action E-WHB 11: Work with professionals from other federal and state agencies, researchers at universities, and others to continue to develop, expand, and test more effective population growth suppression techniques, including contraception options	Action F-WHB 11: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Climate Change					
Action A-WHB-CC 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-WHB-CC 1: —	Action C-WHB-CC 1: —	Action D-WHB-CC 1: As climate change data become available through REAs or other ecological studies, identify areas of unfragmented Greater Sage-Grouse habitat and key habitat linkages that provide the life-cycle and genetic transfer needs for Greater Sage-Grouse . Manage the identified areas as PHMA.	Action E-WHB-CC 1: As climate data becomes available, adjust wild horse and burro and rangeland management practices to allow for Core, Priority, and General Management Areas to sustain or increase their sagebrush ecosystem resiliency and resistance.	Action F-WHB-CC 1: —
Action A-WHB-CC 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-WHB-CC 2: —	Action C-WHB-CC 2: —	Action D-WHB-CC 2: Work cooperatively with multiple agencies and stakeholders to establish and maintain a network of climate monitoring sites and stations.	Action E-WHB-CC2: Collaborate with weather and climate professionals and agencies (e.g., UNR, DRI, and NOAA) to proactively manage the rangelands resources and adjust, as necessary, the current wild horse and burro management policies. Ensure that sufficient ongoing public and political education is provided.	Action F-WHB-CC 2: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Fire Management						
Action A-FFM 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 1: —	Action C-FFM 1: —	Action D-FFM 1: —	Action E-FFM 1: Continue the expansion and implementation of a framework across all land jurisdictions for pre-suppression actions to minimize ignitions and alter fuel conditions in order to avoid, whenever possible, large damaging conflagrations.	Action F-FFM 1: —	
Action A-FFM 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 2: —	Action A-FFM 2: —	Action D-FFM 2: —	Action E-FFM 2: Actively manage habitat within the SGMA across all jurisdictions with the goal of restoring the appropriate role of wildfire to establish resiliency, and actively engage in prevention, suppression and restoration of the effects of fire and invasive species.	Action F-FFM 2: —	
Action A-FFM 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 3: —	Action C-FFM 3: —	Action D-FFM 3: —	Action E-FFM 3: Continue the expansion and implementation of fire suppression plans and strategies across all land jurisdictions within the SGMA.	Action F-FFM 3: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 4: —	Action C-FFM 4: —	Action D-FFM 4: Implement a coordinated inter-agency approach to fire restrictions based upon National Fire Danger Rating System (NFDRS) thresholds (fuel conditions, drought conditions and predicted weather patterns) for Greater Sage-Grouse habitat.	Action E-FFM 4: TMA-2.1: Strengthen and improve interagency wildfire prevention activities statewide through targeted wildfire prevention messages including education on habitat loss, updating interagency agreements, conducting wildfire prevention workshops, and demonstration projects.	Action F-FFM 4: —	
Action A-FFM 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 5: —	Action C-FFM 5: —	Action D-FFM 5: Develop wildfire prevention plans that explain the resource value of Greater Sage-Grouse habitat and include fire prevention messages and actions to reduce human-caused ignitions.	Action E-FFM 5: TMA-2.1: Strengthen and improve interagency wildfire prevention activities statewide through targeted wildfire prevention messages including education on habitat loss, updating interagency agreements, conducting wildfire prevention workshops, and demonstration projects.	Action F-FFM 5: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM 6: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 6: —	Action C-FFM 6: —	Action D-FFM 6: 2 Fuel treatments will be designed though an interdisciplinary process to expand, enhance, maintain, and protect Greater Sage-Grouse habitat. Use green strips and/or fuel breaks, where appropriate, to protect seeding efforts from subsequent fire events. In coordination with USFWS and relevant state agencies, BLM and Forest Service planning units with large blocks of Greater Sage-Grouse habitat will develop, using the assessment process described in Appendix G [of the 2015 Final EIS], Greater Sage-Grouse Wildland Fire and Invasive Species Assessment, a fuels management strategy which considers an up-to-date fuels profile, land use plan direction, current and potential habitat fragmentation, sagebrush and Greater Sage-Grouse ecological factors, and active vegetation management steps to provide critical breaks in fuel continuity, where	Action E-FFM 6: TMA-2.3: Continue the construction of targeted, well designed fuel breaks and "green strips" to break up fuel continuity, reduce fire size, and create safe areas for fire suppression activities. Use the best adapted plant materials to re-vegetate green strips with fire resistant species. Fund and schedule regular maintenance activities of green strips as needed.	Action F-FFM 6: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	(*see above*)	(*see above*)	appropriate. When developing this strategy, planning units will consider the risk of increased habitat fragmentation from a proposed action versus the risk of large scale fragmentation posed by wildfires if the action is not taken.	(*see above*)	(*see above*)
Action A-FFM 7: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 7: —	Action C-FFM 7: —	Action D-FFM 7: Apply seasonal restriction, as needed, for implementing fuels management treatments according to the type of seasonal habitat present.	Action E-FFM 7: <u>TMA-2.3:</u> Continue the construction of targeted, well designed fuel breaks and "green strips" to break up fuel continuity, reduce fire size, and create safe areas for fire suppression activities. Use the best adapted plant materials to re-vegetate green strips with fire resistant species. Fund and schedule regular maintenance activities of green strips as needed.	Action F-FFM 7: —
Action A-FFM 8: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 8: —	Action C-FFM 8: —	Action D-FFM 8: Annually complete a review of landscape assessment implementation efforts with appropriate USFWS and state agency personnel.	Action E-FFM 8: <u>TMA-3.2:</u> Update Fire Management Plans, dispatch run cards, and relevant agreements to ensure "closest forces" concepts are being utilized at all times, particularly nonfederal suppression resources (e.g. Nevada Division of Forestry helicopters, crews, and	Action F-FFM 8: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(see *above*)	(see *above*)	(see *above*)	(see *above*)	volunteer fire departments). TMA-3.3: Establish and utilize Nevada Interagency Incident Management Teams (IMTs) for wildfires in the SGMA. Nevada currently has five Type 3 IMTs that are federally sponsored and comprised of qualified federal, state and local government employees. These IMTs ensure that the state has IMT members with knowledge of Nevada's issues and natural resources, a key advantage over out-of-area IMTs that come to manage a Nevada fire with no local understanding TMA-3.5: Integrate suppression resource locations within the SGMA and pre-position resources as conditions dictate. TMA-3.6: Develop a "suitcase" interagency suppression task force (defined as a highly-mobile that could move throughout the state rapidly) for pre-positioning during high wildfire hazard periods. Activate up to three interagency	(see *above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	(*see above*)	(*see above*)	(*see above*)	"suitcase" task forces and pre-position them during Red Flag and predicted lightning events in the SGMA for initial attack response. TMA-3.14: Assign a local, trained resource advisor with Greater Sage-Grouse expertise on all fire suppression responses in the SGMA. TMA-3.1: Identify and develop suppression plans, including mapping of habitat in the SGMA, to improve initial attack suppression actions.	(*see above*)
Action A-FFM 9: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 9: —	Action C-FFM 9: —	Action D-FFM 9: Threatened, endangered, and sensitive species (including Greater Sage-Grouse) and associated habitats would continue to be a high priority for National and Geographic Multi-Agency Coordination Groups.	Action E-FFM 9: TMA-1.2: Actively manage habitat in the SGMA across all jurisdictions with the goal of restoring the appropriate role of wildfire to establish resiliency, and actively engage in prevention, suppression and restoration of the effects of fire and invasive species (State of Nevada 2012). Limit the use of fire as a management tool in Wyoming Big Sagebrush and Black Sagebrush plant communities.	Action F-FFM 9: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM 10: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 10: —	Action C-FFM 10: —	Action D-FFM 10: Within acceptable risk levels utilize a full range of fire management strategies and tactics, including the management of wildfires to achieve resource objectives, across the range of Greater Sage-Grouse habitat consistent with land use plan direction.	Action E-FFM 10: TMA-3.9: Utilize the interagency Fire Planning Assessment system to optimize utilization of fire suppression resources (e.g. engines, aircraft, water tenders, and hand crews). Fire Program Analysis enables local and national planners to evaluate the effectiveness of alternative fire management strategies for the purpose of meeting fire and land management goals and objectives. TMA-3.10: Encourage use of the State's Air National Guard C-130 Unit with the Modular Airborne Firefighting System (MAFFS) for aerial firefighting support. TMA-3.11: Increase the fleet of available heavy air tankers and develop a system for prioritizing their use to fight fires when needed. TMA-3.12: Eliminate policy and operational inconsistencies by returning jurisdiction over Nevada BLM lands that are currently managed by the California Surprise Field	Action F-FFM 10: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	Office, placing that jurisdiction into the Carson City and Winnemucca Field Offices. TMA-3.13: Develop a specific and concise package of information on management areas within the SGMA for incoming Incident Management Teams to ensure an understanding of Nevada conservation priorities that will be included in all Delegations of Authority and Fire Management Plans. TMA-1.5: Continue the expansion and implementation of fire suppression plans and strategies across all land jurisdictions within the SGMA.	(*see above*)	
Action A-FFM 11: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 11: —	Action C-FFM 11: —	Action D-FFM 11: —	Action E-FFM 11: TMA-3.7: Within the SGMA, eliminate the tactic of "burning out," including backfiring unless there are direct life safety threats.	Action F-FFM 11: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Action A-FFM 12: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 12: —	Action C-FFM 12: —	Action D-FFM 12: Within Greater Sage-Grouse habitat, PHMA (and PACs, if so determined by individual LUP efforts) are the highest priority for conservation and protection during fire operations and fuels management decision making. The PHMA (and PACs, if so determined by individual LUP efforts) will be viewed as more valuable than GHMA when priorities are established. When suppression resources are widely available, maximum efforts will be placed on limiting fire growth in GHMA polygons as well. These priority areas will be further refined following completion of the Greater Sage-Grouse Wildland Fire and Invasive Species Assessment described in Appendix G [of the 2015 Final EIS].	Action E-FFM 12: TMA-3.9: Utilize the interagency Fire Planning Assessment system to optimize utilization of fire suppression resources (e.g. engines, aircraft, water tenders, and hand crews). Fire Program Analysis enables local and national planners to evaluate the effectiveness of alternative fire management strategies for the purpose of meeting fire and land management goals and objectives.	Action F-FFM 12: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM 13: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 13: —	Action C-FFM 13: —	Action D-FFM 13: In post-fire rehabilitation plans within PHMA and GHMA, design re-vegetation projects to (1) maintain and enhance unburned intact sagebrush communities when at risk from adjacent threats; (2) stabilize soils; (3) re-establish hydrologic function; (4) maintain and enhance biological integrity; (5) promote plant resiliency; (6) limit expansion or dominance or invasive species; and (7) reestablish native species.	Action E-FFM 13: TMA-4.4: Continue identifying and obtaining funding opportunities from Federal, State, local, industry and land users dedicated to implementing prioritized habitat enhancement, restoration, and conservation activities.	Action F-FFM 13: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM 14: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 14: —	Action C-FFM 14: —	Action D-FFM 14: In PHMA and GHMA, use native plant seeds for post-fire restoration, based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low, nonnative seeds may be used as long as they meet Greater Sage-Grouse habitat objectives (see Table 2-11 in section 2.8.5 of this Chapter). In all cases, seed must be certified weed-free.	Action E-FFM 14: TMA-4.2: Continue the expansion of, and improvements to, the Nevada Division of Forestry Seedbank & Plant Material program in conjunction with Federal partners. Utilize Nevada Division of Forestry conservation camp crews for native seed collection and rehabilitation activities. Improve storage capabilities for native seed and desirable species that provide a competitive advantage over invasive species and improve storage capabilities to promote longevity of available seed.	Action F-FFM 14: —	
Action A-FFM 15: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 15: —	Action: C-FFM 15 —	Action D-FFM 15: —	Action E-FFM 15: Following fires continue the expansion and implementation of sagebrush enhancement and restoration treatments consistent with Greater Sage-Grouse management objectives in appropriate ecological sites.	Action F-FFM 15: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM 16: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 16: —	Action C-FFM 16: —	Action D-FFM 16: In PHMA and GHMA, following post-fire restoration treatments, monitor and implement management actions as necessary to ensure long-term persistence of seeded or pre-burn native plants.	Action E-FFM 16: TMA-4.5: Continue to focus research and monitoring efforts through demonstration projects on improving rehabilitation and revegetation successes in harsh environments.	Action F-FFM 16: —	
Action A-FFM 17: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 17: —	Action C-FFM 17: —	Action D-FFM 17: Within PHMA and GHMA, ensure that post-fire effectiveness monitoring continues until treatment objectives are met.	Action E-FFM 17: TMA-1.1: Utilize the Nevada Sagebrush Ecosystem Council and the Nevada Sagebrush Ecosystem Technical Team to collect and consolidate funding and develop common criteria and requirements for habitat protection, restoration and monitoring.	Action F-FFM 17: —	
Action A-FFM 18: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 18: —	Action C-FFM 18: —	Action D-FFM 18: Increase post-fire restoration activities within PHMA and GHMA through the use of integrated funding opportunities with other resource programs and partners.	Action E-FFM 18: TMA-1.1: Utilize the Nevada Sagebrush Ecosystem Council and the Nevada Sagebrush Ecosystem Technical Team to collect and consolidate funding and develop common criteria and requirements for habitat protection, restoration and monitoring.	Action F-FFM 18: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM 19: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 19: —	Action C-FFM 19: —	Action D-FFM 19: BLM and Forest Service planning units (Districts and Forests), in coordination with the USFWS and relevant state agencies, would complete and continue to update Greater Sage-Grouse Landscape Wildfire and Invasive Species Habitat Assessments to prioritize at risk habitats, and identify fuels management, preparedness, suppression and restoration priorities necessary to maintain sagebrush habitat to support interconnecting Greater Sage-Grouse populations. These assessments and subsequent assessment updates would also be a coordinated effort with an interdisciplinary team to take into account other Greater Sage-Grouse priorities identified in this plan. Appendix G [of the 2015 Final EIS] describes a minimal framework example and suggested approach for this assessment.	Action E-FFM 19: TMA-2.2: Continue successful landscape level habitat assessments in, and in proximity to, SGMAs to identify those habitat areas that are at the highest risk of wildland fire.	Action F-FFM 19: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM 20: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM 20: —	Action C-FFM 20: —	Action D-FFM 20: GHMA near where PHMA has been burned by wildfire will be managed as PHMA until the burned Greater Sage-Grouse habitat and use has been restored. The location and amount of GHMA to be managed as PHMA will be determined by the BLM or Forest Service and the respective state wildlife agency; in Nevada it will be determined by the Sagebrush Ecosystem Technical Team, based on site-specific evaluations.	Action E-FFM 20: —	Action F-FFM 20: —	
Fuels Management						
Action A-FFM-HFM 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 1: —	Action C-FFM-HFM 1: —	Action D-FFM-HFM 1: Implement the RDFs identified in Appendix D [of the 2015 Final EIS] consistent with applicable law.	Action E-FFM-HFM 1: Implement the RDFs identified in Appendix D [of the 2015 Final EIS] consistent with applicable law.	Action F-FFM-HFM 1: —	
Action A-FFM-HFM 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 2: —	Action C-FFM-HFM 2: —	Action D-FFM-HFM 2: —	Action E-FFM-HFM 2: Limit the use of fire as a management tool in Wyoming Big Sagebrush and Black Sagebrush plant communities.	Action F-FFM-HFM 2: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 3: —	Action C-FFM-HFM 3: —	Action D-FFM-HFM 3: Utilizing an interdisciplinary approach, a full range of fuel reduction techniques will be available. Fuel reduction techniques such as grazing, prescribed fire, chemical, biological and mechanical treatments are acceptable.	Action E-FFM-HFM 3: TMA-2.5: Continue to identify State and County highway/road and utility ROWs for fuel breaks; replacing invasive, fire prone species with fire resistant species and performing other fuels reduction treatments.	Action F-FFM-HFM 3: —	
Action A-FFM-HFM 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 4: —	Action C-FFM-HFM 4: —	Action D-FFM-HFM 4: Identify opportunities for prescribed fire; including where prescribed fire has been identified as the most appropriate tool to meet fuels management objectives and Greater Sage-Grouse conservation objectives, and the potential expansion or dominance of invasive species has been determined to be minimal through an invasive species risk determination for the treatment project (see BLM Manual Section 9015).	Action E-FFM-HFM 4: TMA-2.10: Review current processes and, if necessary, develop authorities and expedite the process to utilize a suite of active vegetative treatments (e.g. mechanical, targeted livestock grazing, prescribed fire, and chemical) to reduce weed invasion and maintain resilient post-fire landscapes and control excessive fuel loading throughout the SGMA and constructed fuel breaks	Action F-FFM-HFM 4: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Action A-FFM-HFM 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 5: —	Action C-FFM-HFM 5: —	Action D-FFM-HFM 5: Upon project completion, monitor and manage fuels projects to ensure long-term success, including persistence of seeded species and/or other treatment components. Control invasive vegetation post-treatment.	Action E-FFM-HFM 5: TMA-22.1: Develop consistent monitoring protocols and methods to be used across all land jurisdictions and agencies. Compile all project monitoring data into one Greater Sage-Grouse database managed by the Nevada Sagebrush Ecosystem Technical Team for use in adaptive management and reporting.	Action F-FFM-HFM 5: —
Action A-FFM-HFM 6: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 6: —	Action C-FFM-HFM 6: —	Action D-FFM-HFM 6: Apply seasonal restriction, as needed, for implementing fuels management treatments according to the type of seasonal habitat present.	Action E-FFM-HFM 6: TMA-1.6: Following fires, continue the expansion and implementation of sagebrush enhancement and restoration treatments consistent with Greater Sage-Grouse management objectives in appropriate ecological sites.	Action F-FFM-HFM 6: —
Action A-FFM-HFM 7: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 7: —	Action C-FFM-HFM 7: —	Action D-FFM-HFM 7: In coordination with USFWS and relevant state agencies, BLM and Forest Service planning units (Districts/Forests) will identify annual treatment needs for wildfire and invasive species management as identified in local unit level Landscape Wildfire	Action E-FFM-HFM 7: TMA-1.7: Continue the expansion and implementation of proactive solutions that are market-based, flexible, and take advantage of economies of scale. An example is the "good of the state" contract for fire fuels reduction services initiated by the State	Action F-FFM-HFM 7: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	and Invasive Species Assessments. Annual treatment needs will be coordinated across state/regional scales and across jurisdictional boundaries for long-term conservation of Greater Sage-Grouse.	Purchasing Division in November 2007 that facilitates the contracting for forest management hand crew services, forestry equipment, hauling services, road construction and rehabilitation, and controlled fire burns. Agencies within the state use these services including the Nevada Division of Forestry and the Tahoe Resource Team to meet fuel reduction objectives TMA-2.4: Continue to support a business environment that incentivizes beneficial uses of biomass and excess fuels (e.g. stewardship contracting and landscape-level long-term projects). TMA-2.7: Continue to utilize Nevada Division of Forestry conservation camp crews for fuels reduction project implementation and as federal grant match	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 8: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 8: In PHMA, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. • Do not reduce sagebrush canopy cover to less than 15% (Connelly et al. 2000a; Hagen et al. 2007) unless a fuels management objective requires additional reduction in sagebrush cover to meet strategic protection of PHMA and conserve habitat quality for the species. Closely evaluate the benefits of the fuel break against the additional loss of sagebrush cover in future NEPA documents. • Apply appropriate seasonal restrictions for implementing fuels management treatments according to the type of seasonal habitats present in a priority area. • Allow no fuels	Action C-FFM-HFM 8: Same as Alternative A.	Action D-FFM-HFM 8: Implementation actions will be tiered to the Local (District/Forest) Greater Sage-Grouse Landscape Wildfire & Invasive Species Assessment described in GEN-1, utilizing best available science related to the conservation of Greater Sage-Grouse .	Action E-FFM-HFM 8: TMA-2.6: Continue to identify and utilize all cross-boundary authorities available to improve project coordination and implementation on the ground.	Action F-FFM-HFM 8: Design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. • Do not reduce sagebrush canopy cover to less than 15% (Connelly et al. 2000a; Hagen et al. 2007) unless a fuels management objective requires additional reduction in sagebrush cover to meet strategic protection of occupied Greater Sage-Grouse habitat and conserve habitat quality for the species. • Closely evaluate the benefits of the fuel break against the additional loss of sagebrush cover in the EA process. • Apply appropriate seasonal	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(see *above*)	treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and will maintain winter range habitat quality. • Do not use fire to treat sagebrush in less than 12-inch precipitation zones (e.g., Wyoming big sagebrush or other xeric sagebrush species; Connelly et al. 2000a; Hagen et al. 2007; Beck et al. 2009). However, if as a last resort and after all other treatment opportunities have been explored and site-specific variables allow, the use of prescribed fire for fuel breaks that would disrupt the fuel continuity across the landscape could be considered, in stands where cheatgrass is a very minor component in the understory (Brown 1982).	(see *above*)	(see *above*)	(see *above*)	restrictions for implementing fuels management treatments according to the type of seasonal habitats present. • Allow no fuels treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and will maintain winter range habitat quality. • Do not use fire to treat sagebrush in less than 12-inch precipitation zones (e.g., Wyoming big sagebrush or other xeric sagebrush species; Connelly et al. 2000a; Hagen et al. 2007; Beck et al. 2009). However, if as a last resort and after all other treatment	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	• Monitor and control invasive vegetation post-treatment. • Rest treated areas from grazing for two full growing seasons unless vegetation recovery dictates otherwise (WGFD 2011). • Require use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success (Richards et al. 1998). Where probability of success or native seed availability is low, nonnative seeds may be used as long as they meet Greater Sage-Grouse habitat objectives (Pyke 2011). • Design post fuels management projects to ensure long-term persistence of seeded or pre-treatment native plants. This may require temporary or long-term changes in livestock grazing management, wild	(*see above*)	(*see above*)	(*see above*)	opportunities have been explored and site-specific variables allow, the use of prescribed fire for that would disrupt the fuel continuity across the landscape could be considered, in stands where cheatgrass is a very minor component in the understory (Brown 1982). • Design post fuels management projects to ensure long-term persistence of seeded or pre-treatment native plants, including sagebrush. This may require temporary or long-term changes in livestock grazing management, wild horse and burro management, travel management, or	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	horse and burro management, travel management, or other activities to achieve and maintain the desired condition of the fuels management project (Eisworth and Shonkwiler 2006).	(*see above*)	(*see above*)	(*see above*)	other activities to achieve and maintain the desired condition of the fuels management project (Eiswerth and Shonkwiler 2006).
Action A-FFM-HFM 9: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 9: —	Action C-FFM-HFM 9: Lands will be managed to be in the good or better ecological condition to help minimize adverse impacts of fire.	Action D-FFM-HFM 9: —	Action E-FFM-HFM 9: —	Action F-FFM-HFM 9: —
Action A-FFM-HFM 10: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 10: —	Action C-FFM-HFM 10: Any fuels treatments will focus on interfaces with human habitation or significant existing disturbances.	Action D-FFM-HFM 10: —	Action E-FFM-HFM 10: —	Action F-FFM-HFM 10: —
Action A-FFM-HFM 11: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 11: Design fuels management projects in PHMA to strategically and effectively reduce wildfire threats in the greatest area. This may require fuels treatments implemented in a more linear versus block design (Launchbaugh et al. 2007).	Action C-FFM-HFM 11: Same as Alternative A.	Action D-FFM-HFM 11: —	Action E-FFM-HFM 11: TMA-2.9: Review current processes and, if necessary, the Federal agencies should obtain authority and expedite the process to implement vegetative treatments for fuels reduction projects in strategic areas for protection of sagebrush habitat	Action F-FFM-HFM 11: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 12: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 12: During fuels management project design, consider the utility of using livestock to strategically reduce fine fuels (Diamond et al. 2009), and implement grazing management that will accomplish this objective (Davies et al. 2011; Launchbaugh et al. 2007). Consult with ecologists to minimize impacts on native perennial grasses.	Action C-FFM-HFM 12: Same as Alternative A.	Action D-FFM-HFM 12: —	Action E-FFM-HFM 12: TMA-2.10: Review current processes and, if necessary, develop authorities and expedite the process to utilize a suite of active vegetative treatments (e.g. mechanical, targeted livestock grazing, prescribed fire, and chemical) to reduce weed invasion and maintain resilient post-fire landscapes and control excessive fuel loading throughout the SGMA and constructed fuel breaks.	Action F-FFM-HFM 12: —	
Action A-FFM-HFM 13: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 13: —	Action C-FFM-HFM 13: —	Action D-FFM-HFM 13: —	Action E-FFM-HFM 13: Manage wildland fires in the SGMA to reduce the number of wildfires that escape initial attack and become greater than 300 acres down to two to three percent of all wildfire ignitions over a ten year period. In this context, fire should not be used in Phase III Pinyon and/or Juniper areas due to a lack of a sufficient sagebrush seed stock in the ground.	Action F-FFM-HFM 13: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 14: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 14: —	Action C-FFM-HFM 14: —	Action D-FFM-HFM 14: —	Action E-FFM-HFM 15: Identify and develop suppression plans, including mapping of the SGMA, to improve initial attack suppression actions.	Action F-FFM-HFM 14: —	
Action A-FFM-HFM 15: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 15: —	Action C-FFM-HFM 15: —	Action D-FFM-HFM 15: —	Action E-FFM-HFM 15: Increase initial attack capability by training and equipping volunteer firefighters, as well as agricultural and other industry work forces for assignment during periods of high fire activity. Trained volunteers who are remotely located will serve as first responders when necessary and appropriate.	Action F-FFM-HFM 15: —	
Action A-FFM-HFM 16: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 16: —	Action C-FFM-HFM 16: —	Action D-FFM-HFM 16: —	Action E-FFM-HFM 16: Integrate suppression resource locations within the SGMA and pre-position resources as conditions dictate.	Action F-FFM-HFM 16: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 17: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 17: In PHMA, prioritize suppression, immediately after life and property, to conserve the habitat.	Action C-FFM-HFM 17: Same as Alternative A.	Action D-FFM-HFM 17: Fire fighter and public safety are the highest priority. Greater Sage-Grouse habitat will be prioritized commensurate with property values and other important habitat to be protected, with the goal to restore, enhance, and maintain areas suitable for Greater Sage-Grouse .	Action E-FFM-HFM 17: TMA-3: Manage wildland fires in the SGMA to reduce the number of wildfires that escape initial attack and become greater than 300 acres down to two to three percent of all wildfire ignitions over a ten year period. In this context, fire should not be used in Phase III Pinyon and/or Juniper areas due to a lack of a sufficient sagebrush seed stock in the ground.	Action F-FFM-HFM 17: Same as Alternative B.	
Action A-FFM-HFM 18: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 18: In GHMA, prioritize suppression where wildfires threaten PHMA.	Action C-FFM-HFM 18: Same as Alternative A.	Action D-FFM-HFM 18: —	Action E-FFM-HFM 18: TMA-3: Manage wildland fires in the SGMA to reduce the number of wildfires that escape initial attack and become greater than 300 acres down to two to three percent of all wildfire ignitions over a ten year period. In this context, fire should not be used in Phase III Pinyon and/or Juniper areas due to a lack of a sufficient sagebrush seed stock in the ground.	Action F-FFM-HFM 18: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 19: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 19: Follow BMPs (WO IM 2013-128).	Action C-FFM-HFM 19: Same as Alternative A.	Action D-FFM-HFM 19: Implement the RDFs identified in Appendix D [of the 2015 Final EIS] consistent with applicable law.	Action E-FFM-HFM 19: <u>TMA-5:</u> Through the Nevada Sagebrush Ecosystem Council, utilizing the avoid, minimize, and mitigate strategy, and with the goal of restoring the appropriate role of wildfire, the following successful Nevada Division of Forestry programs that are a benefit to Greater Sage-Grouse will continue. <u>TMA-5.1:</u> Continue statewide resource programs, including: • Native seed collection, cleaning, bagging, storage, and application with quad seeders and seed drills. • Private landowner technical assistance, project implementation and cost share grants for Pinyon and/or Juniper removal (Forest Health) in sagebrush habitats; fuels reduction; green stripping; prescribed fire; and related habitat improvements on nonfederal lands. • Federal and state land project implementation	Action F-FFM-HFM 19: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	through contracts for numerous vegetation improvement projects, water developments, timber stand improvements, fuels reduction, and green stripping. <u>TMA-5.2:</u> Continue statewide fire programs, including: • Fuels reduction planning, technical assistance, cost share grants and project implementation on state and private lands as well as assisting federal agency projects. • The Nevada Division of Forestry Wildland Fire Program to improve wildfire management in participating counties through strengthened initial attack, landowner education, improved coordination with federal land managers, and fuels reduction. <u>TMA-5.3:</u> Continue the Nevada Division of Forestry Conservation Camp Program that: Provides a trained statewide labor force that can be utilized for	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	(*see above*)	(*see above*)	(*see above*)	numerous Greater Sage-Grouse mitigation activities and for wildland fire suppression (State of Nevada 2004).	(*see above*)
Action A-FFM-HFM 20: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 20: Prioritize native seed allocation for use in Greater Sage-Grouse habitat in years when preferred native seed is in short supply. This may require reallocation of native seed from Emergency Stabilization and Rehabilitation (ESR) (BLM) and/or Burn Area Emergency Rehabilitation (Forest Service) projects outside of PHMA to those inside it. Use of native plant seeds for ESR or Burn Area Emergency Rehabilitation seedings is required based on availability, adaptation (site potential), and probability of success (Richards et al. 1998). Where probability of success or native seed availability is low, nonnative seeds may be used as long as they meet Greater Sage-	Action C-FFM-HFM 20: Livestock and other disturbed areas will be seeded with local native ecotypes of shrubs, grasses and forbs.	Action D-FFM-HFM 20: In PHMA and GHMA, give preference to use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success. Where probability of success or adapted seed availability is low, nonnative seeds may be used as long as they support Greater Sage-Grouse habitat objectives. Choose native plant species outlined in ESDs (Forest Service may use a similar process), where available, to re-vegetate sites. If the commercial supply of appropriate native seed/plants is limited, work with the BLM Native Plant Materials Development Program or NRCS Plant Material Program through your respective State or Forest Supervisor's Office Plant Conservation Program Lead. If	Action E-FFM-HFM 20: TMA-4.2: Continue the expansion of, and improvements to, the Nevada Division of Forestry Seedbank & Plant Material program in conjunction with Federal, state and local jurisdiction partners. Utilize Nevada Division of Forestry conservation camp crews to collect native and adapted seed, and for other appropriate rehabilitation activities. Improve storage capabilities for native seed and desirable species that provide a competitive advantage over invasive species; and, improve storage capabilities to promote longevity of available seed.	Action F-FFM-HFM 20: Same as Alternative B.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	Grouse habitat conservation objectives (Pyke 2011). Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, shall be the highest priority for rehabilitation efforts.	(*see above*)	currently available supplies are limited, use the materials that provide the greatest benefit for Greater Sage-Grouse . In all cases seed must be certified weed-free.	(*see above*)	(*see above*)
Action A-FFM-HFM 21: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 21: Design post ESR and Burn Area Emergency Rehabilitation management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse and burro, and travel management to achieve and maintain the desired condition of ESR and Burn Area Emergency Rehabilitation projects to benefit Greater Sage-Grouse (Eiswerth and Shonkwiler 2006).	Action C-FFM-HFM 21: Same as Alternative A.	Action D-FFM-HFM 21: —	Action E-FFM-HFM 21: TMA-4.1: Complete burn severity assessments and identify ecological site potential in, and in proximity to, the SGMA to identify the areas with the highest potential for restoration of habitat functions following fires. Focus rehabilitation efforts on areas of highest potential success based ecological site conditions (soils, precipitation zone, and geography). Utilize revegetation seed mixtures that include native and adapted plant seed that will quickly stabilize soils, help to provide long-term hazardous fuels reduction, and increase ecosystem resiliency in appropriate locations.	Action F-FFM-HFM 21: Same as Alternative B.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 22: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 22: Consider potential changes in climate (Miller at al. 2011) when proposing post-fire seedings using native plants. Consider seed collections from the warmer component within a species' current range for selection of native seed. (Kramer and Havens 2009).	Action C-FFM-HFM 22: Same as Alternative A.	Action D-FFM-HFM 22: Same as Alternative A.	Action E-FFM-HFM 22: —	Action F-FFM-HFM 22: Same as Alternative B.	
Action A-FFM-HFM 23: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 23: —	Action C-FFM-HFM 23: —	Action D-FFM-HFM 23: —	Action E-FFM-HFM 23: —	Action F-FFM-HFM 23: Establish and strengthen networks with seed growers to assure availability of native seed for ESR projects.	
Action A-FFM-HFM 24: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 24: —	Action C-FFM-HFM 24: —	Action D-FFM-HFM 24: —	Action E-FFM-HFM 24: —	Action F-FFM-HFM 24: Post fire recovery must include establishing adequately sized exclosures (free of livestock grazing) that can be used to assess recovery.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Action A-FFM-HFM 25: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 25: —	Action C-FFM-HFM 25: —	Action D-FFM-HFM 25: —	Action E-FFM-HFM 25: —	Action F-FFM-HFM 25: Livestock grazing should be excluded from burned areas until woody and herbaceous plants achieve Greater Sage-Grouse habitat objectives.
Action A-FFM-HFM 26: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 26: —	Action C-FFM-HFM 26: —	Action D-FFM-HFM 26: —	Action E-FFM-HFM 26: —	Action F-FFM-HFM 26: Where burned Greater Sage-Grouse habitat cannot be fenced from other unburned habitat, the entire area (e.g., allotment/ pasture) should be closed to grazing until recovered.
Action A-FFM-HFM 27: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 27: —	Action C-FFM-HFM 27: Mowing of grass will be used in any fuel break fuels reduction project (roadsides or other areas).	Action D-FFM-HFM 27: —	Action E-FFM-HFM 27: —	Action F-FFM-HFM 27: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 28: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 28: —	Action C-FFM-HFM 28: —	Action D-FFM-HFM 28: —	Action E-FFM-HFM 28: Protect, maintain and improve sagebrush habitat statewide over time by treating, rehabilitating and restoring at least as many acres of Greater Sage-Grouse habitat as are lost to wildfire.	Action F-FFM-HFM 28: —	
Action A-FFM-HFM 29: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 29: —	Action C-FFM-HFM 29: —	Action D-FFM-HFM 29: —	Action E-FFM-HFM 29: Utilize the Nevada Sagebrush Ecosystem Council and the Nevada Sagebrush Ecosystem Technical Team to collect and consolidate funding and develop common criteria and requirements for habitat protection, restoration and monitoring.	Action F-FFM-HFM 29: —	
Action A-FFM-HFM 30: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 30: —	Action C-FFM-HFM 30: —	Action D-FFM-HFM 30: —	Action E-FFM-HFM 30: Support the Nevada Division of Forestry's "Wildland Fire Protection Program," a statewide comprehensive wildfire management program that engages all interagency partners (federal, state & local), to reduce the threats of catastrophic wildfire, rapidly suppress wildfires, and rehabilitate lands damaged by wildfire.	Action F-FFM-HFM 30: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 31: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 31: —	Action C-FFM-HFM 31: —	Action D-FFM-HFM 31: —	Action E-FFM-HFM 31: Continue the expansion and implementation of proactive solutions that are market-based, flexible, and take advantage of economies of scale.	Action F-FFM-HFM 31: —	
Action A-FFM-HFM 32: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 32: —	Action C-FFM-HFM 32: —	Action D-FFM-HFM 32: —	Action E-FFM-HFM 32: Continue successful landscape level habitat assessments in, and in proximity to, the SGMA to identify those habitat areas that are at the highest risk of wildland fire.	Action F-FFM-HFM 32: —	
Action A-FFM-HFM 33: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 33: —	Action C-FFM-HFM 33: —	Action D-FFM-HFM 33: —	Action E-FFM-HFM 33: Continue to support a business environment that incentivizes beneficial uses of biomass and excess fuels (e.g. stewardship, contracting, and landscape-level long-term projects).	Action F-FFM-HFM 33: —	
Action A-FFM-HFM 34: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 34: —	Action C-FFM-HFM 34: —	Action D-FFM-HFM 34: —	Action E-FFM-HFM 34: Continue to identify and utilize all cross-boundary authorities available to improve project coordination and implementation on the ground.	Action F-FFM-HFM 34: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 35: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 35: —	Action C-FFM-HFM 35: —	Action D-FFM-HFM 35: —	Action E-FFM-HFM 35: Continue to utilize Nevada Division of Forestry conservation camp crews for fuels reduction project implementation and as federal grant match.	Action F-FFM-HFM 35: —	
Action A-FFM-HFM 36: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 36: —	Action C-FFM-HFM 36: —	Action D-FFM-HFM 36: —	Action E-FFM-HFM 36: Continue to successfully treat existing areas of invasive vegetative that pose a threat to the SGMA through the use of herbicides, fungicides or bacteria to control cheatgrass and medusahead infestations.	Action F-FFM-HFM 36: —	
Action A-FFM-HFM 37: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 37: —	Action C-FFM-HFM 37: —	Action D-FFM-HFM 37: —	Action E-FFM-HFM 37: Update Fire Management Plans, dispatch run cards, and relevant agreements to ensure “closest forces” concepts are being utilized at all times, particularly nonfederal suppression resources (e.g. Nevada Division of Forestry helicopters, crews, and volunteer fire departments).	Action F-FFM-HFM 37: —	
Action A-FFM-HFM 38: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 38: —	Action C-FFM-HFM 38: —	Action D-FFM-HFM 38: —	Action E-FFM-HFM 38: Establish and utilize IMTs for wildfires in the SGMA.	Action F-FFM-HFM 38: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 39: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 39: —	Action C-FFM-HFM 39: —	Action D-FFM-HFM 39: —	Action E-FFM-HFM 39: Develop a "suitcase" interagency suppression task force for pre-positioning during high wildfire hazard periods. Activate up to three interagency "suitcase" task forces and pre-position them during Red Flag and predicted lightning events in the SGMA for initial attack response.	Action F-FFM-HFM 39: —	
Action A-FFM-HFM 40: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 40: —	Action C-FFM-HFM 40: —	Action D-FFM-HFM 40: —	Action E-FFM-HFM 40: Within the SGMA, eliminate the tactic of "burning out," including backfiring unless there are direct life safety threats.	Action F-FFM-HFM 40: —	
Action A-FFM-HFM 41: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 41: —	Action C-FFM-HFM 41: —	Action D-FFM-HFM 41: —	Action E-FFM-HFM 41: Designate Occupied and Suitable Habitat in the SGMA as a "high priority value" for suppression resource allocation in the Geographical Area Coordination Centers and within the FEMA Fire Management Assistance Grant criteria.	Action F-FFM-HFM 41: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 42: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 42: —	Action C-FFM-HFM 42: —	Action D-FFM-HFM 42: —	Action E-FFM-HFM 42: Utilize the interagency Fire Planning Assessment system to optimize utilization of fire suppression resources (e.g. engines, aircraft, water tenders, and hand crews). Fire Program Analysis enables local and national planners to evaluate the effectiveness of alternative fire management strategies for the purpose of meeting fire and land management goals and objectives	Action F-FFM-HFM 42: —	
Action A-FFM-HFM 43: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 43: —	Action C-FFM-HFM 43: —	Action D-FFM-HFM 43: —	Action E-FFM-HFM 43: Encourage use of the State's Air National Guard C-130 Unit with the Modular Airborne Firefighting System (MAFFS) for aerial firefighting support.	Action F-FFM-HFM 43: —	
Action A-FFM-HFM 44: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 44: —	Action C-FFM-HFM 44: —	Action D-FFM-HFM 44: —	Action E-FFM-HFM 44: Increase the fleet of available heavy air tankers and develop a system for prioritizing their use to fight fires when needed.	Action F-FFM-HFM 44: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 45: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 45: —	Action C-FFM-HFM 45—	Action D-FFM-HFM 45: —	Action E-FFM-HFM 45: Eliminate policy and operational inconsistencies by returning jurisdiction over Nevada BLM lands that are currently managed by the California Surprise Field Office, placing that jurisdiction into the Carson City and Winnemucca Field Offices.	Action F-FFM-HFM 45: —	
Action A-FFM-HFM 46: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 46: —	Action C-FFM-HFM 46: —	Action D-FFM-HFM 46: —	Action E-FFM-HFM 46: Develop a specific and concise package of information on management areas within the SGMA for incoming IMTs to ensure an understanding of Nevada conservation priorities that will be included in all Delegations of Authority and Fire Management Plans.	Action F-FFM-HFM 46: —	
Action A-FFM-HFM 47: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 47: —	Action C-FFM-HFM 47: —	Action D-FFM-HFM 47: —	Action E-FFM-HFM 47: Assign a local, trained resource advisor with Greater Sage-Grouse expertise on all fire suppression responses in the SGMA.	Action F-FFM-HFM 47: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 48: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 48: —	Action C-FFM-HFM 48: —	Action D-FFM-HFM 48: —	Action E-FFM-HFM 48: Carefully review and evaluate all burned areas within the SGMA in a timely manner to ascertain the reclamation potential for reestablishing Greater Sage-Grouse habitat, enhancing ecosystem resiliency, and controlling invasive weed species.	Action F-FFM-HFM 48: —	
Action AFFM-HFM 49: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 49: —	Action C-FFM-HFM 49: —	Action D-FFM-HFM 49: —	Action E-FFM-HFM 49: Complete burn severity assessments and identify ecological site potential in, and in proximity to, the SGMA to identify the areas with the highest potential for restoration of habitat functions following fires. Focus rehabilitation efforts on areas of highest potential success based ecological site conditions (soils, precipitation zone, and geography). Utilize revegetation seed mixtures that include native and adapted plant seed that will quickly stabilize soils, help to provide long-term hazardous fuels reduction, and increase ecosystem resiliency in appropriate locations.	Action F-FFM-HFM 49: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 50: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 50: —	Action C-FFM-HFM 50: —	Action D-FFM-HFM 50: —	Action E-FFM-HFM 50: Continue the expansion of, and improvements to, the Nevada Division of Forestry Seedbank & Plant Material program in conjunction with Federal, state and local jurisdiction partners. Utilize Nevada Division of Forestry conservation camp crews to collect native and adapted seed, and for other appropriate rehabilitation activities. Improve storage capabilities for native seed and desirable species that provide a competitive advantage over invasive species; and, improve storage capabilities to promote longevity of available seed.	Action F-FFM-HFM 50: —	
Action A-FFM-HFM 51: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 51: —	Action C-FFM-HFM 51: —	Action D-FFM-HFM 51: —	Action E-FFM-HFM 51: Continue developing plans and acquiring the necessary resources (e.g. seed collection, seeding equipment pools, and trained staff) for post fire rehabilitation activities and warehouse viable seed stockpiles.	Action F-FFM-HFM 51: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 52: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 52: —	Action C-FFM-HFM 52: —	Action D-FFM-HFM 52: —	Action E-FFM-HFM 52: Continue identifying and obtaining funding opportunities from federal, state, local, industry and land users dedicated to implementing prioritized habitat enhancement, restoration, and conservation activities.	Action F-FFM-HFM 52: —	
Action A-FFM-HFM 53: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 53: —	Action CFFM-HFM 53: —	Action D-FFM-HFM 53: —	Action E-FFM-HFM 53: Continue to focus research and monitoring efforts through demonstration projects on improving rehabilitation and revegetation successes in harsh environments.	Action F-FFM-HFM 53: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 54: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 54: —	Action C-FFM-HFM 54: —	Action D-FFM-HFM 54: —	Action E-FFM-HFM 54: Continue statewide resource programs, including: • Native seed collection, cleaning, bagging, storage, and application with quad seeders and seed drills. • Private landowner technical assistance, project implementation and cost share grants for Pinyon and/or Juniper removal (Forest Health) in sagebrush habitats; fuels reduction; green stripping; prescribed fire; and related habitat improvements on nonfederal lands. • Federal and state land project implementation through contracts for numerous vegetation improvement projects, water developments, timber stand improvements, fuels reduction, and green stripping.	Action F-FFM-HFM 54: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 55: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 55: —	Action C-FFM-HFM 55: —	Action D-FFM-HFM 55: —	Action E-FFM-HFM 55: Continue statewide fire programs, including: • Fuels reduction planning, technical assistance, cost share grants and project implementation on state and private lands as well as assisting federal agency projects. • The Nevada Division of Forestry Wildland Fire Program to improve wildfire management in participating counties through strengthened initial attack, landowner education, improved coordination with federal land managers, and fuels reduction.	Action F-FFM-HFM 55: —	
Action A-FFM-HFM 56: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 56: —	Action C-FFM-HFM 56: —	Action D-FFM-HFM 56: —	Action E-FFM-HFM 56: Continue the Nevada Division of Forestry Conservation Camp Program.	Action F-FFM-HFM 56: —	
Action A-FFM-HFM 57: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 57: —	Action C-FFM-HFM 57: —	Action D-FFM-HFM 57: —	Action E-FFM-HFM 57: Continue the following statewide resource programs: • Nevada Department of Agriculture, per Nevada Revised Statute, is charged with enforcing regulation that require landowners to remove	Action F-FFM-HFM 57: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	and or control invasive, noxious plants species that would otherwise alter habitat. • Biological control program that obtains, releases, and monitors a variety of agents (invertebrates & fungi) which have been approved by USDA-APHIS, to control specific noxious weeds to restore and retain natural habitat. • Seed lot inspections are conducted to ensure the viability of seed and the absence of invasive, noxious plant species for rangeland restoration projects conducted by the BLM, Forest Service, and other local agencies, governments and groups. • Pesticide applicator education, training, and licensing to ensure that pesticide applications are conducted properly on and around habitat.	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFM-HFM 58: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 58: —	Action C-FFM-HFM 58: —	Action D-FFM-HFM 58: —	Action E-FFM-HFM 58: Continue Nevada Department of Agriculture statewide surveys for the detection of incipient invasive and noxious plants in conjunction with United States Department of Agriculture Animal and Plant Health Inspection Service (USDA-APHIS) and the Nevada Department of Transportation.	Action F-FFM-HFM 58: —	
Action A-FFM-HFM 59: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-HFM 59: —	Action C-FFM-HFM 59: —	Action D-FFM-HFM 59: —	Action E-FFM-HFM 59: Continue statewide Weed Seed Free Forage and Gravel Certification Program.	Action F-FFM-HFM 59: —	
Climate Change						
Action A-FFM-CC 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-CC 1: —	Action C-FFM-CC 1: —	Action D-FFM-CC 1: Work cooperatively with multiple agencies and stakeholders to establish and maintain a network of climate monitoring sites and stations.	Action E-FFM-CC 1: See Role of Sagebrush Ecosystem Technical Team.	Action F-FFM-CC 1: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Action A-FFM-CC 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFM-CC 2: —	Action C-FFM-CC 2: —	Action D-FFM-CC 2: As climate change data become available through REAs or other ecological studies, identify areas of unfragmented Greater Sage-Grouse habitat and habitat linkages that provide the life-cycle and genetic transfer needs for Greater Sage-Grouse . Manage the identified areas as PHMA.	Action E-FFM-CC 2: See Role of Sagebrush Ecosystem Technical Team.	Action F-FFM-CC 2: —
Livestock Grazing					
Action A-LG 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 1: —	Action C-LG 1: No grazing will be allowed in PHMA. Livestock grazing will be phased out over a period of three years, in accordance with grazing regulations 4110.4-2.	Action D-LG 1: —	Action E-LG 1: —	Action F-LG 1: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Action A-LG 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 2: Within PHMA, incorporate Greater Sage-Grouse habitat objectives and management considerations into all BLM and Forest Service grazing allotments through AMPs or permit renewals and/or Forest Service Annual Operating Instructions.	Action C-LG 2: —	Action D-LG 2: Within PHMA and GHMA containing Greater Sage-Grouse nesting habitat, implement the following management actions, if not meeting Greater Sage-Grouse habitat objectives: • Provide periods of rest or deferment during critical herbaceous growth period • Limit grazing duration to allow plant growth sufficient to meet Greater Sage-Grouse habitat objectives (see Table 2-11 in section 2.8.5 of this Chapter) • Employ herd management techniques to minimize impacts of livestock on nesting habitat during the nesting season (March 1 – June 30).	Action E-LG 2: Within Greater Sage-Grouse habitat, incorporate Greater Sage-Grouse habitat objectives (see Table 2-2) and management considerations into all BLM and Forest Service grazing allotments through allotment management plans (AMPs), multiple use decisions, or permit renewals and/or Forest Service Annual Operating Instructions. Implement appropriate prescribed grazing conservation actions at scales sufficient to influence a positive population response in Greater Sage-Grouse habitat, such as NRCS conservation Practice Standard 528 for prescribed grazing (NRCS 2011).	Action F-LG 2: Same as Alternative B.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 3: In priority habitat, work cooperatively on integrated ranch planning within Greater Sage-Grouse habitat so operations with deeded/BLM and/or Forest Service allotments can be planned as single units.	Action C-LG 3: —	Action D-LG 3: —	Action E-LG 3: In Greater Sage-Grouse habitat, work cooperatively on integrated ranch planning within Greater Sage-Grouse habitat so operations with deeded land, and BLM and/or Forest Service allotments, can be planned as single units, providing flexibility and adaptive management across all ownership and not altering stocking rates on operations for progressive management decisions.	Action F-LG 3: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 4: Prioritize completion of land health assessments (Forest Service may use other analyses) and processing grazing permits within PHMA. Focus this process on allotments that have the best opportunities for conserving, enhancing or restoring habitat for Greater Sage-Grouse . Utilize BLM Ecological Site Descriptions (ESDs) (Forest Service may use other methods) to conduct land health assessments to determine if standards of range-land health are being met.	Action C-LG 4: —	Action D-LG 4: Continue land health assessments on BLM public lands or other monitoring methods on National Forest System lands in PHMA and GHMA to evaluate current conditions as compared to Greater Sage-Grouse habitat objectives described in Table 2-11 in section 2.8.5 of this Chapter. Incorporate the results of BLM and Forest Service monitoring and land health assessments into future management applications to ensure progress toward meeting Greater Sage-Grouse habitat objectives.	Action E-LG 4: Continue land health assessments on BLM public lands or other monitoring methods on Forest Service-administered lands in Greater Sage-Grouse habitat to evaluate current conditions as compared to Greater Sage-Grouse habitat objectives described in Table 2-2. Incorporate the results of BLM and Forest Service monitoring and land health assessments into future management applications to ensure progress toward meeting Greater Sage-Grouse habitat objectives. Incorporate terms and conditions into grazing permits and adjust these as needed through monitoring and adaptive management to meet Greater Sage-Grouse habitat objectives.	Action F-LG 4: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG-5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG-5: In PHMA, conduct land health assessments that include (at a minimum) indicators and measurements of structure/condition/composition of vegetation specific to achieving Greater Sage-Grouse habitat objectives (Doherty et al. 2011). If local/state seasonal habitat objectives are not available, use Greater Sage-Grouse habitat recommendations from Connelly et al. 2000b and Hagen et al. 2007.	Action C-LG 5: —	Action D-LG 5: —	Action E-LG 5: Continue land health assessments on BLM public lands or other monitoring methods on Forest Service-administered lands in Greater Sage-Grouse habitat to evaluate current conditions as compared to Greater Sage-Grouse habitat objectives described in Table 2-2. Incorporate the results of BLM and Forest Service monitoring and land health assessments into future management applications to ensure progress toward meeting Greater Sage-Grouse habitat objectives. Incorporate terms and conditions into grazing permits and adjust these as needed through monitoring and adaptive management to meet Greater Sage-Grouse habitat objectives.	Action F-LG 5: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Action A-LG 6: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 6: Develop specific objectives to conserve, enhance or restore PHMA based on BLM ESDs (Forest Service may use other methods) and assessments (including within wetlands and riparian areas). If an effective grazing system that meets Greater Sage-Grouse habitat requirements is not already in place, analyze at least one alternative that conserves, restores or enhances Greater Sage-Grouse habitat in the NEPA document prepared for the permit renewal (Doherty et al. 2011; Williams et al. 2011).	Action C-LG 6: —	Action D-LG 6: —	Action E-LG 6: Implement management actions (grazing decisions, Annual Operating Instructions [Forest Service only], AMP/Conservation Plan development, or other agreements) to modify grazing management to show progress toward meeting seasonal Greater Sage-Grouse habitat objectives as defined in Table 2-2 where current livestock grazing is identified as the causal factor of not meeting those objectives. Consider singly, or in combination, changes in: 1. Season, timing (duration) and/or rotation of use; 2. Distribution of livestock use; 3. Intensity of use; 4. Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas and goats; Briske et al. 2011); and 5. Numbers/ AUMs of livestock and other ungulates (includes temporary nonrenewable use, and nonuse). Before imposing grazing restrictions or seeking	Action F-LG 6: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(see *above*)	(see *above*)	(see *above*)	(see *above*)	changes in livestock stocking rates or seasons of permitted use, federal agencies in coordination with grazing permittees must identify and implement all economically and technically feasible livestock distribution, forage production enhancement, weed control programs, prescribed grazing systems, off-site water development by the water rights holder, shrub and pinyon and/or juniper control, livestock salting/supplementing plans, and establishment of riparian pastures and herding. (Eureka County Master Plan 2010) There shall be no unmitigated loss of AUMs.	(see *above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 7: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 7: In PHMA, manage for vegetation composition and structure consistent with ecological site potential and within the reference state to achieve Greater Sage-Grouse seasonal habitat objectives.	Action C-LG 7: —	Action D-LG 7: —	Action E-LG 7: Implement management actions (grazing decisions, Annual Operating Instructions [Forest Service only], AMP/Conservation Plan development, or other agreements) to modify grazing management to show progress toward meeting seasonal Greater Sage-Grouse habitat objectives as defined in Table 2-2 where current livestock grazing is identified as the causal factor of not meeting those objectives. Consider singly, or in combination, changes in: 1. Season, timing (duration) and/or rotation of use; 2. Distribution of livestock use; 3. Intensity of use; 4. Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas and goats; Briske et al. 2011); and 5. Numbers/ AUMs of livestock and other ungulates (includes temporary nonrenewable use, and nonuse). Before imposing grazing restrictions or seeking	Action F-LG 7: Manage for vegetation composition and structure consistent with ecological site potential and within the reference state to achieve Greater Sage-Grouse habitat objectives.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	changes in livestock stocking rates or seasons of permitted use, federal agencies in coordination with grazing permittees must identify and implement all economically and technically feasible livestock distribution, forage production enhancement, weed control programs, prescribed grazing systems, off-site water development by the water rights holder, shrub and pinyon and/or juniper control, livestock salting/supplementing plans, and establishment of riparian pastures and herding. (Eureka County Master Plan 2010) There shall be no unmitigated loss of AUMs.	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 8: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 8: Implement management actions (grazing decisions, Annual Operating Instructions [Forest Service only], AMP/Conservation Plan development, or other agreements) to modify grazing management to meet seasonal Greater Sage-Grouse habitat requirements (Connelly et al. 2011). Consider singly, or in combination, changes in: 1) Season or timing of use; 2) Numbers of livestock (includes temporary nonuse or livestock removal); 3) Distribution of livestock use; 4) Intensity of use; and 5) Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas and goats; Briske et al. 2011).	Action C-LG 8: —	Action D-LG 8: —	Action E-LG 8: Implement management actions (grazing decisions, Annual Operating Instructions [Forest Service only], AMP/Conservation Plan development, or other agreements) to modify grazing management to meet seasonal Greater Sage-Grouse habitat objectives as defined in Table 2-2 where current livestock grazing is identified as the causal factor of not meeting those objectives. Consider singly, or in combination, changes in: 1. Season, timing (duration) and/or rotation of use; 2. Distribution of livestock use; 3. Intensity of use; 4. Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas and goats; Briske et al. 2011); and 5. Numbers/ AUMs of livestock and other ungulates (includes temporary nonrenewable use, and nonuse). Before imposing grazing restrictions or seeking changes in livestock	Action F-LG 8: Implement management actions (grazing decisions, AMP/Conservation Plan Development, or other plans or agreements) to modify grazing management to meet seasonal Greater Sage-Grouse habitat requirements (Connelly et al. 2011). Consider singly, or in combination, changes in: 1) Season, timing, and/or frequency of livestock use 2) Numbers/AUMs of livestock (includes temporary non-use or livestock removal) 3) Distribution of livestock use 4) Intensity of livestock use 5) Type of	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	stocking rates or seasons of permitted use, federal agencies in coordination with grazing permittees must identify and implement all economically and technically feasible livestock distribution, forage production enhancement, weed control programs, prescribed grazing systems, off-site water development by the water rights holder, shrub and pinyon and/or juniper control, livestock salting/supplementing plans, and establishment of riparian pastures and herding. (Eureka County Master Plan 2010) There shall be no unmitigated loss of AUMs.	livestock (e.g., cattle, sheep, horses, llamas, alpacas and goats; Briske et al. 2011).	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 9: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 9: During drought periods, prioritize evaluating effects of the drought in PHMA relative to their needs for food and cover. Since there is a lag in vegetation recovery following drought (Thurow and Taylor 1999; Cagney et al. 2010), ensure that post-drought management allows for vegetation recovery that meets Greater Sage-Grouse needs in PHMA.	Action C-LG 9: —	Action D-LG 9: —	Action E-LG 9: When conditions, i.e., climatic variations (such as drought) and wildfire, requiring unique or exceptional management, work to protect Greater Sage-Grouse habitat on a case by case basis and implement adaptive management to allow for vegetation recovery that meets resistance, resilience, and Greater Sage-Grouse life cycle needs in Greater Sage-Grouse habitat as needed on an individual allotment basis.	Action F-LG 9: During drought periods, prioritize evaluating effects of drought in Greater Sage-Grouse habitat areas relative to their biological needs, as well as drought effects on ungrazed reference areas. Since there is a lag in vegetation recovery following drought (Thurow and Taylor 1999; Cagney et al. 2010), ensure that post-drought management allows for vegetation recovery that meets Greater Sage-Grouse needs in Greater Sage-Grouse habitat areas based on Greater Sage-Grouse habitat objectives.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 10: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 10: Manage riparian areas and wet meadows for proper functioning condition or other similar methodology (Forest Service only) within PHMA.	Action C-LG 10: —	Action D-LG 10: Manage riparian areas and wet meadows for proper functioning condition (Forest Service may use other analysis) within PHMA and GHMA.	Action E-LG 10: Grazing management strategies for riparian areas and wet meadows should, at a minimum, maintain or achieve riparian Proper Functioning Condition (PFC) and promote brood rearing/summer habitat objectives, as described in Table 2-2, within Greater Sage-Grouse habitat. Within Greater Sage-Grouse habitat, manage wet meadows to maintain a component of available perennial forbs with diverse species richness to facilitate brood rearing and stabilizing riparian species (Burton et al. 2011) near where water flows to achieve or maintain PFC. Use Ecological Site Descriptions (ESDs) or locally relevant information about soils, hydrology, soil moisture, and site potential to set realistic objectives and evaluate assessments and monitoring data (Swanson et al. 2006). Also conserve or enhance wet meadow complexes to maintain or increase amount of edge and cover near that edge to minimize elevated	Action F-LG 10: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	(*see above*)	(*see above*)	(*see above*)	mortality during the late brood rearing period (Hagen et al. 2007; Kolada et al. 2009a; Atamian et al. 2010) as observed throughout the reach of the stream/watershed and not on specific sites. Some defined areas of concentrated use may be necessary to protect and enhance the overall riparian area.	(*see above*)
Action A-LG 11: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 11: Within PHMA and GHMA, manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing. Also conserve or enhance these wet meadow complexes to maintain or increase amount of edge and cover within that edge to minimize elevated mortality during the late brood rearing period (Hagen et al. 2007; Kolada et al. 2009a; Atamian et al. 2010).	Action C-LG 11: No similar action	Action D-LG 11: No similar action	Action E-LG 11: Grazing management strategies for riparian areas and wet meadows should, at a minimum, maintain or achieve riparian Proper Functioning Condition (PFC) and promote brood rearing/summer habitat objectives, as described in Table 2-2, within Greater Sage-Grouse habitat. Within Greater Sage-Grouse habitat, manage wet meadows to maintain a component of available perennial forbs with diverse species richness to facilitate brood rearing and stabilizing riparian species (Burton et al. 2011) near where water flows to achieve or maintain PFC. Use Ecological Site Descriptions (ESDs) or	Action F-LG 11: Within Greater Sage-Grouse habitats, manage wet meadows to maintain a component of perennial forbs with diverse species richness and productivity relative to site potential (e.g., reference state) to facilitate brood rearing. Also conserve or enhance these wet meadow complexes to maintain or increase the amount of edge and cover within that edge to minimize elevated mortality during the late brood-rearing

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(see *above*)	(see *above*)	(see *above*)	(see *above*)	locally relevant information about soils, hydrology, soil moisture, and site potential to set realistic objectives and evaluate assessments and monitoring data (Swanson et al. 2006). Also conserve or enhance wet meadow complexes to maintain or increase amount of edge and cover near that edge to minimize elevated mortality during the late brood rearing period (Hagen et al. 2007; Kolada et al. 2009a; Atamian et al. 2010) as observed throughout the reach of the stream/watershed and not on specific sites. Some defined areas of concentrated use may be necessary to protect and enhance the overall riparian area.	period (Hagen et al. 2007; Kolada et al. 2009; Atamian et al. 2010).
Action A-LG 12: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 12: Where riparian areas and wet meadows meet PFC or meet standards using other similar methodology (Forest Service only), strive to attain reference state vegetation relative to the ecological site description.	Action C-LG 12: —	Action D-LG 12: —	Action E-LG 12: Grazing management strategies for riparian areas and wet meadows should, at a minimum, maintain or achieve riparian PFC and promote brood rearing/ summer habitat objectives as described in Table 2-2 within Greater Sage-Grouse habitat.	Action F-LG 12: Same as Alternative B.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	Within Greater Sage-Grouse habitat, manage wet meadows to maintain a component of available perennial forbs with diverse species richness to facilitate brood rearing and stabilizing riparian species (Burton et al. 2011) near where water flows to achieve or maintain PFC. Use ESDs or locally relevant information about soils, hydrology, soil moisture, and site potential to set realistic objectives and evaluate assessments and monitoring data (Swanson et al. 2006). Also conserve or enhance wet meadow complexes to maintain or increase amount of edge and cover near that edge to minimize elevated mortality during the late brood rearing period (Hagen et al. 2007; Kolada et al. 2009a; Atamian et al. 2010).	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 13: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 13: Within PHMA, reduce hot season grazing on riparian and meadow complexes to promote recovery or maintenance of appropriate vegetation and water quality. Utilize fencing/herding techniques or seasonal use or livestock distribution changes to reduce pressure on riparian or wet meadow vegetation used by Greater Sage-Grouse in the hot season (summer) (Aldridge and Brigham 2002; Crawford et al. 2004; Hagen et al. 2007).	Action C-LG 13: —	Action D-LG 13: In PHMA and GHMA, apply principles of prescriptive livestock grazing that control time and timing of grazing so that hot season use does not occur on an annual basis.	Action E-LG 13: Grazing management strategies for riparian areas and wet meadows should, at a minimum, maintain or achieve riparian Proper Functioning Condition (PFC) and promote brood rearing/summer habitat objectives, as described in Table 2-2, within Greater Sage-Grouse habitat. Within Greater Sage-Grouse habitat, manage wet meadows to maintain a component of available perennial forbs with diverse species richness to facilitate brood rearing and stabilizing riparian species (Burton et al. 2011) near where water flows to achieve or maintain PFC. Use Ecological Site Descriptions (ESDs) or locally relevant information about soils, hydrology, soil moisture, and site potential to set realistic objectives and evaluate assessments and monitoring data (Swanson et al. 2006). Also conserve or enhance wet meadow complexes to maintain or increase amount of edge and cover near that edge to minimize elevated	Action F-LG 13: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	(*see above*)	(*see above*)	(*see above*)	mortality during the late brood rearing period (Hagen et al. 2007; Kolada et al. 2009a; Atamian et al. 2010) as observed throughout the reach of the stream/watershed and not on specific sites. Some defined areas of concentrated use may be necessary to protect and enhance the overall riparian area.	(*see above*)
Action A-LG 14: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 14: Authorize new water development for diversion from spring or seep source only when PHMA would benefit from the development. This includes developing new water sources for livestock as part of an AMP/conservation plan to improve Greater Sage-Grouse habitat.	Action C-LG 14: —	Action D-LG 14: Authorize new water development for diversion from spring or seep source when PHMA and GHMA would benefit from the development.	Action E-LG 14: Authorize new water development for diversion from spring or seep sources only when Greater Sage-Grouse habitat would not be net negatively affected by the development. This includes developing new water sources for livestock as part of an AMP/conservation plan to improve Greater Sage-Grouse habitat.	Action F-LG 14: Authorize no new water developments for diversion from spring or seep sources within Greater Sage-Grouse habitat.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 15: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 15: Analyze springs, seeps and associated pipelines to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area within PHMA. Make modifications where necessary, considering impacts on other water uses when such considerations are neutral or beneficial to Greater Sage-Grouse .	Action C-LG 15: —	Action D-LG 15: —	Action E-LG 15: Analyze springs, seeps and associated pipelines to find mutually beneficial opportunities to restore functionality to riparian areas within Greater Sage-Grouse habitat, and allow those opportunities to be developed.	Action F-LG 15: Analyze springs, seeps and associated water developments to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area within Greater Sage-Grouse habitats. Make modifications where necessary, including dismantling water developments.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 16: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 16: In PHMA, only allow treatments that conserve, enhance or restore Greater Sage-Grouse habitat (this includes treatments that benefit livestock as part of an AMP/Conservation Plan to improve Greater Sage-Grouse habitat).	Action C-LG 16: —	Action D-LG 16: Unless targeted grazing is the preferred treatment, livestock grazing would not be authorized within treatment areas during implementation of each treatment. Any livestock grazing closure for the purpose of a vegetation treatment would be done through the grazing decision prior to treatment. Livestock grazing would be authorized to resume within a treatment project area after resource monitoring data verifies the treatment objectives are being met and an appropriate grazing regime has been developed.	Action E-LG 16: In Greater Sage-Grouse habitat, encourage and allow vegetation treatments that conserve, enhance or adaptively restore resilience and resistance over time. This includes adaptive management as part of an AMP/Conservation Plan to improve Greater Sage-Grouse habitat.	Action F-LG 16: Ensure that vegetation treatments create landscape patterns which most benefit Greater Sage-Grouse . Only allow treatments that are demonstrated to benefit Greater Sage-Grouse and retain sagebrush height and cover consistent with Greater Sage-Grouse habitat objectives (this includes treatments that benefit livestock as part of an AMP/Conservation Plan to improve Greater Sage-Grouse habitat).	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 17: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 17: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to PHMA to determine if they should be restored to sagebrush or habitat of higher quality for Greater Sage-Grouse . If these seedings are part of an AMP/Conservation Plan or if they provide value in conserving or enhancing the rest of the PHMA, then no restoration would be necessary. Assess the compatibility of these seedings for Greater Sage-Grouse habitat or as a component of a grazing system during the land health assessments (or other analyses [Forest Service only]) (Davies et al. 2011).	Action C-LG 17: —	Action D-LG 17: —	Action E-LG 17: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to Greater Sage-Grouse habitat to determine if additional efforts should be made to restore sagebrush or habitat of a higher quality for Greater Sage-Grouse . If these seedings are part of an AMP/Conservation Plan or if they provide value in conserving, enhancing, or protecting the rest of the Greater Sage-Grouse habitat, then no restoration may be necessary. Assess the compatibility of these seedings for Greater Sage-Grouse habitat or as a component of a grazing system during the land health assessments (Davies et al. 2011) (or other analyses such as the Humboldt-Toiyabe Resource Implementation Protocol for Rapid Assessment Matrices (Forest Service - HTNF 2007)	Action F-LG 17: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to Greater Sage-Grouse habitat to determine if they should be restored to sagebrush or habitat of higher quality for Greater Sage-Grouse . If these seedings provide value in conserving or enhancing Greater Sage-Grouse habitats, then no restoration would be necessary. Assess the compatibility of these seedings for Greater Sage-Grouse habitat during the land health assessments.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 18: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 18: In PHMA, design any new structural range improvements and location of supplements (salt or protein blocks) to conserve, enhance, or restore Greater Sage-Grouse habitat through an improved grazing management system relative to Greater Sage-Grouse objectives. Structural range improvements, in this context, include but are not limited to: cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or increase following construction must be considered in the project planning process and monitored and treated post-construction.	Action C-LG 18: Livestock infrastructure, including fences, spring developments, pipelines, stock ponds and other harmful facilities will be removed (active restoration).	Action D-LG 18: In PHMA and GHMA, assess and modify as needed existing structural range developments to make sure they conserve, enhance, or restore Greater Sage-Grouse habitat.	Action E-LG 18: In Greater Sage-Grouse habitat, ensure that the design of any new structural range improvements and plan the location of supplements (salt or protein blocks) enhance Greater Sage-Grouse habitat or minimize impacts and to promote Greater Sage-Grouse objectives (see Table 2-2). Structural range improvements, in this context, include but are not limited to: cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or their increase following construction must be considered in the project plan and then monitored, treated, and rehabilitated post-construction.	Action F-LG 18: Avoid all new structural range developments in PHMA and GHMA unless independent peer-reviewed studies show that the range improvement structure benefits Greater Sage-Grouse . Structural range developments, in this context, include but are not limited to cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or increase following construction must be considered in	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	(*see above*)	the project planning process and monitored and treated post-construction. Consider the comparative cost of changing grazing management instead of constructing additional range developments.	
Action A-LG 19: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 19: When developing or modifying water developments in PHMA, use applicable RDFs consistent with applicable law (see Appendix C of NTT report) to mitigate potential impacts from West Nile virus (Clark et al. 2006; Doherty 2007; Walker et al. 2007; Walker and Naugle 2011).	Action C-LG 19: —	Action D-LG 19: Modify existing water development projects as needed or feasible to ensure riparian habitats in PHMA and GHMA are being maintained or improved.	Action E-LG 19: —	Action F-LG 19: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 20: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 20: In PHMA, evaluate existing structural range improvements and location of supplements (salt or protein blocks) to make sure they conserve, enhance or restore Greater Sage-Grouse habitat.	Action C-LG 20: —	Action D-LG 20: Salting and supplemental feeding locations, livestock watering and handling facilities (e.g., corrals and chutes) would be located at least 0.5-mile from riparian zones, springs, and meadows, or active leks in PHMA and GHMA. The distance can be greater based on local conditions.	Action E-LG 20: Salting and supplemental feeding locations, temporary and/or mobile watering and new handling facilities (e.g., corrals and chutes) would be located at least 1/2-mile from riparian zones, springs, meadows, or 1 mile from active leks in Greater Sage-Grouse habitat, unless the pasture is too small or another location offers equal or better habitat benefits. The distance should be based on local conditions.	Action F-LG 20: Same as Alternative B.	
Action A-LG 21: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 21: To reduce outright Greater Sage-Grouse strikes and mortality, remove, modify or mark fences in high risk areas within PHMA based on proximity to lek, lek size, and topography (Christiansen 2009; Stevens 2011).	Action C-LG 21: —	Action D-LG 21: Remove, modify, or mark permanent and/or temporary fences in areas of high risk for bird strikes within PHMA and GHMA. Permanent and/or temporary fences would not be located on or across active Greater Sage-Grouse leks. Remove and re-locate existing fences that are located on or across Greater Sage-Grouse active leks.	Action E-LG 21: To reduce Greater Sage-Grouse strikes and mortality, remove, modify or mark fences in high risk areas within Greater Sage-Grouse habitat based on proximity to lek, lek size, and topography (Christiansen 2009; Stevens 2011). Consideration of the utility of the fence should also be taken into consideration to ensure that its removal does not promote degradation of the overall management for habitat or other objectives (Swanson et al. 2006).	Action F-LG 21: Remove, modify or mark fences in areas of moderate or high risk of Greater Sage-Grouse strikes within Greater Sage-Grouse habitat based on proximity to lek, lek size, and topography (Christiansen 2009; Stevens 2011).	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 22: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 22: In PHMA, monitor for, and treat invasive species associated with existing range improvements (Gelbard and Belnap 2003; Bergquist et al. 2007).	Action C-LG 22: —	Action D-LG 22: —	Action E-LG 22: In Greater Sage-Grouse habitat, monitor, treat and if necessary, rehabilitate sites with invasive species associated with existing range improvements (Gelbard and Belnap 2003; Bergquist et al. 2007). State listed noxious weeds (NRS 555) should be given the highest priority. In general, monitor, map, treat (using IPM and associated tools), and rehabilitate sites that have invasive and noxious weed species, especially those associated with disturbance activities.	Action F-LG 22: Same as Alternative B.	
Action A-LG 23: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 23: Maintain retirement of grazing privileges as an option in priority Greater Sage-Grouse areas when the current permittee is willing to retire grazing on all or part of an allotment. Analyze the adverse impacts of no livestock use on wildfire and invasive species threats (Crawford et al. 2004) in evaluating retirement proposals.	Action C-LG 23: —	Action D-LG 23: Consider retirement of grazing privileges on all voluntary relinquishments in PHMA and GHMA where removal of livestock grazing would enhance the ability to achieve Greater Sage-Grouse habitat objectives (see Table 2-11 in section 2.8.5 of this Chapter).	Action E-LG 23: All permit relinquishments should be voluntary. All options to allow responsible management of livestock grazing on an allotment should be considered before any voluntary withdrawal of a grazing permit is considered, in conformance with the multiple use sections of the Taylor Grazing Act.	Action F-LG 23: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 24: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 24: —	Action C-LG 24: —	Action D-LG 24: Establish vegetation treatment project monitoring sites prior to project implementation. Measure project monitoring sites annually during the livestock grazing closure period.	Action E-LG 24: Prior to implementation, establish project monitoring sites where vegetation treatment is planned and monitor at least annually during the recovery period. To ensure effective recovery, monitoring should continue for a number of years immediately following the livestock exclusion period, depending on local site conditions. To reduce the risk of fire and enhance restoration in large contiguous blocks of cheatgrass-dominated sagebrush or Greater Sage-Grouse habitats that are next to highly flammable cheatgrass dominated lands, create local NEPA documented plans to use, e.g. dormant season temporary nonrenewable (TNR) AUM authorizations and stewardship contracted grazing to reduce fuels in areas dominated by invasive plants (Schmelzer et al., in press). Use adaptive management to allow the use of TNR during other seasons, if science emerges	Action F-LG 24: Any vegetation treatment plan must include pretreatment data on wildlife and habitat condition, establish nongrazing exclosures, and include long-term monitoring where treated areas are monitored for at least three years before grazing returns. Continue monitoring for five years after livestock are returned to the area, and compare to treated, ungrazed exclosures, as well as untreated areas.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	demonstrating effectiveness of such practices. Planning should be conducted on an allotment specific basis, and may be contained in allotment management plans (AMPs), multiple use decisions, or permit renewals.	(*see above*)	
Action A-LG 25: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 25: —	Action C-LG 25: —	Action D-LG 25: Within PHMA and GHMA, incorporate terms and conditions into grazing permits to meet Greater Sage-Grouse habitat objectives (see Table 2-11 in section 2.8.5 of this Chapter).	Action E-LG 25: Continue land health assessments on BLM public lands or other monitoring methods on Forest Service-administered lands in Greater Sage-Grouse habitat to evaluate current conditions as compared to Greater Sage-Grouse habitat objectives described in Table 2-2. Incorporate the results of BLM and Forest Service monitoring and land health assessments into future management applications to ensure progress toward meeting Greater Sage-Grouse habitat objectives. Incorporate terms and conditions into grazing permits and adjust these as needed through monitoring and adaptive management to meet Greater Sage-Grouse habitat objectives.	Action F-LG 25: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 26: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 26: —	Action C-LG 26: —	Action D-LG 26: Grazing permit transfers would not be approved without review of Greater Sage-Grouse habitat conditions. Where Greater Sage-Grouse objectives (See Table 2-11 in section 2.8.5 of this Chapter) are not being met in an allotment and causal factors are attributable to livestock grazing, adjust the annual grazing authorization or operating instructions to reflect the allowable use levels (as identified in Table 2-12 in section 2.8.5 of this Chapter) prior to the next grazing season. The Habitat Assessment Framework will be the tool to determine the level to which standards are or not being met.	Action E-LG 26: The allotment should be meeting objectives or if not, changes should already be in place to make upwards trends possible. Waiting for a change of ownership and making changes is not consistent with the goals and objectives of this section or the state plan. (Refer to Action E LG8: in EIS)	Action F-LG 26: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 27: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 27: —	Action C-LG 27: —	Action D-LG 27: Utilize the Greater Sage-Grouse habitat assessment framework and adjust terms and conditions in the grazing permit renewal process where Greater Sage-Grouse objectives (See Table 2-11 in section 2.8.5 of this Chapter) are not being met in an allotment and causes are attributable to livestock grazing. Where habitat conditions (as defined in Table 2-11 in section 2.8.5 of this Chapter)are not being met, and causal factors are attributable to livestock grazing, adjust the annual grazing authorization or operating instructions to reflect the allowable use levels (as identified in Table 2-12 in section 2.8.5 of this Chapter) prior to the next grazing season. The Habitat Assessment Framework will be the tool to determine the level to which standards are or not being met.	Action E-LG 27: TMA-12: Ensure that existing grazing permits maintain or enhance habitat in the SGMA. Utilize livestock grazing when appropriate as a management tool to improve Greater Sage-Grouse habitat quantity, quality or to reduce wildfire threats. Based on a comprehensive understanding of seasonal Greater Sage-Grouse habitat requirements, and in conjunction with flexibility of livestock operators, encourage land management agencies to cooperatively make timely, seasonal range management decisions to respond to vegetation management objectives, including fuels reduction.	Action F-LG 27: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 28: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 28: —	Action C-LG 28: —	Action D-LG 28: Under appropriate conditions implement *Drought Policy* (BLM 2011c) to protect Greater Sage-Grouse PHMA and GHMA. Implement post-drought management to allow for vegetation recovery that meets Greater Sage-Grouse life cycle needs in PHMA and GHMA.	Action E-LG 28: When conditions, i.e., climatic variations (such as drought) and wildfire, requiring unique or exceptional management, work to protect Greater Sage-Grouse habitat on a case by case basis and implement adaptive management to allow for vegetation recovery that meets resistance, resilience, and Greater Sage-Grouse life cycle needs in Greater Sage-Grouse habitat as needed on an individual allotment basis.	Action F-LG 28: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 29: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 29: —	Action C-LG 29: —	Action D-LG 29: During the annual grazing application, work with permittees to avoid concentrated turn-out locations for livestock within approximately 3 miles of known lek areas during the March 1 to May 15 period. Avoid domestic sheep use and bedding areas, and herder camps within at least 1.24 miles (2 kilometers) of known lek locations. Utilize land features and roads on maps provided to the permittee to help demarcate livestock use avoidance areas. Require terms and conditions language for affected livestock grazing permits regarding livestock use during the lekking period.	Action E-LG 29: During the annual grazing application, work with permittees to avoid consistent concentrated turn-out locations for livestock within approximately 3 miles of known lek areas during the March 1 to May 15 period. During the March 1 to May 15 period, avoid domestic sheep use, bedding areas, and herder camps within at least 1.24 miles (2 kilometers) of known lek locations. Utilize land features and roads on maps provided to the permittee to help demarcate livestock use avoidance areas. Require terms and conditions language for affected livestock grazing permits regarding livestock turnout locations during the lekking period. During the lekking period, use best management practices to avoid livestock aggregation around the lekking grounds.	Action F-LG 29: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 30: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 30: —	Action C-LG 30: —	Action D-LG 30: During the permit renewal process, include terms and conditions language regarding livestock use during the lekking period.	Action E-LG 30: Strive to improve and maintain regular communication at the allotment level between land management agency and the permittee to encourage proper management techniques. Land management agencies should coordinate with relevant state, local and tribal government agencies and permittees to conduct regular trend monitoring at the allotment level. Encourage cooperative permittee monitoring, such as described in Perryman et al 2006.	Action F-LG 30: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 31: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 31: —	Action C-LG 31: —	Action D-LG 31: —	Action E-LG 31: Ensure that existing grazing permits maintain or enhance habitat within the SGMA. Utilize livestock grazing when appropriate as a management tool to improve Greater Sage-Grouse habitat quantity, quality or to reduce wildfire threats. Based on a comprehensive understanding of seasonal Greater Sage-Grouse habitat requirements, and in conjunction with flexibility of livestock operators, encourage land management agencies to cooperatively make timely, seasonal range management decisions to respond to vegetation management objectives, including fuels reduction.	Action F-LG 31: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 32: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 32: —	Action C-LG 32: —	Action D-LG 32: —	Action E-LG 32: Promote and implement proper livestock grazing practices that promote the health of the perennial herbaceous vegetation component. Perennial grasses, especially, are strong competitors with cheatgrass (Booth et al. 2003; Chambers et al. 2007; Davies et al. 2008; Blank and Morgan 2012). Field research has demonstrated that moderate levels of livestock grazing can increase the resiliency of sagebrush communities, reduce the risk and severity of wildfire, and decrease the risk of exotic weed invasion (Davies et al. 2009 and Davies et al. 2010).	Action F-LG 32: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LG 33: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 33: —	Action C-LG 33: —	Action D-LG 33: —	Action E-LG 33: Grazing management strategies for riparian areas should, at a minimum, maintain or achieve riparian PFC. Specific management actions include riparian fencing to provide control of the season, duration or degree of herbivory, providing alternate water sources away from the riparian area, changing the grazing system, or other grazing management practices that promote herbage removal within acceptable limits.	Action F-LG 33: —	
Action A-LG 34: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG 34: —	Action C-LG 34: —	Action D-LG 34: —	Action E-LG 34: Identify and apply appropriate habitat management (e.g. livestock management and vegetation treatments), and all predator control practices (e.g. control of artificial nest and roost sites, increased take, and decrease anthropogenic subsidies) that decrease the effectiveness of predators.	Action F-LG 34: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Climate Change						
Action A-LG-CC 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG-CC 1: —	Action C-LG-CC 1: —	Action D-LG-CC 1: As climate change data become available through REAs or other ecological studies, identify areas of unfragmented Greater Sage-Grouse habitat and key habitat linkages that provide the life-cycle and genetic transfer needs for Greater Sage-Grouse . Manage the identified areas as PHMA.	Action E-LG-CC 1: To aid in planning adaptive management for the purpose of maintaining health of important forage plants (perennials needed for resilience and resistance), cooperatively strategize how various areas in Greater Sage-Grouse habitat allotments can be managed differently each year to achieve positive grazing response index scores (Perryman et al 2006; Reed et al. 1999; Wyman et al. 2006; and USDA FOREST SERVICE 1996) and meet resource objectives.	Action F-LG-CC 1: —	
Action A-LG-CC 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG-CC 2: —	Action C-LG-CC 2: —	Action D-LG-CC 2: Work cooperatively with multiple agencies and stakeholders to establish and maintain a network of climate monitoring sites and stations.	Action E-LG-CC 2: —	Action F-LG-CC 2: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Drought					
Action A-LG-D 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LG-D 1: —	Action C-LG-D 1: —	Action D-LG-D 1: Due to drought conditions, changes in livestock management may be required to protect PHMA. The Field Manager or the Forest Service District Ranger should encourage permittees to take voluntary measures to delay turnout, reduce numbers, and adjust livestock operations. Absent voluntary measures to change livestock management by permittees, the District Manager or Forest Service District Ranger would implement appropriate changes to livestock grazing through decision or Annual Operating Instructions	Action E-LG-D 1: When conditions, i.e., climatic variations (such as drought) and wildfire, requiring unique or exceptional management, work to protect Greater Sage-Grouse habitat on a case by case basis and implement adaptive management to allow for vegetation recovery that meets resistance, resilience, and Greater Sage-Grouse life cycle needs in Greater Sage-Grouse habitat as needed on an individual allotment basis.	Action F-LG-D 1: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Recreation and Visitor Services					
No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-REC 1: Only allow BLM SRPs and Forest Service Recreation Special Use Authorizations (RSUAs) in PHMA that have neutral or beneficial effects on PHMA.	Action C-REC 1: Same as Alternative A.	Action D-REC 1: Allow SRPs and Forest Service Recreation Special Use Authorization (RSUA) in PHMA and GHMA that have neutral or beneficial effects on Greater Sage-Grouse .	Action E-REC 1: All new proposed SRPs and Forest Service Recreation Special Use Authorizations (RSUA) within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-REC 1: Same as Alternative B.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-REC 2: —	Action C-REC 2: Same as Alternative A.	Action D-REC 2: No new recreation facilities would be constructed in PHMA and GHMA (e.g. Campgrounds, day-use areas, scenic pullouts, and trailheads).	Action D-REC 2: All proposed new recreation facilities (e.g. campgrounds, day-use areas, scenic pullouts, and trailheads) within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-REC 2: Seasonally prohibit camping and other nonmotorized recreation within 4 miles of active Greater Sage-Grouse leks.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-REC 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-REC 3: —	Action C-REC 3: —	Action D-REC 3: —	Action E-REC 3: In the SGMA, continue successful programs following the avoid, minimize, and mitigate strategy for recreation and OHV impacts on Greater Sage-Grouse habitat.	Action F-REC 3: —	
Action A-REC 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-REC 4: —	Action C-REC 4: —	Action D-REC 4: —	Action E-REC 4: Study the impact caused by recreational and OHV use in Greater Sage-Grouse habitat.	Action F-REC 4: —	
Action A-REC 5: —	Action B-REC 5: —	Action C-REC 5: —	Action D-REC 5: —	Action E-REC 5: Work collaboratively through LAWGs, State, and Federal agencies to designate OHV areas outside of the SGMA.	Action F-REC 5: —	
Comprehensive Travel and Transportation Management						
Action A-CTTM 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-CTTM 1: In PHMA, limit motorized travel to existing roads, primitive roads, and trails at a minimum, until such time as travel management planning is complete and routes are either designated or closed.	Action C-CTTM 1: Motorized travel would be limited to existing roads, primitive roads, and trails in PHMA.	Action D-CTTM 1: In plans that have been completed and are being implemented (e.g., Northeastern California and Forest Service plans), motorized travel would be limited to designated routes in PHMA and GHMA. In areas where travel planning has not been completed, motorized travel would be limited to existing routes in PHMA and GHMA.	Action E-CTTM 1: In Core and Priority habitat limit motorized travel to existing roads, primitive roads, and trails at a minimum, until such time as travel management planning is complete and routes are either designated or closed.	Action F-CTTM 1: Same as Alternative D.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-CTTM 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-CTTM 2: —	Action C-CTTM 2: —	Action D-CTTM 2: —	Action E-CTTM 2: Work collaboratively through LAWGs, State, and Federal agencies to designate OHV areas outside of the SGMA.	Action F-CTTM 2: —	
Action A-CTTM 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-CTTM 3: —	Action C-CTTM 3: Same as Alternative A.	Action D-CTTM 3: —	Action E-CTTM 3: Design roads to an appropriate standard, no higher than necessary, to accommodate their intended purpose and level of use (see Appendix O [of the 2015 Final EIS]).	Action F-CTTM 3: Prohibit new road construction within 4 miles of active Greater Sage-Grouse leks, and avoid new road construction in PHMA and GHMA.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Action A-CTTM 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-CTTM 4: In PHMA, travel management should evaluate the need for permanent or seasonal road or area closures.	Action C-CTTM 4: Some roads that intrude into lek or winter habitats will be removed or seasonally closed.	Action D-CTTM 4: In PHMA and GHMA, new travel management plans would evaluate vehicle routes and determine the need for permanent or seasonal road closures, and mode of travel (e.g. motorcycle, ATV, and UTV) restrictions, including noise levels and speed. Where such closures or restrictions are infeasible due to administrative or public need, consider re-routing road to improve or protect Greater Sage-Grouse habitat. Periods of seasonal road closures would be identified in the travel management plan taking into account the adverse effect on the particular life-cycle need of Greater Sage-Grouse in the area of the seasonal closure. Routes in PHMA not required for public access or recreation with current administrative/agency purpose or need should be evaluate for administrative access only in the implementation-level transportation management plans.	Action E-CTTM 4: —	Action F-CTTM 4: Same as Alternative B.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Action A-CTTM 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-CTTM 5: Complete activity level travel plans within five years of the ROD. During activity level planning, where appropriate, designate routes in PHMA with current administrative/agency purpose or need to administrative access only.	Action C-CTTM 5: Same as Alternative A.	Action D-CTTM 5: Same as Alternative A.	Action E-CTTM 5: TMA-8.1: Follow a strategy that seeks to avoid conflict with Greater Sage-Grouse by locating facilities and activities in Non-Habitat wherever possible (State of Nevada 2012).	Action F-CTTM 5: Same as Alternative B.
Action A-CTTM 6: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-CTTM 6: In PHMA, limit route construction to realignments of existing designated routes if that realignment has a minimal impact on Greater Sage-Grouse habitat, eliminates the need to construct a new road, or is necessary for motorist safety.	Action C-CTTM 6: Same as Alternative A.	Action D-CTTM 6: In PHMA and GHMA, no new roads would be allowed except those necessary for public safety, administrative or public need to accommodate valid existing rights. Limit route construction to realignments of existing routes if the realignment: 1) maintains or enhances PHMA, 2) eliminates the need to construct a new road, or 3) is necessary for public safety, 4) Minimize impacts on Greater Sage-Grouse habitat through application of RDFs consistent with	Action E-CTTM 6: All proposed new roads within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the	Action F-CTTM 6: Limit route construction to realignments of existing designated routes if that realignment has a minimal impact on Greater Sage-Grouse habitat, eliminates the need to construct a new road, or is necessary for motorist safety. Mitigate any impacts with methods that have been demonstrated to be effective to offset the loss of Greater Sage-Grouse habitat.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	(*see above*)	(*see above*)	applicable law (see Appendix D [of the 2015 Final EIS]) and other mitigation measures.	2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	(*see above*)
Action A-CTTM 7: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-CTTM 7: In PHMA, use existing roads, or realignments as described above to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the absolute minimum standard necessary, and add the surface disturbance to the total disturbance in the priority area. If that disturbance exceeds 3 % for that area, then evaluate and implement additional, effective mitigation necessary to offset the resulting loss of Greater Sage-Grouse habitat (see Objectives).	Action C-CTTM 7: Same as Alternative A.	Action D-CTTM 7: In PHMA and GHMA, access to valid existing rights would be addressed to provide the minimum access necessary to exercise the right and maintain or enhance Greater Sage-Grouse habitat through mitigation necessary to off-set loss to PHMA.	Action D-CTTM 7: All proposed new anthropogenic disturbances, including those necessary to access valid existing rights, within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the “avoid, minimize, mitigate” process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the “avoid process” according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts	Action F-CTTM 7: Same as Alternative B using a 4-mile buffer from leks to determine road route.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	(*see above*)	(*see above*)	(*see above*)	through the Conservation Credit System (see Action E-SSS-ACDM 5).	(*see above*)
Action A-CTTM 8: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-CTTM 8: In PHMA, allow no upgrading of existing routes that would change route category (road, primitive road, or trail) or capacity unless the upgrading would have minimal impact on Greater Sage-Grouse habitat, is necessary for motorist safety, or eliminates the need to construct a new road.	Action C-CTTM 8: Same as Alternative A.	Action D-CTTM 8: In PHMA and GHMA, allow no upgrading of existing routes that would change route category (road, primitive road, or trail) or capacity unless the upgrade would maintain or enhance Greater Sage-Grouse habitat, provide a fuel break to protect native vegetation, is necessary for public safety, or eliminates the need to construct a new road.	Action E-CTTM 8: All proposed upgrades of existing routes, including those which would change route category (road, primitive road, or trail) within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-CTTM 8: Allow no upgrading of existing routes that would change route category (road, primitive road, or trail) or capacity unless it is necessary for motorist safety, or eliminates the need to construct a new road. Any impacts shall be mitigated with methods that have been demonstrated to be effective to offset the loss of Greater Sage-Grouse habitat.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Action A-CTTM 9: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-CTTM 9: In PHMA, conduct restoration of roads, primitive roads and trails not designated in travel management plans. This also includes primitive route/roads that were not designated in WSAs and within lands with wilderness characteristics that have been selected for protection in previous LUPs.	Action C-CTTM 9: Same as Alternative A.	Action D-CTTM 9: In PHMA and GHMA, close primitive roads and trails not designated in travel management plans so they are effectively closed to motorized travel.	Action E-CTTM 9: Conduct rehabilitation of roads, primitive roads, and trails not designated in travel management plans where such plans exist and have been approved for implementation. This also includes primitive route/roads that were not designated in wilderness study areas and within lands managed for wilderness characteristics that have been selected for protection, with due consideration given to any historical significance of existing trails. (See Appendix D [of the 2015 Final EIS])	Action F-CTTM 9: Same as Alternative B.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-CTTM 10: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-CTTM 10: When reseeding roads, primitive roads and trails in PHMA, use appropriate seed mixes and consider the use of transplanted sagebrush.	Action C-CTTM 10: Same as Alternative A.	Action D-CTTM 10: In PHMA and GHMA, obliterate and seed roads, primitive roads and trails not designated in travel management plans, with appropriate seed mixes and transplanted sagebrush when applicable. Use fire resistant species to provide for fire breaks where appropriate. Seed must be certified weed-free.	Action E-CCTM 10: When reseeding roads, primitive roads, and trails, use appropriate seed mixes and consider the use of transplanted sagebrush in order to meet Greater Sage-Grouse habitat restoration objectives. Where invasive annual grasses are present, herbicides may be used to enhance the effectiveness of any seeding and to also establish islands of desirable species for dispersion. (See Appendix D [of the 2015 Final EIS])	Action F-CTTM 10: When reseeding closed roads, primitive roads and trails, use appropriate native seed mixes and require the use of transplanted sagebrush.	
Lands and Realty						
Land Use Authorizations						
Action A-LR-LUA 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 1: Make PHMA exclusion areas for new BLM ROW or Forest Service Special Use Authorization (SUA) permits. Consider the following exceptions: • Within designated ROW or SUA corridors encumbered by existing ROW or SUA: new ROWs or SUAs may be co-located only if the entire footprint of	Action C-LR-LUA 1: Make PHMA ROW exclusion areas including new ROWs within corridors New corridors/facilities will be sited in nonhabitat and bundled with existing corridors to the maximum extent possible.	Action D-LR-LUA 1: Designate PHMA as ROW avoidance areas for all other ROWs or SUAs. Development within avoidance areas could occur if the development incorporates appropriate RDFs, consistent with applicable law, in design and construction (e.g. noise, tall structure, and seasonal restrictions) and development results in no net un-mitigated loss of PHMA and GHMA.	Action E-LR-LUA 1: All proposed ROWs and SUAs within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management	Action F-LR-LUA 1: PHMA and GHMA shall be exclusion areas for new ROWs permits. Consider the following exceptions: • Within designated ROW corridors encumbered by existing ROW authorizations: new ROWs may be co-located only if the entire footprint of the	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	the proposed project (including construction and staging), can be completed within the existing disturbance associated with the authorized ROWs or SUAs. • Subject to valid existing rights: where new ROWs or SUAs associated with valid existing rights are required, co-locate new ROWs or SUAs within existing ROWs or SUAs or where it best minimizes impacts on Greater Sage-Grouse . Use existing roads, or realignments as described above, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the absolute minimum standard necessary, and add the surface disturbance to the total disturbance in the priority area. If	(*see above*)	Subject to valid, existing rights: where new ROWs or SUAs associated with valid existing rights are required, co-locate new ROWs or SUAs within existing ROWs or SUAs to achieve no net un-mitigated loss of PHMA.	category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5). This is similar to designation as ROW avoidance areas. Site new linear features in existing corridors or, at a minimum, co-locate with existing linear features in the SGMA.	proposed project (including construction and staging); can be completed within the existing disturbance associated with the authorized ROWs. • Subject to valid, existing rights: where new ROWs associated with valid existing rights are required, co-locate new ROWs within existing ROWs or where it best minimizes Impacts on Greater Sage-Grouse . Use existing roads, or realignments as described above, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	that disturbance exceeds 3% for that area, then evaluate and implement additional effective mitigation on a case-by-case basis to offset the resulting loss of Greater Sage-Grouse habitat.	(*see above*)	(*see above*)	(*see above*)	the absolute minimum standard necessary, and add the surface disturbance to the total disturbance in the priority area. If that disturbance exceeds 3% for that area, then make additional mitigation that has been demonstrated to be effective to offset the resulting loss of Greater Sage-Grouse habitat.	
Action A-LR-LUA 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 2: Evaluate and take advantage of opportunities to remove, bury, or modify existing power lines within PHMA.	Action C-LR-LUA 2: Same as Alternative A.	Action D-LR-LUA 2: Where appropriate, bury new and existing utility lines as mitigation unless not technically feasible.	Action E-LR-LUA 2: Bury distribution power lines of up to 35kV where ground disturbance can be minimized. Where technology and economic factors allow, bury higher kV power lines. (See Appendix D [of the 2015 Final EIS]).	Action F-LR-LUA 2: Same as Alternative B	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LR-LUA 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 3: Where existing leases or ROWs or SUAs have had some level of development (e.g., road, fence, or well) and are no longer in use, reclaim the site by removing these features and restoring the habitat.	Action C-LR-LUA 3: Same as Alternative A.	Action D-LR-LUA 3: In PHMA and GHMA where existing ROWs or SUAs are no longer in use, coordinate with the lease holder or Forest Service Special Use Permit holder to relinquish the ROW or SUA and reclaim the site by removing overhead lines and other infrastructure.	Action E-LR-LUA 3: Where existing leases or rights-of-way (ROWs) have had some level of development (e.g., road, fence, or well) and are no longer in use, reclaim the site by removing these features, without interfering with valid pre-existing rights, and restoring the habitat. (See Appendix D [of the 2015 Final EIS]).	Action F-LR-LUA 3: Same as Alternative B	
Action A-LR-LUA 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 4: Planning Direction Note: Relocate existing designated ROW corridors crossing PHMA void of any authorized ROWs, outside of the PHMA. If relocation is not possible, undesignate that entire corridor during the planning process.	Action C-LR-LUA 4: Same as Alternative A.	Action D-LR-LUA 4: —	Action E-LR-LUA 4: —	Action F-LR-LUA 4: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LR-LUA 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 5: Make GHMA "avoidance areas" for new ROWs or SUAs.	Action C-LR-LUA 5: See Action C-LR-LUA 1.	Action D-LR-LUA 5: Designate GHMA as ROW avoidance areas for new communication site ROWs or SUAs. Development within avoidance areas could occur if the development incorporates appropriate RFDs in design and construction (e.g. noise, tall structure, and seasonal restrictions) and development results in no net un-mitigated loss of PHMA or GHMA.	Action E-LR-LUA 5: All proposed new communication site ROWs and SUAs within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5). This is similar to designation as ROW avoidance areas.	Action F-LR-LUA 5: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LR-LUA 6: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 6: Where new ROWs or SUAs are necessary in GHMA, co-locate new ROWs or SUAs within existing ROWs or SUAs where possible.	Action C-LR-LUA 6: Same as Alternative A.	Action D-LR-LUA 6: In PHMA and GHMA, co-locate new utility (e.g., power or telephone) lines with other existing linear surface ROWs, such as roads and pipelines.	Action E-LR-LUA 6: TMA-18.6: Site new linear features in existing corridors or, at a minimum, co-locating with existing linear features in the SGMA.	Action F-LR-LUA 6: —	
Action A-LR-LUA 7: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 7: —	Action C-LR-LUA 7: —	Action D-LR-LUA 7: Manage landfills and transfer stations on public lands to reduce opportunities for nesting, cover, or perches for predators. Identify and close trespass landfills and dumps on public lands.	Action E-LR-LUA 7: TMA-9.3: Continue successful programs that have eliminated external food sources for ravens, particularly landfills, waste transfer facilities, and road kill that subsidize raven populations. Enforce existing State laws that require daily covering of landfills. Continue to reduce and minimize external food sources for ravens: particularly landfills, waste transfer facilities, and road kill that subsidize raven populations.	Action F-LR-LUA 7: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LR-LUA 8: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 8: —	Action C-LR-LUA 8: —	Action D-LR-LUA 8: —	Action E-LR-LUA 8: The Nevada Sagebrush Ecosystem Council and the Nevada Sagebrush Ecosystem Technical Team will meet energy goals and Greater Sage-Grouse conservation measures through close coordination with all interest groups and adherence to NRS 701.610 (amended by the 2011 Nevada Legislature) that requires state agency review of all energy development proposals. Attention will be focused on the series of transmission corridors currently being studied to consider the longer term transmission needs required to meet the nation's renewable energy demands. On federal lands, activities that have an approved BLM notice, plan of operation, ROW, or drilling plan, and on State/Private lands, projects with an approved Nevada Division of Environmental Protection permit, are exempt from any new mitigation requirements above and beyond what has already	Action F-LR-LUA 8: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	been stipulated in the projects' approvals.	(*see above*)	
Action A-LR-LUA 9: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 9: —	Action C-LR-LUA 9: —	Action D-LR-LUA 9: —	Action E-LR-LUA 9: Follow a strategy that seeks to avoid conflict with Greater Sage-Grouse by locating facilities and activities in Non-Habitat wherever possible.	Action F-LR-LUA 9: —	
Action A-LR-LUA 10: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 10: —	Action C-LR-LUA 10: —	Action D-LR-LUA 10: —	Action E-LR-LUA 10: In the SGMA, limit conflict through avoidance and minimization of impacts, adaptive management, and appropriate mitigation	Action F-LR-LUA 10: —	
Action A-LR-LUA 11: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 11: —	Action C-LR-LUA 11: —	Action D-LR-LUA 11: —	Action E-LR-LUA 11: Energy developers will work closely with state and federal agency experts to determine important nesting, brood rearing and winter habitats and avoid those areas.	Action F-LR-LUA 11: —	
Action A-LR-LUA 12: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 12: —	Action C-LR-LUA 12: —	Action D-LR-LUA 12: —	Action E-LR-LUA 12: A company representative will provide environmental training to on-site personnel and be responsible for overseeing compliance with all protective measures and coordination in accordance with the permitting authority.	Action F-LR-LUA 12: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LR-LUA 13: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 13: —	Action C-LR-LUA 13: —	Action D-LR-LUA 13: —	Action E-LR-LUA 13: Vehicle trips shall be limited to those times that least impact nesting or wintering Greater Sage-Grouse .	Action F-LR-LUA 13: —	
Action A-LR-LUA 14: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 14: —	Action C-LR-LUA 14: —	Action D-LR-LUA 14: —	Action E-LR-LUA 14: Current transmission and generation siting and construction practices to be reviewed and potentially refined by the Nevada Sagebrush Ecosystem Council and Nevada Sagebrush Ecosystem Technical Team pursuant to the "Resource Selection Function Model" (Coates) and other best available science include proximity to active leks and nesting habitat, relation to migratory and nonmigratory populations, and relation to movement corridors.	Action F-LR-LUA 14: —	
Action A-LR-LUA 15: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 15: —	Action C-LR-LUA 15: —	Action D-LR-LUA 15: Eliminate existing raven nesting opportunities created by anthropogenic development on public lands (e.g., remove infrastructure, power line, and communication facilities no longer in service).	Action E-LR-LUA 15: Remove power lines that traverse important Greater Sage-Grouse habitats when facilities being serviced are no longer in use or when projects are completed (see Appendix D [of the 2015 Final EIS]).	Action F-LR-LUA 15: —	.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LR-LUA 16: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LUA 16: —	Action C-LR- LUA 16: —	Action D-LR-LUA 16: In PHMA and GHMA, require ROW holders to retro-fit existing power lines and other utility structure with perch-deterring devices during ROW renewal process.	Action E-LR-LUA 16: Work with existing rights-of-way holders to encourage installation of perch guards on all poles where existing utility poles are located within 5 km (3.2 miles) of known leks (Coates et al. 2013) (see Appendix D [of the 2015 Final EIS]).	Action F-LR- LUA 16: —	
Action A-LR- LUA 17: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR- LUA 17: —	Action C-LR- LUA 17: —	Action D-LR-LUA 17: —	Action E-LR- LUA 17: Development or infrastructure features should not be placed within a 0.6 mile (1 km) radius around seeps, springs and wet meadows within identified brood rearing habitats wherever possible. These features can provide a competitive advantage for avian predators; therefore increasing Greater Sage-Grouse mortality during a period when birds may be susceptible.	Action F-LR- LUA 17: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LR- LUA 18: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR- LUA 18: —	Action C-LR- LUA 18: —	Action D-LR-LUA 18: Do not designate new utility corridors in PHMA and GHMA.	Action E-LR-LUA 18: Proposed new utility corridors within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-LR- LUA 18: —	
Action A-LR-LUA 19: —	Action B-LR-LUA 19: —	Action C-LR-LUA 19: —	Action D-LR-LUA 19: —	Action E-LR-LUA 19: Aggressively engage in reclamation/weed control efforts during pre-and post-project construction.	Action F-LR-LUA 19: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LR-LUA 20: —	Action B-LR-LUA 20: —	Action C-LR-LUA 20: —	Action D-LR-LUA 20: —	Action E-LR-LUA 20: Apply measures to deter raptor perching and raven nesting on elevated structures	Action F-LR-LUA 20: —	
Land Tenure						
Action A-LR-LT 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LT 1: Retain public ownership of PHMA. Consider exceptions where: • There is mixed ownership, and land exchanges would allow for additional or more contiguous federal ownership patterns within the PHMA. Under PHMA with minority federal ownership, include an additional, effective mitigation agreement for any disposal of federal land. As a final preservation measure consideration should be given to pursuing a permanent conservation easement.	Action C-LR-LT 1: All public lands in ACECs, PHMA, and identified restoration and rehab land areas will be retained in public ownership.	Action D-LR-LT 1: Retain public ownership of PHMA and GHMA. Consider exceptions when: • Disposal and/or acquisitions of public lands would allow for more contiguous federal ownership patterns within the Greater Sage-Grouse habitat area, or where a land tenure adjustment would result in a net gain in amount or quality of Greater Sage-Grouse habitat.	Action E-LR-LT 1: —	Action F-LR-LT 1: Same as Alternative B, without exceptions for disposal to consolidate ownership that would be beneficial to Greater Sage-Grouse .	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LR-LT 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-LT 2: Where suitable conservation actions cannot be achieved in PHMA, seek to acquire state and private lands with intact subsurface mineral estate by donation, purchase or exchange in order to best conserve, enhance or restore Greater Sage-Grouse habitat.	Action C-LR-LT 2: BLM and Forest Service will strive to acquire important private lands in BLM-designated ACECs and Forest Service Greater Sage-Grouse Special Areas. Acquisition will be prioritized over easements.	Action D-LR-LT 2: Where significant conservation actions could be achieved in PHMA, seek to acquire lands with intact subsurface mineral estate by donation, purchase, or exchange in order to best conserve, enhance or restore Greater Sage-Grouse habitat.	Action E-LR-LT 2: —	Action F-LR-LT 2: —	
Withdrawals						
Action A-LR-W 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-W 1: Propose lands within PHMA recommended for mineral withdrawal.	Action C-LR-W 1: Propose lands within PHMA recommended for mineral withdrawal.	Action D-LR-W 1: Same as Alternative A.	Action E-LR-W 1: —	Action F-LR-W 1: Same as Alternative B.	
Action A-LR-W 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-W 2: In PHMA, do not recommend withdrawal proposals not associated with mineral activity unless the land management is consistent with Greater Sage-Grouse conservation measures. (For example; in a proposed withdrawal for a military training range buffer area, manage the buffer area with Greater Sage-Grouse conservation measures.)	Action C-LR-W 2: Same as Alternative A.	Action D-LR-W 2: Same as Alternative A.	Action E-LR-W 2: —	Action F-LR-W 2: Do not approve withdrawal proposals not associated with mineral activity unless the land management is consistent with Greater Sage-Grouse conservation measures. (For example, in a proposed withdrawal for a military training range buffer area,	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	(*see above*)	manage the buffer area with Greater Sage-Grouse conservation measures that have been demonstrated to be effective.	
Action A-LR-W 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-W 3: —	Action C-LR-W 3: ROWs will be amended to require features that enhance Greater Sage-Grouse habitat security. Existing designated corridors in BLM ACECs and Forest Service Special Areas may be accessed for maintenance.	Action D-LR-W 3: —	Action E-LR-W 3: —	Action F-LR-W 3: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LR-W 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-W 4: —	Action C-LR-W 4: —	Action D-LR-W 4: In priority and general habitat, no new road ROWs would be authorized except those necessary for public safety or administrative or public need tied to valid existing rights. Limit route construction to realignments of existing ROWs if the realignment: 1) maintains or enhances priority Greater Sage-Grouse habitat, 2) eliminates the need to authorize a new ROW to construct a new road, or 3) is necessary for public safety, New ROW authorizations would be evaluated on a case-by-case basis. If new road construction is necessary, minimize impacts on Greater Sage-Grouse habitat through application of RDFs and other mitigation measures consistent with applicable law.	Action E-LR-W 4: All proposed new road ROWs within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-LR-W 4: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LR-W 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-W 5: —	Action C-LR-W 5: —	Action D-LR-W 5: Within PHMA and GHMA, allow industrial coal-fired or natural gas-fired energy facilities associated with existing industrial infrastructure (e.g. a mine site) to provide on-site power generation.	Action E-LR-W 5: All proposed industrial coal-fired or natural-gas fired energy facilitates associated with existing infrastructure (e.g. a mine site) within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-LR-W 5: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LR-W 6: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-W 6: —	Action C-LR-W 6: —	Action D-LR-W 6: Lands that are acquired (exchange, purchase or easement) for Greater Sage-Grouse habitat, would be managed as PHMA.	Action E-LR-W 6: —	Action F-LR-W 6: —	
Wind Energy Development						
Action A-LR-WED 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-WED 1: Make PHMA exclusion areas for utility-scale commercial wind energy facilities. Make GHMA avoidance areas for utility-scale commercial wind energy facilities.	Action C-LR-WED 1: Make PHMA exclusion areas for utility-scale commercial wind energy facilities.	Action D-LR-WED 1: Designate PHMA and GHMA as ROW exclusion for utility-scale commercial wind energy facilities (facilities that generate large amounts of electricity that is delivered to many users through transmission and distribution systems).	Action E-LR-WED 1: All proposed utility-scale commercial wind energy facilities within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts	Action F-LR-WED 1: Do not site wind energy development in PHMA and GHMA (Jones 2012).	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	through the Conservation Credit System (see Action E-SSS-ACDM 5).	(*see above*)	
Action A-LR-WED 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-WED 2: —	Action C-LR-WED 2: —	Action D-LR-WED 2: —	Action E-LR-WED 2: All proposed utility-scale commercial wind energy facilities within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-LR-WED 2: Site wind energy development at least five miles from active Greater Sage-Grouse leks.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LR-WED 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-WED 3: —	Action C-LR-WED 3: —	Action D-LR-WED 3: Within PHMA and GHMA allow industrial wind facilities associated with existing industrial infrastructure (e.g. a mine site) to provide on-site power generation.	Action E-LR-WED 3: All proposed industrial wind energy facilities associated with existing industrial infrastructure (e.g. a mine site) within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS] to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-LR-WED 3: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Industrial Solar						
Action A-LR-IS 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-IS 1: — Designate PHMA and GHMA as ROW exclusion for utility-scale solar energy facilities on BLM land. Designate PHMA as open and GHMA as ROW avoidance for utility-scale solar energy facilities on Forest Service Lands.	Action C-LR-IS 1: Designate PHMA and ACECs as ROW exclusion for utility-scale solar energy facilities.	Action D-LR-IS 1: Designate PHMA and GHMA as ROW exclusion for utility-scale solar energy facilities.	Action E-LR-IS 1: All proposed utility-scale commercial solar energy facilities within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-LR-IS 1: Designate PHMA and GHMA as ROW exclusion for utility-scale solar energy facilities.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LR-IS 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-IS 2: —	Action C-LR-IS 2: —	Action D-LR-IS 2: Within PHMA and GHMA, allow industrial solar energy facilities associated with existing industrial infrastructure (e.g. a mine site) to provide on-site power generation.	Action E-LR-IS 2: All proposed industrial solar energy facilities associated with existing infrastructure (e.g. a mine site) within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-LR-IS 2: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Urbanization						
Action A-LR-U 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LR-U 1: —	Action C-LR-U 1: —	Action D-LR-U 1: —	Action E-LR-U 1: TMA-20: When a county or city considers a change to its master plan for a land use of higher intensity affecting the SGMA, the county or city should consult with the Nevada Sagebrush Ecosystem Council through its Nevada Sagebrush Ecosystem Technical Team.	Action F-LR-U 1: —	
Leased Federal Fluid Mineral Estate						
Action A-FFME 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFME 1: In PHMA, apply actions through LUP implementation decisions (e.g., approval of an Application for Permit to Drill, and Sundry Notice) and upon completion of the environmental record of review (43 CFR 3162.5), including appropriate documentation of compliance with NEPA. In this process evaluate, among other things: 1. Whether the conservation measure is "reasonable" (43 CFR 3101.1-2) with the valid existing	Action C-FFME 1: Same as Alternative B.	Action D-FFME 1: —	Action E-FFME 1: —	Action F-FFME 1: Apply the following conservation measures as COAs at the project and well permitting stages, and through RMP implementation decisions and upon completion of the environmental record of review (43 CFR § 3162.5), including appropriate documentation of compliance with NEPA. In this process evaluate, among other things: 1. Whether the conservation	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	rights; and 2. Whether the action is in conformance with the approved LUP.	(*see above*)	(*see above*)	(*see above*)	measure is "reasonable" (43 CFR § 3101.1-2) with the valid existing rights; and 2. Whether the action is in conformance with the approved RMP.
Action A-FFME 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFME 2: In PHMA, provide the following conservation measures as terms and conditions of the approved LUP: Do not allow new surface occupancy on federal leases within PHMA, this includes winter concentration areas (Doherty et al. 2008; Carpenter et al. 2010) during any time of the year. Consider an exception: • If the lease is entirely within PHMA, apply a 4-mile NSO around the lek, and limit permitted disturbances to 1 per section with no more than 3% surface	Action C-FFME 2: Same as Alternative B.	Action D-FFME 2: —	Action E-FFME 2: All proposed surface disturbances on leased federal fluid mineral estates, within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation	Action F-FFME 2: Same as Alternative B.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	disturbance in that section. • If the entire lease is within the 4-mile lek perimeter, limit permitted disturbances to 1 per section with no more than 3% surface disturbance in that section. Require any development to be placed at the most distal part of the lease from the lek, or, depending on topography and other habitat aspects, in an area that is less demonstrably harmful to Greater Sage-Grouse.	(*see above*)	(*see above*)	Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	(*see above*)	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFME 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFME 3: Apply a seasonal restriction on exploratory drilling that prohibits surface-disturbing activities during the nesting and early brood-rearing season in all PHMA during this period.	Action C-FFME 3: Timing avoidance periods will be required.	Action D-FFME 3: Apply requisite seasonal restriction on exploratory drilling that prohibits surface-disturbing activities in winter habitat and during the lekking, nesting, and early brood-rearing season in all PHMA. See Appendix N [of the 2015 Final EIS], Leasable Mineral Stipulations, Waivers, Modifications, and Exceptions.	Action E-FFME 3: During the period specified, manage discretionary surface disturbing activities and uses to prevent disturbance to Greater Sage-Grouse during life cycle periods. Seasonal protection is identified for the following: -Seasonal protection within three (3) miles of active Greater Sage-Grouse leks from March 1 through June 15 during lekking hours of 1-hour before sunrise until 10:00 am -Seasonal protection of Greater Sage-Grouse suitable wintering areas from November 1 through March 31; -Seasonal protection of Greater Sage-Grouse suitable brood-rearing habitat from May 15 to August 15. (See Appendix D [of the 2015 Final EIS])	Action F-FFME 3: Apply a seasonal restriction on exploratory drilling that prohibits surface-disturbing activities during the nesting and brood-rearing season in all PHMA and GHMA during this period. This seasonal restriction shall also to apply to related activities that are disruptive to Greater Sage-Grouse , including vehicle traffic and other human presence.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFME 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFME 4: BLM should closely examine the applicability of categorical exclusions in PHMA. If extraordinary circumstances review is applicable, BLM should determine whether those circumstances exist.	Action C-FFME 4: Same as Alternative B.	Action D-FFME 4: —	Action E-FFME 4: —	Action F-FFME 4: Same as Alternative B.	
Action A-FFME 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFME 5: Complete Master Development Plans in lieu of APD-by-APD processing for all but wildcat wells.	Action C-FFME 5: Same as Alternative B.	Action D-FFME 5: —	Action E-FFME 5: —	Action F-FFME 5: Same as Alternative B.	
Action A-FFME 6: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFME 6: When permitting APDs on existing leases that are not yet developed, the proposed surface disturbance cannot exceed 3% for that area. Consider an exception if: • Additional, effective mitigation is demonstrated to offset the resulting loss of Greater Sage-Grouse (see Objectives). o When necessary, conduct additional, effective mitigation in 1) PHMA or – less preferably – 2)	Action C-FFME 6: Same as Alternative B.	Action D-FFME 6: On leased federal fluid mineral estate, when permitting Master Development Plans in PHMA on leases not yet developed, the proposed surface disturbance must achieve no net unmitigated loss of PHMA. Apply requisite seasonal restrictions on exploratory drilling that prohibits surface-disturbing activities in winter habitat and during the lekking, nesting, and early brood-rearing season in all PHMA. When necessary, prioritize and conduct	Action E-FFME 6: All proposed surface disturbances on leased federal fluid mineral estates, within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority,	Action F-FFME 6: When permitting APDs on existing leases that are not yet developed, the proposed surface disturbance cannot exceed 3% <u>per section</u> for that area. Consider an exception if: • Additional, effective mitigation is demonstrated to offset the resulting loss of Greater Sage-Grouse (see	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(see *above*)	o GHMA (dependent upon the area-specific ability to increase Greater Sage-Grouse populations). o Conduct additional, effective mitigation first within the same population area where the impact is realized, and if not possible then conduct mitigation within the same Management Zone as the impact, per 2006 WAFWA Strategy – pg. 2-17.	(see *above*)	additional mitigation: • Within the same population area where the impact is realized; or • Within the same WAFWA Management Zone as the impact, unless greater population benefits can be realized outside the population area or WAFWA management zone, subject to BLM and State Wildlife agency consultation and agreement.	General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Objectives). o When necessary, conduct additional, effective mitigation in PHMA and GHMA (dependent upon the area-specific ability to increase Greater Sage-Grouse populations). o Conduct additional, effective mitigation first within the same population area where the impact is realized, and if not possible then conduct mitigation within the same Management Zone as the impact, per 2006 WAFWA Strategy – pg. 2-17.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFME 7: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFME 7: Require unitization when deemed necessary for proper development and operation of an area (with strong oversight and monitoring) to minimize adverse impacts on Greater Sage-Grouse according to the Federal Lease Form, 3100-11, Sections 4 and 6.	Action C-FFME 7: Same as Alternative B.	Action D-FFME 7: —	Action E-FFME 7: —	Action F-FFME 7: Same as Alternative B.	
Action A-FFME 8: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFME 8: Identify areas where acquisitions (including subsurface mineral rights) or conservation easements, would benefit Greater Sage-Grouse habitat.	Action C-FFME 8: Same as Alternative B.	Action D-FFME 8: —	Action E-FFME 8: —	Action F-FFME 8: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action B-FFME 9: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFME 9: For future actions, require a full reclamation bond specific to the site in accordance with 43 CFR 3104.2, 3104.3, and 3104.5. Insure bonds are sufficient for costs relative to reclamation (Connelly et al. 2000a, Hagen et al. 2007) that would result in full restoration of the lands to the condition it was found prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM or Forest Service will perform the work.	Action C-FFME 9: Same as Alternative B.	Action D-FFME 9: —	Action E-FFME 9: —	Action F-FFME 9: Same as Alternative B.	
Action A-FFME 10: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFME 10: Make applicable RDFs consistent with applicable law (see Appendix D of the NTT Report) mandatory as COAs within priority Greater Sage-Grouse habitat.	Action C-FFME 10: Same as Alternative B.	Action D-FFME 10: On leased federal fluid mineral estate (where no APD has been issued), RDFs would be attached as lease notices consistent with applicable law.	Action E-FFME 10: On lease fluid mineral estate, Site-Specific Consultation Based Design Features will be required and determined through the SETT Consultation process (see Appendix D [of the 2015 Final EIS]).	Action F-FFME 10: Same as Alternative B.	
Action A-FFME 11: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFME 11: —	Action C-FFME 11: Agencies will explore options to amend, cancel, or buy out leases in ACECs and PHMA.	Action D-FFME 11: —	Action E-FFME 11: —	Action F-FFME 11: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFME 12: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFME 12: —	Action C-FFME 12: Include conditions that require relinquishment of leases/authorizations if doing so will: 1) mitigate the impact of a proposed development, or 2) mitigate the unanticipated impacts of an approved development.	Action D-FFME 12: —	Action E-FFME 12: —	Action F-FFME 12: —	
Action A-FFME 13: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFME 13: —	Action C-FFME 13: No waivers will be issued.	Action D-FFME 13: —	Action E-FFME 13: —	Action F-FFME 13: —	
Action A-FFME 14: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFME 14: —	Action C-FFME 14: —	Action D-FFME 14: On leased federal fluid mineral estate within PHMA complete Master Development Plans in lieu of APD-by-APD processing for all but wildcat wells.	Action E-FFME 14: —	Action F-FFME 14: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FFME 15: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FFME 15: —	Action C-FFME 15: —	Action D-FFME 15: On leased federal fluid mineral estate within PHMA, require a full reclamation bond specific to the site. Insure bonds are sufficient for costs relative to reclamation that would result in full restoration. Base the reclamation costs on the assumption that contractors for the BLM will perform the work.	Action E-FFME 15: —	Action F-FFME 15: —	
Fluid Minerals						
Action A-FM 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FM 1: Close PHMA to fluid mineral leasing. Consider an exception when there is an opportunity for the BLM and Forest Service to influence conservation measures where surface and/or mineral ownership is not entirely federally owned (i.e., checkerboard ownership). In this case, a plan amendment may be developed that opens the priority area for new leasing. The plan must demonstrate long-term population increases in the priority area through mitigation (prior to issuing the	Action C-FM 1: Close PHMA to fluid mineral leasing.	Action D-FM 1: In un-leased federal fluid mineral estate in PHMA apply a NSO stipulation and do not allow for waivers, exceptions, or modifications to that stipulation. Upon expiration or termination of existing leases within PHMA, apply the same stipulation as above.	Action E-FM 1: All un-leased federal fluid mineral estate within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation	Action F-FM 1: Close PHMA and GHMA to fluid mineral leasing. Consider an exception: When there is an opportunity for the BLM to influence conservation measures where surface and/or mineral ownership is not entirely federally owned (i.e., checkerboard ownership). In this case, a plan amendment may be developed that opens Greater Sage-Grouse habitat	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(see *above*)	lease) including lease stipulations and off-site mitigation, and avoid short-term losses that put the Greater Sage-Grouse population at risk from stochastic events leading to extirpation.	(see *above*)	(see *above*)	Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	for new leasing. The plan must demonstrate long-term population increases in the priority area through mitigation (prior to issuing the lease) including lease stipulations, <u>and</u> off-site mitigation, and avoid short-term losses that put the Greater Sage-Grouse population at risk from stochastic events leading to extirpation.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FM 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FM 2: Same as Alternative A.	Action C-FM 2: See C-FM 1.	Action D-FM 2: In un-leased federal fluid mineral estate in GHMA, apply a NSO stipulation, but allow for waivers, exception, or modifications consistent with the objective. Upon expiration or termination of existing leases within GHMA, apply the same stipulation as above.	Action E-FM 2: All un-leased federal fluid mineral estate within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-FM 2: See Action F-FM 1.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FM 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FM 3: Allow geophysical exploration within PHMA to obtain exploratory information for areas outside of and adjacent to PHMA. Only allow geophysical operations by helicopter-portable drilling methods and in accordance with seasonal timing restrictions and/or other restrictions that may apply.	Action C-FM 3: Same as Alternative B.	Action D-FM 3: Allow geophysical exploration within PHMA and GHMA that does not result in crushing of sagebrush vegetation or create new or additional surface disturbance. Heli-portable drilling methods, articulated rubber-tired vehicles that "leave no trace," and vibroseis geophysical operations conducted on existing roads and bladed shoulders would be allowed. Geophysical operations would be subject to TLs and CSU stipulations established for Greater Sage-Grouse in PHMA and GHMA. Allow no use of surface shot methods within PHMA.	Action E-FM 3: All proposed geophysical exploration within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-FM 3: Allow geophysical exploration within PHMA and GHMA to obtain exploratory information for areas outside of and adjacent to PHMA. Only allow geophysical operations by helicopter-portable drilling methods and in accordance with seasonal timing restrictions and/or other restrictions that may apply. Geophysical exploration shall be subject to seasonal restrictions that preclude activities in breeding, nesting, brood rearing and winter habitats during their season of use by Greater Sage-Grouse .	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-FM 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-FM 4: —	Action C-FM 4: —	Action D-FM 4: In un-leased federal fluid mineral estate in GHMA, apply a NSO stipulation, but allow for waivers, exception, or modifications consistent with the objective. Upon expiration or termination of existing leases within GHMA, apply the same stipulation as above.	Action E-FM 4: All un-leased federal fluid mineral estate within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-FM 4: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Locatable Minerals						
Action A-LOC 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LOC 1: In PHMA, recommend for withdrawal from mineral entry based on risk to the Greater Sage-Grouse and its habitat from conflicting locatable mineral potential and development. • Make any existing claims within the withdrawal area subject to validity exams or buy out. Include claims that have been subsequently determined to be null and void in the proposed withdrawal. • In plans of operations required prior to any proposed surface disturbing activities, include the following: o Additional, effective mitigation in perpetuity for conservation (In accordance with existing policy, WO IM 2008-204). Example: purchase private land and mineral rights or severed subsurface	Action C-LOC 1: In PHMA, recommend for withdrawal from mineral entry.	Action D-LOC 1: BLM Public Lands- Authorize locatable mineral development activity per the 43 CFR 3809 regulations through Plan of Operation Approvals and apply mitigation and Greater Sage-Grouse RDFs (consistent with applicable law) that minimizes the loss of PHMA or provides for enhancement of PHMA through off-site mitigation within the WAFWA management zone. Forest Service: Require that new plans of operation on National Forest System lands authorized under 36 CFR 228 Subpart A – Locatable Minerals, include measures to avoid or minimize adverse effects on Greater Sage-Grouse populations or their habitat.	Action E-LOC 1: All new proposed locatable mineral development activities (per the 43 CFR 3809 and 36 CFR 228 Subpart A regulations for BLM and Forest Service administered lands respectively) through Plan of Operation Approvals within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation	Action F-LOC 1: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	mineral rights within the priority area and deed to US Government). o Consider seasonal restrictions if deemed effective.	(*see above*)	(*see above*)	Credit System (see Action E-SSS-ACDM 5).	(*see above*)
Action A-LOC 2: —	Action B-LOC 2: —	Action C-LOC 2: —	Action D-LOC 2: —	Action E-LOC 2: All new proposed mineral exploration activities within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-LOC 2: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Action A-LOC 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LOC 3: Make applicable RDFs (consistent with applicable law), Appendix E of the NTT) mandatory as COAs within PHMA.	Action C-LOC 3: Same as Alternative B.	Action D-LOC 3: —	Action E-LOC 3: TMA-15.1: —	Action F-LOC 3: Same as Alternative B.
Action A-LOC 4: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LOC 4: —	Action C-LOC 4: —	Action D-LOC 4: —	Action E-LOC 4: Through the Nevada Sagebrush Ecosystem Council, encourage the strong conservation ethic in the mining industry by implementing effective avoidance management, and enhancement and reclamation of disturbed lands to preserve, protect, and improve habitat in the SGMA. On federal lands, activities that have an approved BLM or Forest Service notice of intent, plan of operation, ROW, or drilling plan, and on State/Private lands, projects with an approved Nevada Division of Environmental Protection permit, are exempt from any new mitigation requirements above and beyond what has already been stipulated in the projects' approvals.	Action F-LOC 4: —

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LOC 5: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LOC 5: —	Action C-LOC 5: —	Action D-LOC 5: —	Action E-LOC 5: Implement a centralized impact assessment process overseen by the Nevada Sagebrush Ecosystem Council that provides consistent evaluation, reconciliation, and guidance for project development that avoids or minimizes conflicts with Greater Sage-Grouse in the SGMA.	Action F-LOC 5: —	
Action A-LOC 6: —	Action B-LOC 6: —	Action C-LOC 6: —	Action D-LOC 6: —	Action E-LOC 6: Follow a strategy that seeks to avoid conflict with Greater Sage-Grouse by locating facilitates and activities in Non-Habitat wherever possible.	Action F-LOC 6: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LOC 7:: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LOC 7: —	Action C-LOC 7: —	Action D-LOC 7: —	Action E- LOC 7: Recognize existing state and federal regulatory mechanisms that govern mining and exploration activities, including BLM 43 CFR 3809 surface management regulations for hard rock mining, Forest Service 36 CFR 228A regulations governing mining and exploration, and NAC 519A regulations for reclamation of mining and exploration projects, that are adequate to conserve Greater Sage-Grouse and sagebrush habitats in the interim until future Suitable conservation plans are approved by the Nevada Sagebrush Ecosystem Council.	Action F- LOC 7: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LOC 8: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LOC 8: —	Action C-LOC 8: —	Action D-LOC 8: —	Action E-LOC 8: Aggressively engage in reclamation efforts as projects are completed, and target reclamation where the ecological site potential exists in the SGMA. Focus efforts on habitat that has the greatest potential for use by Greater Sage-Grouse as guided by ecological site descriptions and other restoration priorities established by the Nevada Sagebrush Ecosystem Council.	Action F-LOC 8: —	
Action A-LOC 9: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LOC 9: —	Action C-LOC 9: —	Action D-LOC 9: —	Action E-LOC 9: Recognize that stipulations for other species (e.g. raptors) may impede the ability to effectively reclaim areas of impact and remove those barriers in order to achieve immediate and effective reclamation.	Action F-LOC 9: —	
Action A-LOC 10: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LOC 10: —	Action C-LOC 10: —	Action D-LOC 10: —	Action E-LOC 10: Prioritize areas for habitat improvement utilizing sound resource information including soil surveys, ecological site descriptions, and Greater Sage-Grouse population data.	Action F-LOC 10: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-LOC 11: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LOC 11: —	Action C-LOC 11: —	Action D-LOC 11: —	Action EB-LOC 11: Design exploration projects for mineral access and the betterment of habitat. Ensure roads and other ancillary features that impact Greater Sage-Grouse habitat are designed to avoid where feasible and otherwise minimize and mitigate impacts in the short and long term.	Action F-LOC 11: —	
Action A-LOC 12: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LOC 12: —	Action C-LOC 12: —	Action D-LOC 12: —	Action E-LOC 12: Differentiate between short-(exploration) and long-term (active mining) impacts and manage timing of operations and physical disturbance accordingly.	Action F-LOC 12: —	
Action A-LOC 13: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-LOC 13: —	Action C-LOC 13: —	Action D-LOC 13: Close or mitigate abandon mines sites within PHMA and GHMA to reduce predation of Greater Sage-Grouse by eliminating physical structures that could provide nesting opportunities and perching sites for predators.	Action E-LOC 13: —	Action F-LOC 13: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
Salable Minerals					
Action A-SAL 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SAL 1: Close PHMA to mineral material sales.	Action C-SAL 1: Close PHMA to mineral material sales.	Action D-SAL 1: Allow no new salable mineral material sites in PHMA and GHMA.	Action E-SAL 1: All new proposed salable mineral sites within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-SAL 1: Same as Alternative B.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-SAL 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SAL 2: In PHMA, restore salable mineral pits no longer in use to meet Greater Sage-Grouse habitat conservation objectives.	Action C-SAL 2: Same as Alternative B.	Action D-SAL 2: In PHMA, reclaim salable mineral materials sites no longer in use to meet Greater Sage-Grouse habitat objectives (see Table 2-11 in section 2.8.5 of this Chapter).	Action E-SAL 2: See Role of Sagebrush Ecosystem Technical Team.	Action F-SAL 2: Same as Alternative B.	
Action A-SAL 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-SAL 3: —	Action C-SAL 3: —	Action D-SAL 3: On existing mineral materials sites, allow mineral materials sales in PHMA and GHMA as required, to meet Federal, Tribal, State, County and public needs. Loss of habitat through disturbance in PHMA and GHMA would be off-set through mitigation. Additional mitigation, including off-site mitigation would be required to off-set any net loss of habitat as a result of authorizing expansion of existing materials pits. Habitat loss in PHMA and GHMA would be off-set through mitigation to ensure no net un-mitigated loss. All mineral materials activities would be subject to compliance with standard surface use stipulations (general	Action E-SAL 3: Existing mineral material sites would only trigger SETT Consultation and the "avoid, minimize mitigate" process if there is a proposal to expand activities within the SGMA. Allow mineral materials sales in the SGMA as required, to meet Federal, Tribal, State, County, and public needs.	Action F-SAL 3: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	occupancy, seasonal and yearlong TLs, and CSU stipulations) for Greater Sage-Grouse in PHMA and GHMA.	(*see above*)	(*see above*)	
Action A-SAL 4: No common action across LUPs within the sub-region. See Section 2.10.10.1.	Action B-SAL 4: —	Action C-SAL 4: —	Action D-SAL 4: Close or mitigate abandon mines sites within PHMA and GHMA to reduce predation of Greater Sage-Grouse by eliminating physical structures that could provide nesting opportunities and perching sites for predators.	Action E-SAL 4: —	Action F-SAL 4: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Nonenergy Leasable Minerals						
Action A-NEL 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-NEL 1: Close PHMA to nonenergy leasable mineral leasing. This includes not permitting any new leases to expand an existing mine.	Action C-NEL 1: Close PHMA to nonenergy leasable mineral leasing.	Action D-NEL 1: Close PHMA and GHMA to nonenergy leasable mineral leasing.	Action E-NEL 1: All new proposed nonenergy leasable mineral leasing within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-NEL 1: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-NEL 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-NEL 2: —	Action C-NEL 2: —	Action D-NEL 2: Issue no nonenergy leasable prospecting permits within PHMA and GHMA.	Action E-NEL 2: All new proposed nonenergy leasable prospecting permits within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	Action F-NEL 2: —	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
Action A-NEL 3: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-NEL 3: For existing nonenergy leasable mineral leases in PHMA, in addition to the solid minerals RDFs consistent with applicable law (Appendix E of NTT), follow the same RDFs applied to Fluid Minerals consistent with applicable law (Appendix D of NTT), when wells are used for solution mining.	Action C-NEL 3: Same as Alternative B.	Action D-NEL 3: —	Action E-NEL 3: —	Action F-NEL 3: Same as Alternative B.	
Mineral Split Estate						
Action A-MSE 1: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-MSE 1: Where the federal government owns the mineral estate in PHMA, and the surface is in nonfederal ownership, apply the conservation measures applied on public lands.	Action C-MSE 1: Same as Alternative B.	Action D-MSE 1: Where the federal government owns the mineral estate in PHMA and GHMA and the surface is in nonfederal ownership and adjacent to public lands, apply the appropriate conservation measures and RDFs consistent with applicable law on public lands.	Action E-MSE 1: All new proposed surface development activities in which the federal government owns the mineral estate and the surface is in nonfederal ownership within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the	Action F-MSE 1: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	applicable management category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	(*see above*)	
Action A-MSE 2: No common action across LUPs within the sub-region. See Section 2.10.1.	Action B-MSE 2: Where the federal government owns the surface, and the mineral estate is in nonfederal ownership in PHMA, apply appropriate Fluid Mineral RDFs consistent with applicable law (see Appendix D of NTT) to surface development.	Action C-MSE 2: Same as Alternative B.	Action D-MSE 2: Where the federal government owns the surface and the mineral estate is in nonfederal ownership in PHMA and GHMA, apply appropriate surface use stipulations and RDFs to surface development consistent with applicable law.	Action E-MSE 2: All new proposed surface development activities in which the federal government owns the surface and the mineral estate is in nonfederal ownership within the SGMA will trigger SETT Consultation (See Action E-SSS-ACDM 1) for application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of Greater Sage-Grouse habitat due to anthropogenic disturbances within the SGMA. This includes application of the "avoid process" according to the applicable management	Action F-MSE 2: Same as Alternative B.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	(*see above*)	(*see above*)	(*see above*)	category (Core, Priority, General, and Non-Habitat) (see Action E-SSS-ACDM 3); incorporation of Site-Specific Consultation Based Design Features (see Action E-SSS-ACDM 4 and Appendix D [of the 2015 Final EIS]) to minimize impacts; and mitigation of impacts through the Conservation Credit System (see Action E-SSS-ACDM 5).	(*see above*)
Special Designations-Areas of Critical Environmental Concern (ACECs)					
Action A-SD 1: No common action across LUPs within the sub-region. See Section 2.10.1. No new ACECs are proposed. Continue to manage 246,276 acres in 29 existing ACECs (which contain Greater Sage-Grouse PHMA and GHMA habitat) in accordance with existing ACEC management prescriptions for the protection of their respective Relevance and Importance Values. Some management prescriptions for the existing ACECs will also	Action B-SD 1: —	Action C-SD 1: Designate the following proposed ACECs and Zoological Conservation Areas (FS)to preserve, protect, conserve, restore, and sustain Greater Sage-Grouse populations and the sagebrush ecosystem on which the Greater Sage-Grouse relies. • Black Rock (239,300 acres) • Butte/Buck/White Pine (669,800 acres) • Central Elko (1,680,500 acres) • Central Great Basin (1,216,500 acres)	Action D-SD 1: Same as Alternative A.	Action E-SD 1: —	Action F-SD 1: Designate the following proposed ACECs (BLM) and Zoological Conservation Areas (FS) as sagebrush reserves to conserve Greater Sage-Grouse - and other sagebrush-dependent species. • Bates Mountain (242,200 acres) • Cortez Range (76,300 acres) • Fish Creek Mountains (39,500 acres) • Little Fish Lake Valley (87,700 acres)

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
be beneficial to Greater Sage-Grouse habitat.	(*see above*)	• East High Desert (241,500 acres) • Lassen/South Washoe (683,400 acres) • Likely Tables PMU (9,600 acres) • Lone Willow (332,200 acres) • Monitor (444,100 acres) • Northeast Elko (317,600 acres) • Northwest Great Basin – NV (1,086,700 acres) • Northwest Interior (176,500 acres) • Owyhee (1,357,900 acres) • Pueblo Range (7,200 acres) • Ruby (504,200 acres) • Smith/Reese (283,200 acres) • Southeastern Nevada (315,900 acres • West Pershing (7,200 acres) Continue to manage 237,000 acres in 29 existing ACECs (which contain	(*see above*)	(*see above*)	• Monitor (53,400 acres) • Monitor Valley (173,600 acres) • Reese River (92,200 acres) • Roberts Mountain (74,400 acres) • Telegraph Mountain (9,100 acres) Continue to manage 237,000 acres in 29 existing ACECs (which contain Greater Sage-Grouse PHMA and GHMA habitat) in accordance with existing ACEC management prescriptions for the protection of their respective Relevance and Importance Values. The more restrictive management prescriptions in either existing management or proposed management will predominate.	

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F
(*see above*)	(*see above*)	Greater Sage-Grouse PHMA and GHMA habitat) in accordance with existing ACEC management prescriptions for the protection of their respective Relevance and Importance Values. The more restrictive management prescriptions in either existing management or proposed management will predominate. Special Management: To protect the relevance and importance values of the Greater Sage-Grouse and habitat, . Management prescriptions for PHMA, as addressed under every resource above, would apply.	(*see above*)	(*see above*)	Special Management: To protect the relevance and importance values of the Greater Sage-Grouse and habitat, management prescriptions for PHMA, as addressed under every resource above, would apply. There are a few management prescriptions that would be unique for the ACECs under this alternative: • No new mechanized or motorized routes within 4 miles of leks or within PHMA. • Seasonally prohibit camping and nonmotorized recreation within 4 miles of active leks • Prioritize acquisition of private lands in ACECs over easements

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E*	Alternative F	
(*see above*)	(*see above*)	(*see above*)	(*see above*)	(*see above*)	• Do not use Categorical Exclusion to resolve Section 390 resource conflicts in PHMA	

*Alternative E was submitted by the State of Nevada's Governor's office and only covers land within the decision area in the State of Nevada (also in Appendix O [of the 2015 Final EIS]). The State of California did not submit a Sage Grouse Conservation Plan as part of this planning effort, therefore, under Alternative E, the lands in California were analyzed as the No Action Alternative.

[1]The use of **—** indicates that there is no similar action, or that the similar action is reflected in another management action in the alternative.

[2]BMPs as currently referred to would become RDFs to be applied consistent with applicable law.

2.7 PLAN EVALUATION, MONITORING, AND ADAPTIVE MANAGEMENT

Plan evaluation is the process by which the plan and monitoring data are reviewed to determine if management objectives are being met and progress is being made toward meeting management goals and if management direction is sound. RMP evaluations determine if decisions are being implemented, if mitigation measures are satisfactory, if there are significant changes in the related plans of other entities, if there are new data of significance to the plan, and if decisions should be amended or revised.

Monitoring data gathered over time are examined and used to draw conclusions on whether management actions are meeting stated objectives, and if not, why. Conclusions are then used to make recommendations on whether to continue current management or to identify what changes need to be made in management practices to meet objectives. The BLM would use RMP evaluations to determine if the decisions in this Proposed RMPA, supported by the accompanying NEPA analysis, are still valid in light of new information and monitoring data.

Evaluations would follow the protocols established by the BLM Land Use Planning Handbook (H-1601-1), DOI Adaptive Management Guidance (including Williams et. al 2009, Adaptive Management: The US Department of the Interior Guide) and other appropriate guidance in effect at the time the evaluation is initiated.

This RMPA/EIS also includes an adaptive management strategy that can be found in **Appendix E**.

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Chapter 3. Affected Environment

3.1 Introduction

The purpose of this chapter is to describe the existing biological, physical, and socioeconomic characteristics of the planning area, including human uses that could be affected by implementing the alternatives described in **Chapter 2**. The affected environment provides the context for assessing potential impacts described in **Chapter 4**. The resource topics included in this chapter reflect those in **Table 1-2** as corresponding to an issue carried forward for detailed analysis in the 2015 Final EIS and the 2019 planning process.

The BLM analyzed the management situation in full compliance with its regulations and policies. The BLM evaluated inventory and other data and information, partnering with USGS and coordinating extensively with States, to help provide a basis for formulating reasonable alternatives. The BLM described this process in its Report to the Secretary in response to SO 3353 (Aug. 4, 2017). Among other things, the Report describes how the BLM coordinated "with each State to gather information related to the [Secretary's] Order, including State-specific issues and potential options for actions with respect to the 2015 Greater Sage-Grouse Plans and Instruction Memorandums (IMs) to identify opportunities to promote consistency with State plans." (Report to the Secretary at 3.) This process overlapped to some degree with the BLM's scoping process, which also assisted the BLM in identifying the scope of issues to be addressed and significant issues, and with coordination with the States occurring after the Report.

The geographic extent of this environmental analysis is the same as that in the 2015 Final EIS. The BLM acknowledges that there have been changes to the landscape since 2015; however, due to the scale of this analysis covering 45,359,000 acres of BLM-administered lands, data collected consistently across the range indicate that the extent of these changes to the landscape are relatively minimal. For example, BLM monitoring data collected and analyzed annually at the biologically significant unit (BSU) scale, as outlined in the Greater Sage-Grouse Monitoring Framework (Appendix D of the 2015 ARMPA/ROD), indicates that there has been a minimal overall increase in estimated disturbance of less than 1 percent from 2015 through 2017 of Priority Habitat Management Areas (PHMA) within BSUs. It is also important to note that consistent with the 2015 ARMPA/ROD, any discretionary actions contributing to anthropogenic disturbance were required to comply with the mitigation hierarchy of avoid, minimize, and compensate to achieve a net conservation gain.

Estimates of Greater Sage-Grouse Habitat Management Areas (HMA) burned for 2016 and 2017 indicate a sharp increase in potential habitat availability loss during 2017, compared with previous fire seasons (**Sections 3.1.1** and **3.4**, below); however, through the BLM's Emergency, Stabilization, and Rehabilitation efforts, many of these areas are currently undergoing rehabilitation.

Actions since the 2015 Final EIS were authorized consistent with that document. The BLM would continue to implement the decisions in the 2015 Final EIS, unless those decisions are amended.

Acreage figures and other numbers were approximated using a geographic information systems (GIS) technology; they do not reflect exact measurements or precise calculations.

3.1.1 Greater Sage-Grouse Literature, 2015–2018

As part of the consideration of whether to amend some, all, or none of the 2015 Greater Sage-Grouse land use plans, the BLM requested the USGS to inform the effort through the development of an annotated bibliography of Greater Sage-Grouse science published since January 2015 (Carter et al. 2018)[1] and a report that synthesized and outlined the potential management implications of this new science (Hanser et al. 2018).[2]

Following the 2015 Final EIS, the scientific community has continued to improve the knowledge available to inform implementation of management actions and an overall understanding of Greater Sage-Grouse populations, their habitat requirements, and their response to human activity. The report discussed the science related to six major topics identified by USGS and BLM (summarized below), as follows:

- Multiscale habitat suitability (habitat objectives) and mapping tools
- Discrete human activities
- Diffuse activities
- Fire and invasive species
- Restoration effectiveness
- Population estimation and genetics

Multiscale Habitat Suitability (Habitat Objectives) and Mapping Tools

Since the 1950s, biologists have worked to develop a set of site-scale vegetation indicators to inform habitat management, including the collection and analysis of Greater Sage-Grouse habitat use, nest success, and population trends relative to vegetation condition (Patterson 1952; Sveum et al. 1998a, 1998b; Connelly et al. 2000b; Holloran et al. 2005; Hagen et al. 2007; Kolada et al. 2009; Kaczor et al. 2011).

The existing state of knowledge for Greater Sage-Grouse habitat use at the site scale has been described and synthesized (Connelly et al. 2000a; 2011; Hagen et al. 2007; Stiver et al. 2015). This information was included in the Habitat Objectives (Table 2-2) in the 2015 Final EIS. The science developed since 2015 largely corroborates the knowledge prior to 2015 regarding Greater Sage-Grouse habitat selection.

Improvements at the site scale facilitate a better understanding that indicates the potential need for a reevaluation of the existing habitat objective indicators and associated values in Table 2-2 in the 2015 Final EIS (Hanser et al. 2018).

Some of the science that was developed since 2015 that may require reevaluation and incorporation in the Habitat Objectives for Greater Sage-Grouse (Table 2-2 in the 2015 Final EIS) includes the following:

The importance of mesic habitats for Greater Sage-Grouse brood-rearing identified in western Nevada, eastern California, and southeastern Oregon (Donnelly et al. 2016).

[1] Available online: https://doi.org/10.3133/ofr20181008
[2] Available online: https://doi.org/10.3133/ofr20181017

- Big and other sagebrush were important for Greater Sage-Grouse, but the species of sagebrush shrub usually varied across life stages within Nevada and northeastern California (Coates et al. 2016). Additionally, this study found selection for upland mesic sites during the brood-rearing season and general avoidance of landscapes dominated by nonnative annual grass across all seasons (Coates et al. 2016).
- Nesting and late brood-rearing microhabitat selection and linkages to survival were quantified in xeric and mesic regions of the Great Basin (primarily Nevada; Coates et al. 2017a). All vegetation measurements were phenologically corrected (Gibson et al. 2016), and the authors found strong selection and positive survival for high horizontal cover and total shrub cover during nesting and late brood-rearing across all sites. Indicator values for grass height need to be examined to ensure they have not been derived from studies using vegetation data collected at different times for successful and unsuccessful nests without applying correction factors and are geographically appropriate. Results from this study also provide more targeted guidelines for Greater Sage-Grouse microhabitat in Nevada and California, compared with broader range-wide guidelines published previously (Connelly et al. 2000).
- Adult females in areas impacted by wildfire 10 years prior tended to use other shrubs for nesting cover, suggesting that other shrub species might need to be considered in evaluations of fire-affected environments (Lockyer et al. 2015; Coates et al. 2017a).
- Hens and broods avoided pinyon-juniper by at least 68 meters in Nevada and California (Coates et al. 2016a).
- A model concluded hens and broods avoided edges with trees (conifers or willows) in late brood-rearing habitats (Westover et al. 2016).

The BLM has completed a plan maintenance action, whereby the agency has clarified its ability to modify the habitat objective indicator values in Table 2-2 in the 2015 Final EIS, based on local, site-specific information.

Mapping Tools

Advances in modeling and mapping techniques at the range-wide scale can help inform broad-scale habitat assessment, allocations, and targeting of land management resources to benefit Greater Sage-Grouse conservation. The 2015 Final EIS included the 2014 version of the "Spatially explicit modeling of Greater Sage-Grouse (*Centrocercus urophasianus*) habitat in Nevada and northeastern California—A decision-support tool for management"-USGS Open-File Report 2014-1163 (Coates et al. 2014) to delineate Greater Sage-Grouse HMAs within the planning area.

In 2016, the USGS updated the 2014 decision support tool, as follows:

- Adding radio and global positioning system (GPS) telemetry locations from Greater Sage-Grouse monitored at multiple sites during 2014 to the original location dataset beginning in 1998
- Integrating high resolution maps of sagebrush and pinyon and/or juniper cover
- Modifying the spatial extent of the analyses to match newly available vegetation layers
- Accounting for differences in habitat availability between mesic sagebrush steppe communities in the northern part of the study area and drier Great Basin sagebrush in southerly regions

- Deriving updated land management categories and an updated index of Greater Sage-Grouse abundance and space-use
- Masking urban footprints and major roadways out of the final map products

Based on continued efforts to refine and improve Greater Sage-Grouse habitat mapping and incorporate the best available science, the BLM adopted the updated 2016 spatially explicit model -USGS Open-File Report 2016-1080 (Coates et al. 2016) in the 2019 ARMPA, which was also adopted by the State of Nevada and recommended for adoption by the State of California. Adoption of Coates et al. 2016 allows the BLM to update delineations for Greater Sage-Grouse HMAs (PHMA, GHMA, and OHMA).

Discrete Anthropogenic Activities

The science developed since 2015 corroborates the knowledge prior to 2015 regarding the impact of discrete human activities on Greater Sage-Grouse. New science suggests that strategies to limit surface disturbance may be successful at limiting range-wide population declines, but they are not expected to reverse the declines, particularly where active oil and gas operations are present (Hanser et al. 2018). This information may have relevance when considering the impact of changes to management actions designed to limit discrete disturbances.

Diffuse Activities

The science developed since 2015 does not appreciably change the knowledge prior to 2015 regarding diffuse activities (e.g., livestock grazing, predation, hunting, wild horses and burros, fences, recreation, etc.); however, some study authors questioned current assumptions, provided refinements, or corroborated existing understanding. This information was considered when determining the scoping issues addressed in **Chapter 1**, **Section 1.4.1**.

Studies have shown that the effects of livestock grazing will vary with grazing intensity and season. Predation can be limiting to Greater Sage-Grouse populations in areas with overabundant predator numbers or degraded habitats. Application of predator control has potential short-term benefits in small, declining populations; however, reducing human subsidies may be necessary to generate long-term changes in raven numbers. This is because raven control has produced only short-term declines in local raven populations.

Refinements to the current hunting seasons used by state wildlife agencies may minimize potential effects on Greater Sage-Grouse populations, but none of the studies implicated current application of hunting seasons and timings as a plausible cause for Greater Sage-Grouse declines. Finally, no new insights into the effects of wild horses and burros, fence collision, or recreational activity on Greater Sage-Grouse have been developed (Hanser et al. 2018).

Fire and Invasive Species

Science since 2015 indicates that wildfire will continue to threaten Greater Sage-Grouse through loss of available habitat, reductions in multiple vital rates, and declining population trends, especially in the western part of its range. The concepts of resilience after wildfire and resistance to invasion by nonnative annual grasses have been mapped across the sagebrush ecosystem using links to soil temperature and moisture regimes. These concepts inform restoration and management strategies and help prioritize application of Greater Sage-Grouse management resources (Hanser et al. 2018).

Restoration Effectiveness

Since 2015, tools have been developed to help managers strategically place and design restoration treatments where they will have the greatest benefit for Greater Sage-Grouse. Conifer removal benefited Greater Sage-Grouse through increased female survival and nest and brood success.

Treatment methods and site potential can affect post-treatment vegetation characteristics. Sagebrush manipulation treatments seem to benefit Greater Sage-Grouse populations and brood-rearing habitat availability, but benefits may be limited to areas with high sagebrush cover at higher elevations and in mountain big sagebrush (*Artemisia tridentata vaseyana*) communities. Studies indicate that Greater Sage-Grouse populations did not benefit from, or were negatively affected by, prescribed fire and mechanical sagebrush removal treatments (Hanser et. al. 2018). Restoration activities occur mainly at the implementation level (project or site-specific implementation), and the BLM maintains the flexibility to incorporate new tools in the agency's project planning for restoration actions.

Population Estimation and Genetics

The accuracy of estimating Greater Sage-Grouse populations has increased because of improved sampling procedures used to complete count surveys at leks and the development of correction factors for potential bias in lek count data. In addition, techniques to map Greater Sage-Grouse genetic structure at multiple spatial scales has also improved. This genetic data is used in statistical models to increase understanding of how landscape features and configuration affect gene flow. This understanding emphasizes the importance of maintaining connectivity between populations to ensure genetic diversity and distribution (Hanser et al. 2018). New information continues to affirm the BLM's understanding that Greater Sage-Grouse is a species that selects for large, intact landscapes and habitat patches.

New Science and Information Considered by the BLM

After reviewing comments on the DSEISs, the BLM identified that best available science and the role of the NTT and COT reports in planning were reoccurring comment themes from the public. This heightened interest from commenters prompted the BLM to conduct a thorough review of new science and other information received during the DSEIS comment period. These articles and professional scientific papers were published subsequent to the USGS report that reviewed the new science published between January 1, 2015 and January 25, 2018.

The objective of the BLM's review effort was to assess whether any information and scientific literature identified by the public during the DSEIS comment period and any new scientific papers that were not included in the previous USGS science review would change the scope (i.e., issues, alternatives, and effects) of the 2019 planning process or conflict with the sage-grouse conservation measures in the NTT and COT Reports.

At regular intervals, the BLM has assessed and synthesized new science, using it to inform efforts to better aligned its management with state and local frameworks. The BLM first initiated its own assessment through the NTT as described above, followed by the USFWS efforts to develop the COT report. The BLM then commissioned a second synthesis from USGS in 2017 prior to initiating the 2019 planning process. Finally, the BLM coordinated with USGS in 2020 to review scientific literature presented during the DSEIS comment period. The USGS has continuously evaluated science published after 2018 and has maintained an annotated bibliography of scientific research on greater sage-grouse. The BLM relied upon USGS' annotated bibliography for the 2020 review. Out of the 75 articles considered by the BLM as new science, USGS had already reviewed 67 articles. BLM biologists summarized the remaining eight papers submitted by the public for validation. The BLM also accepted and reviewed comments that provided background information. These comments did not provide management recommendations or rigorous science-based information.

After the documents were reviewed and summarized, a team of BLM biologists and land use planners reviewed each summary to determine if the findings provided management recommendations that: 1) conflicted with the NTT and COT report recommendations; or 2) changed the scope (i.e., issues, alternatives, effects) of the 2019 plans resulting in a need for a new planning effort.

The BLM found that the most up-to-date Greater Sage-Grouse science and other information has incrementally increased, and built upon, the knowledgebase of Greater Sage-Grouse management evaluated by the BLM most recently in its 2019 land use plan amendments, but does not change the scope or direction of the BLM's management. While the NTT, the COT and this new science and information remain thus consistent with the scope of the 2019 planning decisions, new science does suggest adaptations to management may be warranted at site-specific scales.

The scientists and managers that authored the COT and NTT reports could not have anticipated all the variables that would affect sage grouse into the future when they provided their recommendations. Varying topographic factors, ecological site potential, changes in methodologies, technological advances, variation in vegetation types, and anthropogenic disturbance, to name a few, make it difficult to adequately address all factors that affect sage grouse populations and habitat. Therefore, where appropriate, the BLM will consider this science and information through implementation-level NEPA analysis, consistent with its approved land use plans, policies, and regulatory frameworks. This is precisely the approach envisioned by the NTT and COT reports as well as the BLM's decades long planning efforts to address local actions that may affect Greater Sage-Grouse.

3.2 Resources Affected

Per **Chapter 1** (see **Section 1.4.1**), the following resources may have potentially significant effects based on the actions considered in **Chapter 2**. **Table 3-1**, below, provides the location of baseline information in the 2015 Final EIS, and, where applicable, additional information contained in the Sagebrush Focal Area Withdrawal Draft EIS (BLM 2016b).

Table 3-1
Affected Environment Incorporated by Reference

Resource Topic	Location of Baseline Information
Greater Sage-Grouse and its Habitat	Chapter 3, Section 3.2 (Greater Sage-Grouse and Greater Sage-Grouse Habitat), page 3-3 to 3-41 (BLM 2015) Chapter 3, Section 3.7 (Wildlife and Special Status Animals, including Greater Sage-Grouse), page 3-139 to 3-180 (BLM 2016)
Vegetation (Including Invasive and Exotic Species and Noxious Weeds)	Chapter 3, Section 3.3 (Vegetation [Including Invasive and Exotic Species and Noxious Weeds]), page 3-41 to 3-57 (BLM 2015) Chapter 3, Section 3.6 (Vegetation, Including Special Status Plants), page 3-128 to 3-138 (BLM 2016)
Livestock Grazing	Chapter 3, Section 3.8, (Livestock Grazing) page 3-93 to 3-101 (BLM 2015)
Land Use and Realty	Chapter 3, Section 3.11 (Land Use and Realty), page 3-110 to 3-121 (BLM 2015)

Resource Topic	Location of Baseline Information
Renewable Energy	Chapter 3, Section 3.12 (Renewable Energy Resources), page 3-121 to 3-124 (BLM 2015)
Mineral Resources	Chapter 3, Section 3.13 (Mineral Resources), page 3-124 to 3-143 (BLM 2015) Chapter 3, Section 3.4 (Geology and Mineral Resources), page 3-2 to 3-8 (BLM 2016)
Socioeconomics	Chapter 3, Section 3.23 (Socioeconomics and Environmental Justice), page 3-193 to 3-231 (BLM 2015) Chapter 3, Section 3.5 (Social and Economic Conditions), page 3-9 to 3-127 (BLM 2016)
Comprehensive Travel Management	Chapter 3, section 3.10 (Comprehensive Travel and Transportation Management), page 3-104 to 3-110 (BLM 2015)

3.2.1 Resources Not Carried Forward for Analysis

The following resources and resource uses analyzed in the 2015 Final EIS were reviewed to determine if they could have potentially significant effects based on the actions considered in **Chapter 2**. Aligning BLM management with the State of Nevada's Conservation Plan and with the State of California's conservation strategies and incorporating the best available current science and better balancing of multiple uses in regard to HMA mapping, adaptive management, mitigation, and seasonal timing restrictions would not substantially alter management direction or result in different outcomes. Because of this, no additional analysis was completed for the resources shown in **Table 3-2** below; therefore, no new information on affected environment is provided.

Table 3-2
Resources and Resource Uses Not Carried Forward for Analysis

Riparian Areas and Wetlands	Recreation
Fish, Wildlife, and Special Status Species	Visual Resources
Wild Horses and Burros	Special Designations
Water Resources	Soils
Lands with Wilderness Characteristics	Air Quality
Climate Change	

3.3 Greater Sage-Grouse and its Habitat

The existing condition of Greater Sage-Grouse in the planning area is described in the 2015 Final EIS in Section 3.2; therefore, except as otherwise expressly indicated by new or updated information contained in this section, the affected environment for Greater Sage-Grouse described in the 2015 Final EIS is hereby incorporated by reference.

Since 2015, the BLM and Forest Service have been implementing the Greater Sage-Grouse conservation measures outlined in the 2015 Final EIS. In addition to working with partners, such as NDOW, CDFW, and USGS, to monitor the status of Greater Sage-Grouse populations in the planning area, the BLM has also been tracking human disturbance, wildland fire, and reclamation/restoration efforts in Greater Sage-Grouse HMAs.

3.3.1 Greater Sage-Grouse Population Status

Management Zones

The Nevada and Northeastern California Sub-regional planning area includes Greater Sage-Grouse habitat and populations in three management zones (MZs), as delineated by Western Association of Fish and Wildlife Agencies (WAFWA). The boundaries of these MZs were delineated based on their ecological and biological attributes, rather than on arbitrary political boundaries (Stiver et al. 2006). Vegetation found in each management zone is similar, and Greater Sage-Grouse and its habitat in these areas are likely to respond similarly to environmental factors and management actions.

MZs in the Nevada and Northeastern California sub-region are as follows:

- MZ III—Southern Great Basin (includes Utah, Nevada, and California)
- MZ IV—Snake River Plain (includes Idaho, Utah, Nevada, Oregon, Montana and Wyoming)
- MZ V—Northern Great Basin (includes Oregon, California, and Nevada)

These MZs and their aggregate populations and subpopulations in the Nevada and Northeastern California Sub-region are described in Table 3-5 and Figure 3-3 of the 2015 Nevada and Northeastern California Proposed Land Use Plan Amendments and Final EIS (BLM 2015a; 2015 Final EIS).

As of 2017, there were 717 leks classified as active and 341 leks classified as inactive, as shown in **Table 3-3**.

Table 3-3
Leks in Population/Subpopulations

Population/ Subpopulation	Active	Inactive	Total
Management Zone III			
Central Nevada	185	83	269
Northwestern Interior Nevada	0	8	8
Quinn Canyon Range Nevada	N/A	N/A	N/A
Southeastern Nevada	132	22	154
Management Zone IV			
North-central Nevada	60	40	100
Northeastern Nevada	195	82	277
Management Zone V			
Klamath-Oregon/California	1	0	1
Lake Area Oregon-NE California/NW Nevada	99	84	183
South-central Oregon/North-central Nevada	39	22	61
Warm Springs Valley Nevada	6	0	6

Sources: NDOW, CDFW and WAFWA 2017

In a recent publication by USGS (Coates et al. 2017b), data from monitored Greater Sage-Grouse lek sites across Nevada and Northeastern California from 2000 to 2016 were used to estimate annual rates of change in Greater Sage-Grouse populations. As of 2016, populations across Nevada and northeastern

California have declined at an average rate of 3.86 percent annually over the last 17 years. This estimated rate of population decline corresponds to other estimates documented for Greater Sage-Grouse in the Great Basin (Garton et al. 2011; Coates et al. 2016a).

Overall results indicate that localized fluctuations in lek attendance have occurred, but overall numbers of active and inactive leks have been relatively stable. Of all the MZs within the sub-region, MZ III had the most number of leks in decline.

The 2015 Nevada and Northeastern California Sub-regional ARMPA incorporated an adaptive management strategy that included population triggers for leks, lek clusters, and biologically significant units across the sub-regional planning area. Calculating the 2015 adaptive management population triggers required the use of a hierarchical population model that was created by USGS in partnership with the BLM, USFWS, Nevada Department of Wildlife, and the California Department of Fish and Wildlife. Shortly after the signing of the ROD approving the 2015 ARMPA, USGS restructured the model with best available information, which in turn modified the numeric triggers contained in the 2015 ARMPA (see *Centrocercus urophasianus) in Nevada and California—Identifying populations for management at the appropriate spatial scale: U.S. Geological Survey Open-File Report 2017-1089*, https://doi.org/10.3133/ofr20171089)). Therefore, as part of the 2019 plan amendment process, the BLM analyzed and adopted the updated numeric population triggers and the updated USGS model to calculate these triggers on an annual basis. USGS identified 12 soft lek triggers, five hard lek triggers, and seven soft lek cluster triggers in 2019. In addition, seven Population Management Units were identified as reaching a habitat trigger.

Given the 2019 preliminary injunction, BLM Nevada and California are unable to implement the 2019 Adaptive Management Strategy. However, the state of Nevada has adopted the same strategy as part of their State's Greater Sage-Grouse Conservation Plan and is moving forward with implementing the strategy in cooperation with BLM Nevada and California, NDOW, local working groups and other partners.

3.4 Wildland Fire and Habitat Treatment

The wildland fire threat was discussed in the 2015 Final EIS (Section 3.2.3). Ongoing efforts for fuel treatments are described in Executive Order 13855, *Promoting Active Management of America's Forests, Rangelands, and other Federal Lands to Improve Conditions and Reduce Wildfire Risk* (December 21, 2018), and Secretary's Order 3372, *Reducing Wildlife Risks on Department of Interior Land through Active Management* (January 2, 2019), which provide direction to the BLM to address wildfire prevention and suppression, which the BLM has implemented by setting ambitious fuel treatment targets to protect and restore sagebrush ecosystems.

From 2015 to 2017 there have been additional large-scale wildfires within the decision area (**Table 3-4**, below). These wildfires burned over 1.3 million acres of HMAs (as depicted in **Figure 2-2a**) within the planning area, which included approximately 358,000 acres in PHMA, 400,500 acres in GHMA and 373,000 acres in OHMA, resulting in a reduction of available Greater Sage-Grouse habitat. During that same time, approximately 175,546 acres in Greater Sage-Grouse HMAs have been treated to improve habitat for the species (see **Table 3-5** and **Table 3-6**).

Table 3-4
Wildland Fire Statistics—Greater Sage-Grouse Habitat Acres Burned

State	2015	2016	2017
Nevada	12,233	215,073	967,324
California	16,176	5,145	88,551
Total	**28,409**	**220,218**	**1,055,875**

Source: Greater Sage-Grouse Habitat Data for Wildland Fire Management Decision Making and Reporting of Acres Burned; Information Bulletin No. FA IB-2017-009; Bureau of Land Management. Note: habitat acres burned are based on **Figure 2-2a**.

Table 3-5
Acres of Greater Sage-Grouse Conservation Actions in Nevada

Year	Conifer Removal	Fuel Breaks	Invasive Species Removal	Habitat Protection	Habitat Restoration	Total
2015	12,883	3,809	7,311	351	17,957	42,311
2016	19,785	6,655	10,956	644	14,753	52,793
2017[1]	40,386	4,455	2,265	12,561	1,378	61,045
Total	**73,054**	**14,919**	**20,532**	**13,556**	**34,088**	**156,149**

Source: National Fuels Reporting Operations Reporting System (NFPORS)

Table 3-6
Acres of Greater Sage-Grouse Conservation Actions in California

Year	Conifer Removal	Fuel Breaks	Invasive Species Removal	Habitat Protection	Habitat Restoration	Total
2015	5,403	217	2,545	1,360	0	9,525
2016	2,735	0	1,643	1,653	0	6,031
2017[1]	5,769	0	1,802	2,260	0	9,831
Total	**13,907**	**217**	**5,990**	**5,273**	**0**	**25,387**

Source: NFPORS 2017

Since the 2015 plan, more habitat in Greater Sage-Grouse HMAs has been lost to wildfire than has been gained through treatment; however, the BLM intends to implement more habitat improvements projects, per the decisions in the 2015 Final EIS. Projects such as the Great Basin Ecosystem Strategy would further enhance the tools and priorities for implementing these activities. Under these projects, two programmatic EISs are being prepared for fuel breaks, fuels reduction, and rangeland restoration. See Wildland Fires (Section 3.7) in the 2015 Final EIS for acres burned by decade.

3.5 Human Disturbance

Human disturbance was discussed in the 2015 Final EIS (Section 3.2.4, Regional Context [Infrastructure]). The BLM tracked direct human disturbance in PHMA from 2015 to 2017, in accordance with the Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment Record of Decision, Management Decision, Special Status Species 2 (BLM 2015).

Direct human disturbance has incrementally increased over the Nevada and Northeastern California Sub-region, with the greatest percentage increase of 0.12 and an average across all of the BSUs of 0.01 percent. The level of human disturbance in the Butte/Buck/White Pine BSU decreased by 62 acres (0.01 percent) during this time. It is also important to note that consistent with the 2015 ARMPA/ROD, any discretionary actions contributing to anthropogenic disturbance during this time were required to comply with the mitigation hierarchy of avoid, minimize, and compensate to achieve a net conservation gain.

3.6 Socioeconomics

Since 2015, socioeconomic conditions in Nevada have changed to some degree. Income from non-service industries has fallen slightly, while service industry jobs and income have increased at a steady rate.

Many industry sectors remained mostly steady from 2014 to 2016, the most recent year for which verified data are available. For example, earnings from the mining industry, including fossil fuels, grew by slightly more than 1 percent during that period. In contrast, earnings from government (which includes federal, military, state, and local government employment, as well as government enterprise) grew by 6.1 percent; earnings from the medical and social assistance industries grew by 11.5 percent, and earnings from the construction industry increased by more than 26 percent from 2014 to 2016. Construction has been in recovery, after falling by more than 63 percent from 2006 to 2013.

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Chapter 4. Environmental Consequences

4.1 Introduction

This chapter presents the anticipated direct, indirect, and cumulative impacts on the human and natural environment from implementing the alternatives in **Chapter 2**. The purpose of this chapter is to describe to the decision maker and the public the differences between the entire range of alternatives considered in 2018, including the 2018 Draft Plan (Management Alignment Alternative), the 2018 Proposed Plan Amendment, as well as the range of alternatives incorporated by reference from the 2015 plan amendments. It is meant to clarify that Greater Sage-Grouse management was comprehensively analyzed in 2018 through multiple NEPA and planning processes.

This chapter is organized by topic, based on the affected resources identified in **Chapters 1** and **3**. Only those issues listed in **Table 1-2** were carried forward for analysis.

Impact analysis is a cause-and-effect process. The detailed impact analyses and conclusions are based on the following:

- The BLM planning team's knowledge of resources and the planning area
- Literature reviews
- Information provided by experts in the BLM, other agencies, cooperating agencies, interest groups, and concerned citizens

The baseline used for the impact analysis is the current condition or situation, as described in **Chapter 3**. Impacts on resources and resource uses are analyzed and discussed, commensurate with resource issues and concerns identified through the NEPA process. At times, impacts are described in qualitative terms or using ranges of potential impacts.

This SEIS describes more explicitly the full range of alternatives that the BLM has evaluated, summarizing each action alternative contained in the 2015 and 2018 EISs.

4.2 Analytical Assumptions

Several overarching assumptions have been made in order to facilitate the analysis of the potential impacts. These assumptions set guidelines and provide reasonably foreseeable projected levels of development that would occur in the planning area during the planning period. These assumptions should not be interpreted as constraining or redefining the management objectives and actions proposed for each alternative, as described in **Chapter 2**.

The following general assumptions apply to all resource categories; any specific resource assumptions are provided in the methods of analysis section for that resource:

- Sufficient funding and personnel would be available for implementing the final decision.
- Implementation-level actions necessary to execute the RMP level decisions in this SEIS would be subject to further environmental review, including that under NEPA.

- Direct impacts of implementing the RMPA/EIS would primarily occur on public lands administered by the BLM in the planning area. Indirect impacts of implementing the Proposed RMPA/Final EIS could occur on either BLM-administered lands, or adjacent lands, regardless of ownership/administration. The discussion of impacts is based on best available science and data. Knowledge of the planning area, decision area, and professional judgment, based on observation and analysis of conditions and responses in similar areas, are used for environmental impacts where data are limited.
- Restrictions (such as siting, design, and mitigation measures) would apply, where appropriate, to surface-disturbing activities associated with land use authorizations and permits issued on BLM-administered lands and federal mineral estate.
- GIS data have been used in developing acreage calculations and to generate the figures in **Appendix A**. Calculations depend on the quality and availability of data. Acreage figures and other numbers are approximate projections for comparison and analysis only; readers should not infer that they reflect exact measurements or precise calculations. In the absence of quantitative data, best professional judgment was used. Impacts were sometimes described using ranges of potential impacts, or they were described qualitatively, when appropriate.

The effects analysis from the 2015 Final EIS for the applicable portions of the Proposed Plan are carried forward into this SEIS. The No-Action Alternative for this SEIS was identified as the Proposed Plan in the 2015 Final EIS. The 2012 Governor's plan was identified as Alternative E in the 2015 Final EIS. The effects of the changes proposed in the Management Alignment Alternative were generally within the range of impacts identified among the alternatives considered in the 2015 Final EIS.

4.3 General Method for Analyzing Impacts

Potential impacts are described in terms of type, context, duration, and intensity, which are generally defined below.

Type of impact—Impacts are characterized using the indicators described in the 2015 Final EIS (where applicable). The presentation of impacts for key planning issues is intended to provide the BLM decision maker and reader with an understanding of the multiple use trade-offs associated with each alternative.

Context—This describes the area or site-specific, local, planning area-wide, or regional location where the impact would occur. Site-specific impacts would occur at the location of the action; local impacts would occur in the general vicinity of the action area; planning area-wide impacts would affect a greater portion of decision area lands in Nevada and northeast California; and regional impacts would extend beyond the planning area boundaries.

Duration—This describes the associated time period of an impact, either short term or long term. Unless otherwise noted, short-term is defined as anticipated to begin and end within the first 5 years after the action is implemented; long-term is defined as lasting beyond 5 years to the end of or beyond the life of this SEIS.

Intensity—Rather than categorize impacts with qualitative statements (e.g., major, moderate, or minor), this analysis discusses impacts using quantitative data wherever possible.

Direct and indirect impacts—Direct impacts are caused by an action or implementation of an alternative and occur at the same time and place; indirect impacts result from implementing an action or alternative but usually occur later in time or are removed in distance and are reasonably certain to occur.

For ease of reading, the impacts of the management actions for a particular alternative on a specific resource are generally compared with the status quo or baseline for that resource; however, in order to properly and meaningfully evaluate the impacts under each alternative, its expected impacts should be measured against those projected to occur under the No-Action Alternative. This alternative is the baseline for comparing the alternatives to one another. This is because it represents what is anticipated to occur should the RMPA/EIS not be implemented.

Irreversible and irretrievable commitment of resources is discussed in **Section 4.12**, below. Irreversible commitments of resources result from actions in which resources are considered permanently changed; irretrievable commitments of resources result from actions in which resources are considered permanently lost.

4.3.1 No-Action Alternative with the Inclusion of SFAs (No-Action Alternative)

The impacts of the No-Action Alternative, or current management, of this SEIS were analyzed as the Proposed Plan in the 2015 Final EIS, and within the various alternatives analyzed in the Sagebrush Focal Areas Withdrawal Draft EIS (2016 SFA Draft EIS; BLM 2016b). The BLM has reviewed new information to verify that the analysis in the 2015 Final EIS remains sound; therefore, impacts from implementing the No-Action Alternative are substantially the same as those analyzed in the 2015 Final EIS.

Table 4-1, below, shows where information on the impacts of the No-Action Alternative can be found.

Table 4-1
Environmental Consequences for the No-Action Alternative Incorporated by Reference

Issue	Resource / Resource Use	Location of Impact Analysis from the 2015 Final EIS
Habitat Management Area (HMA) Boundaries	Greater Sage-Grouse	The impacts on Greater Sage-Grouse and its habitat through the management of established HMAs are discussed in Section 4.4.10 of the 2015 Final EIS beginning on page 4-51.
	Vegetation	The impacts on Vegetation through the management of the established HMAs are discussed in Section 4.5.10 of the 2015 Final EIS beginning on page 4-91.
	Land Use and Realty	The impacts on Land Use and Realty through the management of the established HMAs are discussed in Section 4.13.10 of the 2015 Final EIS beginning on page 4-269.
	Renewable Energy	The impacts on Renewable Energy through the management of the established HMAs are discussed in Section 4.14.10 of the 2015 Final EIS beginning on page 4-284.
	Minerals and Energy	The impacts on Minerals and Energy through the management of the established HMAs are discussed in Section 4.15 of the 2015 Final EIS beginning on page 4-286.
	Socioeconomics	The impacts on Socioeconomics through the management of the established HMAs are discussed in Section 4.21 of the 2015 Final EIS beginning on page 4-402.

Issue	Resource / Resource Use	Location of Impact Analysis from the 2015 Final EIS
Habitat Management Area (HMA) Boundaries *(continued)*	Livestock Grazing	The impacts on Livestock Grazing through the management of the established HMAs are discussed in Section 4.10.10 of the 2015 Final EIS beginning on page 4-232.
	Comprehensive Travel Management	The impacts on Comprehensive Travel Management through the management of the established HMAs are discussed in Section 4.12.10 of the 2015 Final EIS beginning on page 4-252.
Sagebrush Focal Areas (SFA)	Greater Sage-Grouse	The impacts on Greater Sage-Grouse from withdrawing SFAs from location and entry under the Mining Law of 1872 are discussed in the 2016 SFA Draft EIS, Section 4.5 of the 2015 Final EIS beginning on page 4-82.
	Vegetation	The impacts on Vegetation from withdrawing SFAs from location and entry under the Mining Law of 1872 are discussed in Section 4.5.10 of the 2015 Final EIS beginning on page 4-91 and the 2016 SFA Draft EIS, Section 4.4 Vegetation, including Special Status Plants, beginning on page 4-68.
	Land Use and Realty	The impacts of establishing SFAs on Land Use and Realty are discussed in Section 4.13.10 of the 2015 Final EIS beginning on page 4-269.
	Renewable Energy	The impacts of establishing SFAs on Renewable Energy are discussed in Section 4.14.10 of the 2015 Final EIS beginning on page 4-284.
	Minerals and Energy	The impacts of establishing SFAs on Minerals and Energy are discussed in Section 4.15 of the 2015 Final EIS beginning on page 4-286 and the 2016 SFA Draft EIS, Section 4.2 Geology and Mineral Resources, beginning on page 4-7.
	Socioeconomics	The impacts of establishing SFAs on Socioeconomics are discussed in Section 4.21 of the 2015 Final EIS beginning on page 4-402 and the 2016 SFA Draft EIS, Section 4.3 Social and Economic, beginning on page 4-20.
	Livestock Grazing	The impacts of establishing SFAs on Livestock Grazing are discussed in Section 4.10.10 of the 2015 Final EIS beginning on page 4-232.
	Comprehensive Travel Management	The impacts of establishing SFAs on Comprehensive Travel Management are discussed in Section 4.12.10 of the 2015 Final EIS beginning on page 4-252.
Adaptive Management	Greater Sage-Grouse	The Adaptive Management Plan analyzed in 2015 can be found in Section 2.7.1 of the 2015 Final EIS. The impacts on Greater Sage-Grouse through the application of the established Adaptive Management Plan are discussed in Section 4.4.10 of the 2015 Final EIS beginning on page 4-51.
	Vegetation	The Adaptive Management Plan analyzed in 2015 can be found in Section 2.7.1 of the 2015 Final EIS. The impacts on Vegetation through the application of the established Adaptive Management Plan are discussed in Section 4.5.10 of the 2015 Final EIS beginning on page 4-91.
	Land Use and Realty	The Adaptive Management Plan analyzed in 2015 can be found in Section 2.7.1 of the 2015 Final EIS. The impacts on Land Use and Realty through the application of the established Adaptive Management Plan are discussed in Section 4.13.10 of the 2015 Final EIS beginning on page 4-269.
	Renewable Energy	The Adaptive Management Plan analyzed in 2015 can be found in Section 2.7.1 of the 2015 Final EIS. The impacts on Renewable Energy through the application of the established Adaptive Management Plan are discussed in Section 4.14.10 of the 2015 Final EIS beginning on page 4-284.

Issue	Resource / Resource Use	Location of Impact Analysis from the 2015 Final EIS
Adaptive Management *(continued)*	Minerals and Energy	The Adaptive Management Plan analyzed in 2015 can be found in Section 2.7.1 of the 2015 Final EIS. The impacts on Minerals and Energy through the application of the established Adaptive Management Plan are discussed in Section 4.15 of the 2015 Final EIS beginning on page 4-286.
	Socioeconomics	The Adaptive Management Plan analyzed in 2015 can be found in Section 2.7.1 of the 2015 Final EIS. The impacts on Socioeconomics through the application of the established Adaptive Management Plan are discussed in Section 4.21 of the 2015 Final EIS beginning on page 4-402.
	Livestock Grazing	The Adaptive Management Plan analyzed in 2015 can be found in Section 2.7.1 of the 2015 Final EIS. The impacts on Livestock Grazing through the application of the established Adaptive Management Plan are discussed in Section 4.10.10 of the 2015 Final EIS beginning on page 4-232.
	Comprehensive Travel Management	The Adaptive Management Plan analyzed in 2015 can be found in Section 2.7.1 of the 2015 Final EIS. The impacts on Comprehensive Travel Management through the application of the established Adaptive Management Plan are discussed in Section 4.12.10 of the 2015 Final EIS beginning on page 4-252.
Allocation Exception Process	Greater Sage-Grouse	A number of exceptions were outlined in the 2015 Final EIS according to specific resource uses or conditions. These are summarized in Section 2.5 of this SEIS under the heading Issue: Allocation Exception Process, under the No-Action Alternative. The impacts on Greater Sage-Grouse through the management of the established Allocation Exception Process are discussed in Section 4.4.10 of the 2015 Final EIS beginning on page 4-51.
	Vegetation	A number of exceptions were outlined in the 2015 Final EIS according to specific resource uses or conditions. These are summarized in Section 2.5 of this SEIS under the heading Issue: Allocation Exception Process, under the No-Action Alternative. The impacts on Vegetation through the management of the established Allocation Exception Process are discussed in Section 4.5.10 of the 2015 Final EIS beginning on page 4-91.
	Land Use and Realty	A number of exceptions were outlined in the 2015 Final EIS according to specific resource uses or conditions. These are summarized in Section 2.5 of this SEIS under the heading Issue: Allocation Exception Process, under the No-Action Alternative. The impacts on Land Use and Realty through the management of the established Allocation Exception Process are discussed in Section 4.13.10 of the 2015 Final EIS beginning on page 4-269.
	Renewable Energy	A number of exceptions were outlined in the 2015 Final EIS according to specific resource uses or conditions. These are summarized in Section 2.5 of this SEIS under the heading Issue: Allocation Exception Process, under the No-Action Alternative. The impacts on Renewable Energy through the management of the established Allocation Exception Process are discussed in Section 4.14.10 of the 2015 Final EIS beginning on page 4-284.

Issue	Resource / Resource Use	Location of Impact Analysis from the 2015 Final EIS
Allocation Exception Process *(continued)*	Minerals and Energy	A number of exceptions were outlined in the 2015 Final EIS according to specific resource uses or conditions. These are summarized in Section 2.5 of this SEIS under the heading Issue: Allocation Exception Process, under the No-Action Alternative. The impacts on Minerals and Energy through the management of the established Allocation Exception Process are discussed in Section 4.15 of the 2015 Final EIS beginning on page 4-286.
	Socioeconomics	A number of exceptions were outlined in the 2015 Final EIS according to specific resource uses or conditions. These are summarized in Section 2.5 of this SEIS under the heading Issue: Allocation Exception Process, under the No-Action Alternative. The impacts on Socioeconomics through the management of the established Allocation Exception Process are discussed in Section 4.21 of the 2015 Final EIS beginning on page 4-402.
	Livestock Grazing	A number of exceptions were outlined in the 2015 Final EIS according to specific resource uses or conditions. These are summarized in Section 2.5 of this SEIS under the heading Issue: Allocation Exception Process, under the No-Action Alternative. The impacts on Livestock Grazing through the management of the established Allocation Exception Process are discussed in Section 4.10.10 of the 2015 Final EIS beginning on page 4-232.
	Comprehensive Travel Management	A number of exceptions were outlined in the 2015 Final EIS according to specific resource uses or conditions. These are summarized in Section 2.5 of this SEIS under the heading Issue: Allocation Exception Process, under the No-Action Alternative. The impacts on Comprehensive Travel Management through the management of the established Allocation Exception Process are discussed in Section 4.12.10 of the 2015 Final EIS beginning on page 4-252.
Mitigation	Greater Sage-Grouse	The mitigation strategy that constitutes the action under this alternative is described in Section 2.7.3 of the 2015 Final EIS beginning on page 2-88. The impacts on Greater Sage-Grouse through the management of the established mitigation are discussed in Section 4.4.10 of the 2015 Final EIS beginning on page 4-51. The Regional Mitigation Strategy is explained in Appendix I of the 2015 Final EIS.
	Vegetation	The mitigation strategy that constitutes the action under this alternative is described in Section 2.7.3 of the 2015 Final EIS beginning on page 2-88. The impacts on Vegetation through the management of the established mitigation are discussed in Section 4.5.10 of the 2015 Final EIS beginning on page 4-91.
	Land Use and Realty	The mitigation strategy that constitutes the action under this alternative is described in Section 2.7.3 of the 2015 Final EIS beginning on page 2-88. The impacts on Land Use and Realty through the management of the established mitigation are discussed in Section 4.13.10 of the 2015 Final EIS beginning on page 4-269.
	Renewable Energy	The mitigation strategy that constitutes the action under this alternative is described in Section 2.7.3 of the 2015 Final EIS beginning on page 2-88. The impacts on Renewable Energy through the management of the established mitigation are discussed in Section 4.14.10 of the 2015 Final EIS beginning on page 4-284.

Issue	Resource / Resource Use	Location of Impact Analysis from the 2015 Final EIS
Mitigation *(continued)*	Minerals and Energy	The mitigation strategy that constitutes the action under this alternative is described in Section 2.7.3 of the 2015 Final EIS beginning on page 2-88. The impacts on Minerals and Energy through the management of the established mitigation are discussed in Section 4.15 of the 2015 Final EIS beginning on page 4-286.
	Socioeconomics	The mitigation strategy that constitutes the action under this alternative is described in Section 2.7.3 of the 2015 Final EIS beginning on page 2-88. The impacts on Socioeconomics through the management of the established mitigation are discussed in Section 4.21 of the 2015 Final EIS beginning on page 4-402.
	Livestock Grazing	The mitigation strategy that constitutes the action under this alternative is described in Section 2.7.3 of the 2015 Final EIS beginning on page 2-88. The impacts on Livestock Grazing through the management of the established mitigation are discussed in Section 4.10.10 of the 2015 Final EIS beginning on page 4-232.
	Comprehensive Travel Management	The mitigation strategy that constitutes the action under this alternative is described in Section 2.7.3 of the 2015 Final EIS beginning on page 2-88. The impacts on Comprehensive Travel Management through the management of the established mitigation are discussed in section 4.12.10 of the 2015 Final EIS beginning on page 4-252.
Seasonal Timing Restrictions	Greater Sage-Grouse	The seasonal timing restrictions are tied to specific seasonal habitat needs for Greater Sage-Grouse. The discussion related to these restrictions is found in Management Action SSS-2 of the 2015 Final EIS beginning on page 2-20. The discussion specific to seasonal timing restrictions begins on page 2-23. The impacts on Greater Sage-Grouse through the management of the established seasonal timing restrictions are discussed in Section 4.4.10 of the 2015 Final EIS beginning on page 4-51.
	Vegetation	The seasonal timing restrictions are tied to specific seasonal habitat needs for Greater Sage-Grouse. The discussion related to these restrictions is found in Management Action SSS-2 of the 2015 Final EIS beginning on page 2-20. The discussion specific to seasonal timing restrictions begins on page 2-23. The impacts on Vegetation through the management of the established seasonal timing restrictions are discussed in Section 4.5.10 of the 2015 Final EIS beginning on page 4-91.
	Land Use and Realty	The seasonal timing restrictions are tied to specific seasonal habitat needs for Greater Sage-Grouse. The discussion related to these restrictions is found in Management Action SSS-2 of the 2015 Final EIS beginning on page 2-20. The discussion specific to seasonal timing restrictions begins on page 2-23. The impacts on Land Use and Realty through the management of the established seasonal timing restrictions are discussed in Section 4.13.10 of the 2015 Final EIS beginning on page 4-269.
	Renewable Energy	The seasonal timing restrictions are tied to specific seasonal habitat needs for Greater Sage-Grouse. The discussion related to these restrictions is found in Management Action SSS-2 of the 2015 Final EIS beginning on page 2-20. The discussion specific to seasonal timing restrictions begins on page 2-23. The impacts on Renewable Energy through the management of the established seasonal timing restrictions are discussed in Section 4.14.10 of the 2015 Final EIS beginning on page 4-284.

Issue	Resource / Resource Use	Location of Impact Analysis from the 2015 Final EIS
Seasonal Timing Restrictions *(continued)*	Minerals and Energy	The seasonal timing restrictions are tied to specific seasonal habitat needs for Greater Sage-Grouse. The discussion related to these restrictions is found in Management Action SSS-2 of the 2015 Final EIS beginning on page 2-20. The discussion specific to seasonal timing restrictions begins on page 2-23. The impacts on Minerals and Energy through the management of the established seasonal timing restrictions are discussed in Section 4.15 of the 2015 Final EIS beginning on page 4-286.
	Socioeconomics	The seasonal timing restrictions are tied to specific seasonal habitat needs for Greater Sage-Grouse. The discussion related to these restrictions is found in Management Action SSS-2 of the 2015 Final EIS beginning on page 2-20. The discussion specific to seasonal timing restrictions begins on page 2-23. The impacts on Socioeconomics through the management of the established seasonal timing restrictions are discussed in Section 4.21 of the 2015 Final EIS beginning on page 4-402.
	Livestock Grazing	The seasonal timing restrictions are tied to specific seasonal habitat needs for Greater Sage-Grouse. The discussion related to these restrictions is found in Management Action SSS-2 of the 2015 Final EIS beginning on page 2-20. The discussion specific to seasonal timing restrictions begins on page 2-23. The impacts on Livestock Grazing through the management of the established seasonal timing restrictions are discussed in Section 4.10.10 of the 2015 Final EIS beginning on page 4-232.
	Comprehensive Travel Management	The seasonal timing restrictions are tied to specific seasonal habitat needs for Greater Sage-Grouse. The discussion related to these restrictions is found in Management Action SSS-2 of the 2015 Final EIS beginning on page 2-20. The discussion specific to seasonal timing restrictions begins on page 2-23. The impacts on Comprehensive Travel Management through the management of the established seasonal timing restrictions are discussed in Section 4.12.10 of the 2015 Final EIS beginning on page 4-252.
Habitat Objectives	Greater Sage-Grouse	The habitat objectives are discussed in Section 2.6.2 under Objective SSS-1 and the Habitat Objectives (Table 2-2) in the 2015 Final EIS beginning on page 2-17. The impacts on Greater Sage-Grouse through the management of the established Habitat Objectives are discussed in Section 4.4.10 of the 2015 Final EIS beginning on page 4-51.
	Vegetation	The habitat objectives are discussed in Section 2.6.2 under Objective SSS-1 and the Habitat Objectives (Table 2-2) in the 2015 Final EIS beginning on page 2-17. The impacts on Vegetation through the management of the established Habitat Objectives are discussed in Section 4.5.10 of the 2015 Final EIS beginning on page 4-91.
	Land Use and Realty	The habitat objectives are discussed in Section 2.6.2 under Objective SSS-1 and the Habitat Objectives (Table 2-2) in the 2015 Final EIS beginning on page 2-17. The impacts on Land Use and Realty through the management of the established Habitat Objectives are discussed in Section 4.13.10 of the 2015 Final EIS beginning on page 4-269.
	Renewable Energy	The habitat objectives are discussed in Section 2.6.2 under Objective SSS-1 and the Habitat Objectives (Table 2-2) in the 2015 Final EIS beginning on page 2-17. The impacts on Renewable Energy through the management of the established Habitat Objectives are discussed in Section 4.14.10 of the 2015 Final EIS beginning on page 4-284.

Issue	Resource / Resource Use	Location of Impact Analysis from the 2015 Final EIS
Habitat Objectives *(continued)*	Minerals and Energy	The habitat objectives are discussed in Section 2.6.2 under Objective SSS-1 and the Habitat Objectives (Table 2-2) in the 2015 Final EIS beginning on page 2-17. The impacts on Minerals and Energy through the management of the established Habitat Objectives are discussed in Section 4.15 of the 2015 Final EIS beginning on page 4-286.
	Socioeconomics	The habitat objectives are discussed in Section 2.6.2 under Objective SSS-1 and the Habitat Objectives (Table 2-2) in the 2015 Final EIS beginning on page 2-17. The impacts on Socioeconomics through the management of the established Habitat Objectives are discussed in Section 4.21 of the 2015 Final EIS beginning on page 4-402.
	Livestock Grazing	The habitat objectives are discussed in Section 2.6.2 under Objective SSS-1 and the Habitat Objectives (Table 2-2) in the 2015 Final EIS beginning on page 2-17. The impacts on Livestock Grazing through the management of the established Habitat Objectives are discussed in Section 4.10.10 of the 2015 Final EIS beginning on page 4-232.
	Comprehensive Travel Management	The habitat objectives are discussed in Section 2.6.2 under Objective SSS-1 and the Habitat Objectives (Table 2-2) in the 2015 Final EIS beginning on page 2-17. The impacts on Comprehensive Travel Management through the management of the established Habitat Objectives are discussed in Section 4.12.10 of the 2015 Final EIS beginning on page 4-252.

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This table is a summary of the environmental consequences from the 2015 alternatives that were incorporated by reference into the 2019 planning effort and considered throughout the process. **Table 4-2** presents a comparison summary of impacts from management actions proposed for the alternatives considered in 2015.

Table 4-2
Summary of Environmental Consequences

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Greater Sage-Grouse						
Continued implementation of BLM vegetation and soil management policies and standards in sagebrush habitat would decrease invasive species, help re-establish native plants, reduce the risk of wildfire, and reduce juniper and/or pinyon and invasive grasses, leading to a long-term improvement in quality and quantity of Greater Sage-Grouse habitat. Continuation of national and local livestock management plans and policies would not specifically protect Greater Sage-Grouse habitat, though they could provide indirect benefits through preservation of existing sagebrush habitat. Management of riparian areas to achieve PFC would improve Greater Sage-Grouse brood-rearing habitats. Range improvements would be designed to meet range and wildlife objectives, which could protect Greater Sage-Grouse habitats. Most LUPs do not include provisions for managing fires and fuels to protect Greater Sage-Grouse habitat. Under Alternative A, wildfires would likely continue to increase in size and frequency in seven of the nine populations/subpopulations in the sub-region. Greater Sage-Grouse would subsequently continue to be degraded or lost. Small and heavily disturbed populations with dominance of invasive grass understory would be particularly susceptible to these impacts. Wild horses and burros would continue to be managed on HMAs/WHBTs, but management	Alternative B management prescriptions for vegetation and soil applied to PHMA (9,573,300 acres) and GHMA (6,953,300 acres) would provide greater protection and restoration efforts for Greater Sage-Grouse habitat compared with Alternative A. Under Alternative B, the same number of acres would be open to livestock grazing as under Alternative A. In comparison with Alternative A, Alternative B management actions would further reduce, but would not eliminate, impacts from livestock grazing on Greater Sage-Grouse and its habitat. Under Alternative B, impacts on Greater Sage-Grouse from fire suppression activities would be largely the same as Alternative A. Relative to the amount of Greater Sage-Grouse habitat that is expected to burn based on current trends and is outside the control of the BLM or Forest Service, Alternative B may provide localized but minimal protections and improvements to Greater Sage-Grouse habitat. Alternative B provides significant short-term and localized improvements to grass cover and forb availability from changes in wild horse and burro management, compared with Alternative A. Fluid minerals management under Alternative B would close 10,120,700 acres of PHMA to leasing. Withdrawal from mineral leasing would result in long-term beneficial impacts on Greater Sage-	Management under Alternative C would not prioritize restoration treatments within occupied habitats; therefore, it would decrease the potential for restoring Greater Sage-Grouse habitat, compared with Alternative A. Livestock use would be closed on about 16,526,600 acres of PHMA. Under Alternative C, impacts on Greater Sage-Grouse would be reduced compared with Alternative A in upland sites but increased in riparian sites. Removal of fencing would reduce the potential of Greater Sage-Grouse direct strikes but would increase negative impacts on brood-rearing habitats from wild horses and burros having access to more riparian sites. Impacts on Greater Sage-Grouse from wildfire suppression and fuels management would be the same as Alternative B. Under Alternative C, wild horses and burros would be managed on the same HMA/WHBT acreage as under Alternative A. However, horses and burros would be expected to range over a larger area than under Alternative A and would cause greater adverse impacts on quality Greater Sage-Grouse habitat. Under Alternative C, fluid mineral leasing would be precluded for all ACECs, including all PHMA. Closed acreage would protect all occupied or potentially occupied Greater Sage-Grouse habitat.	Management under Alternative D would focus on vegetation management within PHMA and GHMA with a goal of maintaining a resilient sagebrush vegetative community, restoring sagebrush communities to reduce habitat fragmentation, and maintaining and re- establishing habitat connectivity over the long term. Habitat trends for 10 and 50 years would improve compared with Alternative A and would be similar to Alternative B. Compared with Alternative A, Alternative D livestock management actions would further reduce, but would not eliminate, impacts from grazing on Greater Sage-Grouse and its habitat. Impacts from wildfire and fuels management are expected to be similar to but slightly less than Alternative B due to the fact that fuels management treatments and post-fire rehabilitation projects in PHMA are focused on maximizing benefits to Greater Sage-Grouse. Similar to Alternative B, wild horse and burro management under Alternative D provides significant, short-term, and localized improvements to grass cover and forb availability. Alternative D would allow fluid mineral leasing on all lands with federal fluid mineral estate, but within PHMA and GHMA, leasing would only be allowed with NSO stipulations. NSO stipulations would provide an increased level of protection to all acres of PHMA and GHMA compared with Alternative A.	In comparison with Alternative A, Alternative E would provide greater benefits to Greater Sage-Grouse and its habitats by establishing regulatory mechanisms that would provide protections for Greater Sage-Grouse on lek or nesting habitat. Riparian impacts would be expected to be reduced in comparison to Alternative A. Management under Alternative E would provide for more vegetation treatments within occupied Greater Sage-Grouse habitat than under Alternative A, similar to Alternatives B and D. Ten and fifty-year habitat trends would improve compared to Alternative A and would be similar to Alternatives B and D. Livestock grazing management under Alternative E would emphasize cooperative implementation of appropriate prescribed grazing conservation actions at scales sufficient to influence a positive response in Greater Sage-Grouse habitat. Riparian areas would be managed, at a minimum, for PFC. BLM riparian areas would be managed to meet RAC standards. Alternative E would promote riparian grazing improvements along with additional infrastructure in order to control season, duration, and degree of use. These improvements would be beneficial to late summer brood-rearing habitat for Greater Sage-Grouse. Effects from wildfire suppression and fuels management would be	Vegetation management under Alternative F would provide about the same level of, or slightly less, protection to Greater Sage-Grouse and its habitat as Alternative B. In comparison with Alternative A, livestock management under Alternative F would provide more indirect benefits to Greater Sage-Grouse due to increases in nesting and brood-rearing habitat amount and quality. Alternative F may increase some direct impacts on nesting Greater Sage-Grouse when compared with Alternative A by not applying timing restrictions to livestock during Greater Sage-Grouse nesting periods. This is likely offset by closure of 25 percent of each planning area to livestock grazing each year and a 25 percent reduction in AUMs and removal of certain livestock-related structures such as fences. Effects on Greater Sage-Grouse from wildfire and fuels management would be the same as Alternative B. Under Alternative F, AML for wild horses and burros would be reduced by 25 percent in all HMAs and WHBTs in Greater Sage-Grouse habitat. All other management would be the same as under Alternative B. Leasable minerals management under Alternative F would close PHMA and GHMA to fluid mineral leasing, as under Alternative C. Impacts from locatable minerals management would be the same as for Alternative B. Impacts from	***Vegetation*** Management for vegetation under the Proposed Plan would increase the amount and quality of Greater Sage-Grouse habitat compared with Alternative A and similar to Alternative D for all Greater Sage-Grouse seasonal life-cycle requirements, including breeding, nesting, brood-rearing, and wintering. Management would be focused in PHMA and GHMA with a goal of maintaining a resilient sagebrush vegetative community, restoring sagebrush communities to reduce habitat fragmentation, and maintaining and re-establishing habitat connectivity over the long term. ***Livestock*** These management actions would speed recovery of negatively impacted Greater Sage-Grouse habitats as compared with Alternative A. Direct impacts on breeding and/or nesting Greater Sage-Grouse individuals and habitats would also be reduced due to the use of various herd management actions (e.g., seasonal timing restrictions) applied during the Greater Sage-Grouse breeding and nesting season as compared to Alternative A. Removing livestock ponds outside of perennial waterways and requiring salting locations and range facilities to be moved farther away from riparian areas, springs, and meadows would reduce long-term negative impacts on riparian brood-rearing habitats.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
would not be based specifically on the habitat needs of Greater Sage-Grouse. Keeping horses and burros at AML would reduce overall impacts on vegetation, especially nesting cover and riparian brood-rearing habitats, during periods of drought. Currently 1,884,300 acres of PHMA and GHMA are closed to fluid minerals leasing. Lands closed to mineral entry comprise 521, 600 acres of PHMA and GHMA. There are 1,884,300 acres closed to mineral material disposal within PHMA and GHMA. Closed areas provide an increased level of protection to nesting habitat associated with leks. Under current land use and realty management, ROW exclusion would affect 1,884,300 acres of Greater Sage-Grouse habitat. Acres of PHMA and GHMA identified as available for disposal total 766,300 under Alternative A. Under this alternative, ROW exclusion and avoidance management would be expected to continue to reduce both direct and indirect impacts on Greater Sage-Grouse. Under Alternative A, 1,884,300 acres are managed for exclusion and 0 acres are managed for avoidance of wind energy within existing PHMA/GHMA. Under Alternative A, 521,600 acres of PHMA and GHMA would be closed to motorized vehicle use.	Grouse habitats associated with all seasonal life history requirements. Under Alternative B, management of locatable minerals would be more protective of Greater Sage-Grouse habitat than under Alternative A. Proposed withdrawals from mineral entry under Alternative B would include 9,342,600 acres of PHMA. Within modeled nesting habitat there would be 10,522,300 acres of PHMA. Alternative B closes 10,120,700 acres of PHMA to mineral material sales. Closing PHMA to leasing, entry, and sales would provide an increased level of protection to Greater Sage-Grouse and its habitat during all seasonal life- cycle requirements. Under Alternative B, more habitat would be managed as ROW avoidance (6,470,600 acres) and exclusion (10,056,000 acres) areas than under Alternative A. Impacts on Greater Sage-Grouse from lands and realty management would be reduced by greatly increasing acreage subject to ROW avoidance and exclusion and by protection and acquisition of important Greater Sage-Grouse habitats. Under Alternative B, impacts from management of lands for wind and solar energy development would be the same as for Alternative A. Under Alternative B, 521,600 acres of PHMA and GHMA would be closed to motorized vehicle use, and 9,599,100 acres would be limited to existing roads and trails. Compared to Alternative A, Alternative B would reduce the potential for vehicle disturbance to Greater Sage-Grouse within PHMA during all phases of their seasonal life history.	Mineral entry withdrawal would be proposed for PHMA and all ACECs, protecting all occupied or potentially occupied Greater Sage-Grouse habitat and providing an increased level of protection to all associated populations and sub-populations. Management under Alternative C would close PHMA (16,526,600 acres) to mineral material sales. Closure would increase protection of all acres of PHMA. Under Alternative C, ROW avoidance acres would remain the same as under Alternative A. Within PHMA, there are more acres managed as ROW exclusion under Alternative C (16,526,600 acres) than under Alternative A (1,884,300 acres). Under this alternative, fewer acres are identified for disposal and more areas are prioritized for acquisition. This alternative would result in fewer direct or indirect impacts on Greater Sage-Grouse and their habitats compared with Alternative A. Compared with Alternative A, Alternative C eliminates the impacts from renewable energy development on Greater Sage-Grouse and its habitat in all seasonal ranges. Under Alternative C, any designated open roads within PHMA would be managed as limited for motorized travel with the exception of existing closed areas within PHMA.	Impacts on Greater Sage-Grouse habitat from locatable minerals management would be the same as under Alternative A. Impacts on Greater Sage-Grouse habitat from salable minerals management would be the same as under Alternative C. Applying avoidance criteria throughout PHMA and GHMA would result in greater control of impacts on Greater Sage-Grouse in these habitats than would occur under Alternative A. ROW exclusion areas would be the same as under Alternative A; therefore, these impacts would be expected to be the same. Under Alternative D, all PHMA and GHMA would be managed as ROW exclusion for wind facilities. This level of closure provides the maximum preservation of sagebrush habitat. Under Alternative D, PHMA and GHMA would be managed as ROW exclusion for new solar energy facilities. This would provide a high level of protection for sagebrush, excluding 22,245,600 acres of Greater Sage-Grouse habitat from new development. Under Alternative D, areas designated as open to cross-country travel within PHMA and GHMA would be managed as limited to motorized travel, making it the most limiting to travel management designations.	similar to the effects described under Alternative D but would emphasize economic incentives to promote rehabilitation and restoration activities. Impacts from wild horse and burro management under Alternative E would be similar to Alternatives B and D. Management under Alternative E would allow leasing within the SGMA on all lands with federal fluid mineral estate. This would include moderate stipulations (TL and CSU) and would be subject to avoid, minimize, and mitigate policy. Under Alternative E, lands would be generally open to mineral location, except if already withdrawn under current management. Effects on Greater Sage-Grouse populations and habitat would be similar to Alternative A. Management under Alternative E would avoid mineral material sales within the SGMA and apply a policy of avoid, minimize, and mitigate. The Nevada Conservation Credit System would be implemented. Existing withdrawn acreage, avoidance, and implementation of the avoid, minimize, and mitigate policy would provide an increased level of protection to all acres of Greater Sage-Grouse habitats. Impacts from lands and realty management would be similar to Alternative D, establishing core and priority habitats within SGMA as avoidance areas subject to an avoid, minimize, and mitigate strategy, which would reduce direct and indirect impacts on Greater Sage-Grouse and its habitat. Under Alternative E, renewable energy management would site projects outside of Greater Sage-	salable minerals management would be the same as for Alternative A. Lands and realty management would be expected to provide greater direct protections to Greater Sage-Grouse than Alternative A due to the larger number of acres managed as ROW exclusion. Indirect impacts on habitat would be expected to also be less than Alternative A. For example, all PHMA would be managed as ROW exclusion for new permits, with exceptions for co- location of projects within existing footprints and valid, existing rights. Under Alternative F, solar development would be the same as Alternative A, and the same nature and scope of impacts would be expected. Under Alternative F, wind energy development would be the same as under Alternative D, and solar energy development would be the same as under Alternative A. Impacts from travel and transportation management would be the same as under Alternative B.	***Fire and Fuels*** Incorporation of the FIAT and Resistance and Resilience concepts would reduce impacts from invasive annual grasses and altered fire regimes on the sagebrush ecosystem as well as reduce the rate of conifer encroachment in order to reduce Greater Sage-Grouse habitat fragmentation and maintain or re-establish habitat connectivity over the long term and at a landscape scale compared with Alternative A. Fuel breaks would also be implemented to better contain wildfires, and during firefighting operations, sagebrush habitat would be protected, to the extent possible, as a valuable resource, increasing protection to Greater Sage-Grouse habitats from wildfire as compared with Alternative A. ***WHB*** As with livestock grazing, these reductions would be expected to provide long-term benefits to Greater Sage-Grouse and its habitat by increasing the overall quality of riparian and upland habitats through increased diversity and availability of vegetation, as well as reducing potential direct impacts on Greater Sage-Grouse from wild horse and burros, compared with Alternative A. ***Fluid Minerals*** This alternative affords increased protection of all seasonal Greater Sage-Grouse habitats from disturbance, decreases fragmentation, and reduces disturbance from structures and noise as compared to Alternative A. NSO stipulations within PHMA and SFAs would prohibit occupancy and all surface- disturbing activities on all or part of the lease for the life of the lease. The NSO would protect more acres of PHMA than

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
(*see above*)	(*see above*)	(*see above*)	(*see above*)	Grouse habitat wherever possible. Because this strategy would not rule out the construction of projects within or adjacent to Greater Sage-Grouse habitat, there would be the possibility for more land use for both wind and solar energy development than under Alternative A. Impacts from travel and transportation management would be the same as under Alternative D.	(*see above*)	under Alternative A. Direct and indirect impacts on Greater Sage-Grouse individuals, populations, and habitat within the NSO would be reduced under the Proposed Plan. Under the Proposed Plan, within PHMA and GHMA on leases not yet developed, proposed surface disturbances must achieve a net conservation gain of Greater Sage-Grouse habitat. This requirement would ensure that Greater Sage-Grouse habitats within or outside of Greater Sage-Grouse habitats are restored to meet Greater Sage-Grouse habitat objectives (**Table 2-2**). A 3 percent disturbance cap would also be applied in PHMA. Seasonal restrictions would be applied to exploratory drilling in PHMA and GHMA, minimizing and/or eliminating direct impacts on individual Greater Sage-Grouse, populations, and habitat as compared with Alternative A. ***Locatable Minerals*** The Proposed Plan is the similar to Alternatives D and E but includes additional management actions and RDFs that would be applied consistent with applicable law. Management under the Proposed Plan would decrease direct and indirect impacts on Greater Sage-Grouse and its habitat by eliminating noise impacts to Greater Sage-Grouse during the breeding season as compared with Alternative A. ***Salable*** Management under the Proposed Plan would close PHMA to new material disposal. RDFs to conserve and maintain the quality and distribution of Greater Sage-Grouse habitat would be applicable within all Greater Sage-Grouse habitats consistent with applicable law, minimizing or eliminating

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
(*see above*)	(*see above*)	(*see above*)	(*see above*)	(*see above*)	(*see above*)	disturbance to Greater Sage-Grouse and its habitat from surface disturbance, noise impacts, West Nile virus, and habitat fragmentation, in addition to a 3 percent disturbance cap in PHMA and a net conservation gain of Greater Sage-Grouse habitat compared with Alternative A. ***Lands and Realty*** The management actions under the Proposed Plan would reduce the number of developments within proximity of leks and other seasonal habitats where Greater Sage-Grouse are most susceptible to aerial predators. Major and minor ROWs would be managed as avoidance areas in PHMA. In GHMA, major ROWs would be managed as avoidance and minor ROWs would be managed as open. The TransWest Express Transmission project is not subject to the decisions made in this planning effort. Co-locating power and communication lines or siting in non-habitats and application of the net conservation gain goal would decrease direct disturbance to Greater Sage-Grouse habitat. Noise and seasonal restrictions would reduce disturbance to Greater Sage-Grouse during the breeding season as compared with Alternative A. ***Renewable Energy*** Under the Proposed Plan, PHMA would be managed as exclusion areas for wind energy facilities. More acres (over 11 million additional acres) would be excluded under the Proposed Plan than under Alternative A. Fewer direct and indirect impacts on Greater Sage-Grouse and all of its seasonal habitats would be afforded under the Proposed Plan than under Alternative A.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
(*see above*)	(*see above*)	(*see above*)	(*see above*)	(*see above*)	(*see above*)	***Solar*** Under the Proposed Plan, PHMA and GHMA would be managed as exclusion areas for utility-scale commercial solar energy facilities. This represents over 8 million fewer acres open to solar energy development than under Alternative A. Fewer direct and indirect impacts on Greater Sage-Grouse and all of its seasonal habitats would be afforded under the Proposed Plan than under Alternative A. ***Travel*** Under the Proposed Plan, no acres would be open to motorized travel, and the BLM would manage over 16 million acres as limited to existing or designated routes. No new roads would be allowed in PHMA or upgrades of existing routes. Seasonal timing restrictions could also be applied to roads near leks. The Proposed Plan would provide fewer impacts on Greater Sage-Grouse and its habitat than under Alternative A. ***ACEC*** Similar to Alternatives D and E, Greater Sage-Grouse management prescriptions would be extended over 115,300 acres of PHMA, GHMA, and OHMA in 29 existing ACECs. In addition, the recommendation for withdrawal of locatable minerals in SFAs would include some existing ACECs that are currently open to locatable materials. Direct and indirect impacts on Greater Sage-Grouse and its habitat would be less than under Alternative A.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Vegetation and Soils						
Integrated Vegetation Management Handbook policies would continue to be followed and would provide guidance on which treatments and chemicals can be used. Application of these policies would improve vegetation management in sagebrush habitat, thereby likely improving vegetation conditions in these areas. A greater acreage of sagebrush may be burned within PHMA areas since this alternative is the least restrictive on wildland fire management within PHMA and GHMA areas. As a result, a greater loss of vegetation could occur in sagebrush habitats. This could result in an increased risk of annual grass and noxious weed invasion due to the disturbance.	Large-scale disturbances within PHMA would not be permitted and small-scale disturbances would be limited to 3 percent surface disturbance. This would minimize disturbance to vegetation and soils. Soils and vegetation management actions under Alternative B would aim to improve vegetation conditions and prioritize restoration efforts to benefit sagebrush vegetation. As a result, the restoration and vegetation management actions would enhance vegetation beyond the extent and condition relative to Alternative A. Impacts on soils from livestock grazing management are likely to be the same as those identified under Alternative A. Fewer acres of sagebrush habitat would be converted to an early seral stage than under Alternative A. However, there could also be a greater potential for catastrophic fire as a result of fire suppression and exclusion.	This alternative relies more on passive restoration and would lead to fewer acres of vegetation management being treated compared with Alternative A. However, it is likely that more acres of crested wheatgrass seedings and cheatgrass-invaded areas would be treated, improving vegetative conditions for Greater Sage-Grouse habitat with success in those areas. With minimizing the use of herbicides to treat annual grasses and noxious weeds, fewer acres of treatment would be completed under this alternative compared with Alternative A. Perennial grass utilization levels of 10-15 percent could leave fine-fuel levels at a high risk for wildfire. Shrub integrity measures could leave sagebrush and other upland shrub species with little impact other than natural forces. All PHMA and GHMA closed to livestock grazing could show a reduction in the potential for invasive species establishment. This may not control or reduce the existing invasive species presence. Impacts from wildland fire management would be the same as those described under Alternative A.	Lands would be managed to meet Greater Sage-Grouse and habitat objectives and as a result, sagebrush/perennial grass ecosystems would be enhanced or maintained. With suppression efforts focused on PHMA and GHMA, more acres would likely burn in areas outside PHMA and GHMA, increasing the need for ESR treatments in non-Greater Sage-Grouse habitat. Grazing management to achieve vegetation composition and structure consistent with ecological site potential could maintain or enhance sagebrush and perennial grass conditions within PHMA. Drought management and livestock resting during the growing season would provide a more resilient plant community. Fewer acres of sagebrush habitat in PHMA and GHMA would be converted to an early seral stage, and would have less risk for invasive grass and noxious weed invasion than under Alternative A.	Alternative E uses the avoid, minimize, and mitigate concept to manage vegetation conditions in Greater Sage-Grouse habitat. This would limit disturbance to sagebrush/perennial grass communities and likely lead to improved health and vigor of this vegetation. Areas selected for mitigation would likely result in increased sagebrush/perennial grass vegetation communities. This alternative assigns the Nevada Sagebrush Ecosystem Council with establishment of policies for the identification and prioritization of landscape-scale enhancement, restoration, fuel reduction, and mitigation projects. Without knowing what actions would be taken by the Council, it cannot be determined fully what level of impacts would occur as a result of their policies. Grazing management to achieve vegetation composition and structure consistent with ecological site potential could maintain or enhance sagebrush and perennial grass conditions within the SGMA. Impacts from wildland fire management would be the same as under Alternative D. Under Alternative E, OHV routes would be designated to areas outside of the SGMA; disturbance from OHV use on vegetation and soils could be reduced in the SGMA through the avoidance, minimization, and mitigation of sagebrush/perennial grass communities.	Disturbance to sagebrush would be limited to 3 percent surface disturbance. This could maintain sagebrush/perennial grass vegetation communities within PHMA. Impacts from vegetation and soils management would be the same as those described under Alternative B, with the exception that this alternative would exclude livestock grazing from burned areas until woody and herbaceous plants achieve Greater Sage-Grouse habitat objectives. This would accelerate burned area recovery towards meeting Greater Sage-Grouse habitat requirements. Wild horse AMLs would be reduced by 25 percent within occupied Greater Sage-Grouse habitats. While impacts from wild horses and burros would remain, this would reduce the effects of wild horses described under Alternative A. Impacts from wildland fire management would be the same as under Alternative B. Limiting motorized travel to existing routes under Alternative F would minimize disturbance of vegetation and soils from vehicle traffic within the planning area.	Under the Proposed Plan, comprehensive strategies to manage Greater Sage-Grouse habitat across the planning area would result in sagebrush/perennial grass communities being improved or protected in comparison to Alternative A. Numerous strategies to control invasive weeds and treat hazardous fuels would help to improve the resiliency to disturbance and resistance to exotic plant invasion. Encroaching conifers would be removed in historic sagebrush sites. Invasive or noxious weed populations would be reduced. Limited disturbance due to restricting permitted actions would lead to improved vegetation conditions. Also, limited disturbance of soils due to restricting permitted actions would lead to biological soils crusts being maintained or improved. Establishment of sagebrush focal areas would lead to large blocks of sagebrush/perennial grass communities, and treatments would be prioritized to maintain or improve those stands. Integrated vegetation management at a landscape level is expected to improve the condition of public lands. In addition, increased emphasis on incorporation of Greater Sage-Grouse habitat objectives and considerations into programs such as livestock grazing, recreation, and wild horse and burro management would likely lead to improvements in overall vegetation conditions. The avoid, minimize, and apply compensatory mitigation strategy proposed for anthropogenic activities in Greater Sage-Grouse habitat under the Proposed Plan would reduce or eliminate both direct and indirect adverse impacts on vegetation and soils across the planning area.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Riparian Areas and Wetlands						
Overall, condition and trend of important riparian areas and wetlands within PMUs would likely continue to improve. For example, many programs designed to improve watershed function (fire and fuels, vegetation, livestock and wild horse and burro management) would continue to result in improvement in condition and trend of riparian areas and wetlands within the sub-region. As a result of livestock grazing management, condition and trend of riparian areas and wetlands in PHMA and GHMA are likely to continue to improve in portions, but not all, of the sub-region. Riparian areas and wetlands could potentially be impacted from activities associated with leasing fluid minerals over the majority of the planning area, including PHMA and GHMA. Because ROW avoidance and exclusion areas make up a relatively small percent of PHMA or GHMA within the planning area, only limited areas of wetland and riparian habitats would continue to be protected from disturbance.	Comprehensive actions to reduce land disturbance in priority Greater Sage-Grouse habitats would substantially reduce potential for disturbance to riparian areas and wetlands within the planning area. Measures including closing or withdrawing large areas of priority Greater Sage-Grouse habitats to both leasable and locatable minerals exploration and development, adding stipulations to GHMA for most minerals programs, establishing ROW avoidance areas, limiting travel, requiring RDFs to be applied consistent with applicable law in PHMA and retaining Greater Sage-Grouse habitat in public ownership would benefit riparian areas and wetlands in comparison to Alternative A. Collectively, these measures would reduce direct and indirect adverse impacts on riparian areas from soil and vegetation loss, soil compaction, accelerated erosion, and invasive plant infestations. Retention of priority riparian habitats in public ownership would also preclude opportunities for future development of these important areas. Riparian areas in Greater Sage-Grouse habitats would also receive greater focus for livestock and for wild horse and burro management and for application of ecological restoration practices compared to Alternative A. Actions including remediating non-functional water developments, incorporating riparian habitat objectives into the planning process for livestock and wild horses, and placing more emphasis on managing both grazing and vegetation programs for watershed health would collectively improve condition and trend of riparian areas and	Alternative C provides for extensive protection of Greater Sage-Grouse habitat (including both PHMA and GHMA) through large-scale restrictions on livestock grazing, mining, travel, and energy development. Removing infrastructure such as fences and water developments is also proposed. Collectively, these measures would improve riparian habitats through natural healing and by reducing disturbance over a broad area compared to Alternative A. Proposed restoration of crested wheatgrass seedings and cheatgrass infestations, and reclamation of disturbed areas would also potentially provide indirect benefits to riparian areas through improved watershed function and resiliency. However, opportunities for collaborative livestock management affecting intermixed private lands could be reduced or eliminated. Since much priority riparian habitats occur on private lands, fewer acres of riparian habitats on these areas would benefit from targeted or prescriptive management approaches compared to Alternative A. In addition, a proposal to restrict use of helicopters for gathering wild horses could result in increased direct and indirect impacts to riparian areas as a result of fewer numbers of horses being gathered.	Under Alternative D, measures to protect and enhance priority Greater Sage-Grouse habitats and to reduce disturbance would improve condition and trend of riparian areas and wetlands throughout much of the planning area. Management, evaluation, and protection of Greater Sage-Grouse habitat would receive much more focus in comparison to Alternative A. Greater Sage-Grouse habitat needs would be prioritized in development of plans for both livestock grazing and for wild horses. Fuels, vegetative treatments, and fire suppression actions would all include strategies for enhancement and/or protection of Greater Sage-Grouse habitat. Management actions covering minerals, lands, and recreation would emphasize avoiding, reducing, or minimizing impacts on Greater Sage-Grouse habitats. Incorporation of RFDs consistent with applicable law into the planning and permitting process would further limit disturbance while providing for consideration of Greater Sage-Grouse habitat needs during reclamation for PHMA, GHMA, and OHMA. Collectively, these measures would have the effect of substantially reducing direct and indirect adverse impacts from disturbance on riparian areas and wetlands across the planning area in comparison to Alternative A. In addition, many more acres of riparian habitats would be improved under Alternative D.	Alternative E represents a comprehensive strategy to evaluate and manage Greater Sage-Grouse habitat and to reduce impacts from anthropogenic disturbance. If successful, innovative approaches, including use of a dedicated technical team to address Greater Sage-Grouse habitat issues, development of a mitigation banking and credit system to offset impacts, and greater focus on collaboration across jurisdictional lines, could increase opportunities for improvement of riparian areas and wetlands in Greater Sage-Grouse habitat than currently exist under Alternative A. A number of specific requirements included as part of the compensatory mitigation program add a level of certainty to the assertion that more acres of riparian habitats would be improved in comparison to Alternative A. However, Alternative E does not establish a disturbance cap and does not identify fixed areas for exclusion, potentially resulting in more disturbances to some riparian habitats compared to the Proposed Plan. In addition, exceptions tied to habitat values and feasibility could result in situations where impacts to some riparian areas are not avoided. Alternative E also incorporates provisions of the Eureka County Master Plan, which would limit flexibility in making adjustments in livestock grazing to benefit riparian areas and wetlands.	Alternative F is similar to Alternative B but is more comprehensive in scope. Additional restrictions on a wide range of land use activities affecting both renewable and nonrenewable resources would significantly reduce the potential to disturb riparian and wetlands habitats. In addition, designation of sagebrush reserves with further limitations on development and disturbance would result in additional protection of riparian resources. Proposed actions focused on restoration and remediation of damage or disturbance would also directly and indirectly benefit riparian areas and wetlands within the planning area. Collectively, these measures would result in more riparian and wetland habitat improvement compared with Alternative A. Alternative F generally reduces land disturbances and would result in fewer impacts on riparian habitats associated with a particular use compared with Alternative A. Impacts from Greater Sage-Grouse management on riparian areas and wetlands are similar to Alternative B, with additional emphasis on protecting priority Greater Sage-Grouse habitat. Added focus on both preserving habitat and limiting disturbance would result in more acres of riparian and wetland habitat being improved or protected in comparison to Alternatives A and B. Identifying no new water developments in occupied habitat unless they can be shown to benefit Greater Sage-Grouse and modifying existing developments to maintain the continuity of the predevelopment riparian area within Greater Sage-Grouse habitats could result in fewer	Comprehensive strategies to manage Greater Sage-Grouse habitat across the planning area would result in more acres of riparian areas and wetlands being improved or protected compared with Alternative A. Numerous actions to reduce threats from invasive weeds and catastrophic wildfires and to restore degraded plant communities through focused vegetative treatments would benefit riparian habitats by improving functionality and resiliency of surrounding watersheds. Where strategies are focused on limiting or mitigating disturbance in PHMA and GHMA through a screening process, more acres of riparian habitats would be protected or enhanced in comparison to Alternative A. In the case of SFA, all habitat (PHMA, GHMA and OHMA) would be protected from androgenic disturbance, while requirements for a net conservation gain for PHMA and GHMA would likely result in greater focus on restoring riparian areas and wetlands than currently exists. Providing for more of a collaborative approach to management of Greater Sage-Grouse habitat across jurisdictional boundaries would also benefit riparian areas, since many of these sites occur on private lands or on a combination of private and BLM-administered lands. Increased emphasis on incorporating Greater Sage-Grouse habitat needs into programs such as livestock grazing, recreation, travel, and wild horses and burros would likely focus greater management attention on restoring or protecting riparian habitats than currently exists. Better livestock grazing practices and/or reduced use from wild horses would allow for increases in growth and establishment of

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
(*see above*)	wetlands in Greater Sage-Grouse habitat compared to Alternative A.	(*see above*)	(*see above*)	(*see above*)	impacts on riparian habitat than Alternative A. Increased focus on vegetation management for the benefit of Greater Sage-Grouse habitat would indirectly benefit riparian and wetland habitat by improving overall watershed health, resulting in greater benefits to these areas in comparison to Alternative A. Condition and trend of riparian habitats would likely improve under Alternative F as a result of a placing greater emphasis on livestock impacts on late summer brood-rearing habitat. Impacts on riparian areas and wetlands are similar to Alternatives A, B, and D. Wild horse and burro AMLs would be reduced by 25 percent within HMAs/WHBTs with occupied Greater Sage-Grouse habitat. While impacts from wild horses and burros would remain, this would reduce the effects of wild horses and burros described under Alternatives A, B, and D. Impacts from fluid minerals management would be the same as under Alternative B. Impacts from lands and realty management would be the same as under Alternative C. Travel management under Alternative F is similar to Alternative B, but with more focus on planning and on closing or remediating roads in priority habitat. These measures would reduce impacts on riparian areas and wetlands in comparison to Alternatives A and B.	riparian vegetation. Fewer direct impacts from travel and recreational uses would also lead to increases in riparian plant growth, recovery of compacted soils, and less opportunity for establishment of invasive weeds. The avoid, minimize, and apply compensatory mitigation strategy, including the 3 percent disturbance cap for anthropogenic activities in BSUs (limited exceptions apply in Nevada but not California) and the requirement for a net conservation gain, would reduce or eliminate both direct and indirect adverse impacts on riparian and wetland habitats in PHMA and GHMA. Where impacts on riparian areas cannot be avoided, they would be offset through compensatory mitigation programs, including the Conservation Credit System in Nevada (this program does not apply to California). Use of the Conservation Credit System would incentivize conservation and potentially result in improvement of many acres of riparian areas and wetlands across the planning area, especially on private lands. Implementing the adaptive management strategy proposed under the Proposed Plan would trigger changes in land uses based on habitat and population trends. Conceivably, this would focus management planning on achieving and maintaining Greater Sage-Grouse habitat objectives, including those identified for riparian areas and wetlands. Application of the Monitoring Framework for the Proposed Plan would also help to ensure a more consistent and effective monitoring and tracking system for both positive and negative changes to priority riparian habitats within Greater Sage-Grouse habitat.

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Special Status Species						
Most of the management actions for Greater Sage-Grouse would be beneficial for the majority of sensitive species inhabiting the planning area. The possible exception would be species that require pinyon and juniper woodlands for at least part of their life-cycle requirements. The BLM and Forest Service acknowledge the requirements of pinyon and juniper obligate species may be contradictory to the restoration of sagebrush habitat for Greater Sage-Grouse, but management decisions would need to be made on a local case-by-case basis; therefore, this is not further discussed in this programmatic document.						
Wild Horse and Burros						
Impacts would continue to be the same as those identified in the individual LUP documents.	Protections afforded to Greater Sage-Grouse and its habitat would be expected to benefit and impact wild horse and burro populations. However, temporary or long-term management changes to wild horses and burros (e.g., reduction in AML, designation, removals, movement patterns, and forage access) may be necessary to achieve and maintain the desired project objectives. Allowance of vegetation treatments designed to conserve, enhance, or restore Greater Sage-Grouse habitat would also benefit wild horses and burros. Managing wild horses and burros and their habitat to protect and maintain PHMA could impact wild horses and burros whose HMAs/WHBTs overlap with these habitats. Prioritizing wild horse and burros gathers in those HMAs/WHBTs that overlap PHMA could impact population management activities within non-Greater Sage-Grouse HMAs/WHBTs. Managing livestock grazing to protect and maintain priority Greater Sage-Grouse habitat would be expected to benefit wild horses and burros where HMAs/WHBTs overlap with these habitats. Modification or elimination of watering sites in order to conserve Greater Sage-Grouse habitat could reduce water availability, resulting in potential need for reduction of wild horse and burro numbers within an HMA/WHBT.	Protections afforded to Greater Sage-Grouse and its habitat would be expected to benefit and impact wild horse and burro populations. However, temporary or long-term management changes to wild horses and burros (e.g., reduction in AML, designations, removals, movement patterns, and forage access) may be necessary to achieve and maintain the desired habitat condition. Impacts from vegetation management would be the same as under Alternative A. Elimination of livestock grazing within SUAs and reducing grazing levels within those areas that retain grazing use to protect and maintain occupied Greater Sage-Grouse habitat would benefit wild horses and burros where HMAs/WHBTs overlap with these habitats. Evaluation of AMLs and completing land health assessments may result in need to reduce wild horse and burro numbers within a HMA/WHBT to achieve Greater Sage-Grouse habitat needs. Restricting removal and population control techniques could hamper proper management. Alternative C would require more intensive management when compared to Alternative A. Alternative B would result in reduced disturbance (i.e., vegetation removal) when compared to Alternative A.	Protections afforded to Greater Sage-Grouse and its habitat would be expected to benefit and impact wild horse and burro populations. However, temporary or long-term management changes to wild horses and burros (e.g., reduction in AML, designations, removals, movement patterns, and forage access) may be necessary to achieve and maintain the desired habitat condition. Evaluation and prioritization of Greater Sage-Grouse habitat restoration treatments identified for PHMA or GHMA habitat would benefit wild horse and burro habitat. Associated landscape-scale management and surface disturbance restrictions would also benefit wild horse and burro habitat. Allowance of management treatments designed to conserve, enhance, or restore PHMA and GHMA habitats that benefit livestock would also benefit wild horses and burros. Authorization of new or modification of existing livestock watering sites that benefit or conserve PHMA and GHMA habitats would benefit wild horses and burros. Elimination of existing water sources that may be identified as impacting PHMA and GHMA habitats could reduce water availability resulting in potential need for reduction of wild horse and burro numbers within an HMA/WHBT. Fuels projects that protect and restore existing sagebrush ecosystems and associated PHMA	Alternative E represents a comprehensive strategy to evaluate and manage Greater Sage-Grouse habitat and to reduce impacts from anthropogenic disturbance. If successful, innovative approaches, including use of a dedicated technical team to address Greater Sage-Grouse habitat issues, development of a mitigation banking and credit system to offset impacts, and greater focus on collaboration across jurisdictional lines, could increase opportunities for improvement of Greater Sage-Grouse habitat than currently exist under Alternative A. Impacts from managing livestock grazing under Alternative E would be same as Alternative A. Fire management activities that protect, maintain, and improve sagebrush habitat would benefit wild horses and burros with HMAs/WHBTs that overlap these habitats. Prioritizing wild horse and burro gathers and population growth suppression to those HMAs/WHBTs that overlap SGMA habitat could impact population management activities in HMAs/WHBTs located outside of Greater Sage-Grouse habitat. Evaluation of HMA designations and their associated AMLs within the SGMA through completion of land health assessments may result in the need to reduce or eliminate wild horse and burro HMA/WHBT in order to achieve Greater Sage-Grouse habitat objectives.	Protections afforded to Greater Sage-Grouse and its habitat would be expected to benefit wild horses and burros where HMAs/WHBTs overlap with PHMA or GHMA. However, the long-term management change (i.e., 25 percent reduction in HMA/WHBT AMLs) would require prioritization of subsequent NEPA to implement these reductions. However, temporary or long-term management changes to wild horses and burros (e.g., reduction in AML, designations, removals, movement patterns, and forage access) may be necessary to achieve and maintain the desired habitat condition. Vegetation treatments designed to conserve, enhance, or restore Greater Sage-Grouse habitat would also benefit wild horses and burros. Managing livestock grazing to protect and maintain PHMA would benefit wild horse and burro habitats. To achieve Greater Sage-Grouse habitat objectives, reducing the AMLs of the established HMA/WHBTs within occupied habitat by 25 percent would reduce utilization levels and other impacts associated with wild horses and burros. Costs of wild horse and burro management would increase, due to a need for additional wild horse and/or burro gathers for removal and population growth suppression treatment to achieve and maintain the newly established AMLs. Reductions to this level could impact herd sustainability and	Protections afforded to Greater Sage-Grouse and its habitat would be expected to benefit and impact wild horse and burro populations. However, temporary or long-term management changes to wild horses and burros (e.g., reduction in AML, designations, removals, movement patterns, and forage access) may be necessary to achieve and maintain the desired habitat condition. Evaluation and prioritization of Greater Sage-Grouse habitat restoration treatments identified for SFA, PHMA or GHMA habitat would benefit wild horse and burro habitat. Associated landscape-scale management and surface disturbance restrictions would also benefit wild horse and burro habitat. Allowance of management treatments designed to conserve, enhance, or restore SFA, PHMA, and GHMA habitats that benefit livestock would also benefit wild horses and burros. Authorization of new or modification of existing livestock watering sites that benefit or conserve SFA, PHMA, and GHMA habitats would benefit wild horses and burros. Eliminating existing water sources that may be identified as impacting SFA, PHMA, and GHMA habitats could reduce water availability, resulting in potential need for reduction of wild horse and burro numbers within an HMA/WHBT. Fuels projects that protect and restore existing sagebrush ecosystems and associated SFA, PHMA, and GHMA habitats would benefit wild horses and burros

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(*see above*)	Prioritizing the evaluation of AMLs and completing land health assessments may result in need for the reduction of wild horse and burro numbers within an HMA/WHBT in order to achieve Greater Sage-Grouse habitat objectives. Alternative B would require more intense management when compared to Alternative A. Alternative B would result in reduced disturbance (i.e., vegetation removal) when compared to Alternative A.	(*see above*)	and GHMA habitats would benefit wild horses and burros where HMAs/WHBTs overlap with these habitats. Prioritizing wild horse and burro gathers to those HMAs/WHBTs that overlap PHMA and GHMA habitats could impact population management activities within non-Greater Sage-Grouse HMAs/WHBTs. Evaluation of AMLs may result in need for the reduction of wild horse and burro numbers within a HMA/WHBT to achieve Greater Sage-Grouse habitat objectives. Alternative D would require more intensive management when compared to Alternative A. Alternative D would result in reduced disturbance (i.e., vegetation removal) when compared to Alternative A.	Alternative E would require more intensive management when compared to Alternative A.	diversity, which could lead to changes in HMA/WHBT designation and long-term management in these occupied habitats. Prioritizing wild horse and burros gathers to those HMAs/WHBTs that overlap PHMA could impact population management activities within non-Greater Sage-Grouse HMAs/WHBTs. Modification or elimination of watering sites could reduce water availability, resulting in potential need for reduction of wild horse and burro numbers within a HMA/WHBT. Prioritizing the evaluation of AMLs, HMA designations, and completing land health assessments may result in need for the reduction or elimination of wild horse and burro populations within an HMA/WHBT in order to achieve Greater Sage-Grouse habitat objectives. Fuels treatments that protect existing sagebrush ecosystems and associated PHMA would benefit wild horses and burros where HMAs/WHBTs overlap with these habitats. Alternative F would require more intensive management when compared to Alternative A. Alternative F would result in reduced disturbance (i.e., vegetation removal) when compared to Alternative A.	where HMAs/WHBTs overlap with these habitats. Managing wild horse and burro populations and their habitat to achieve Greater Sage-Grouse habitat objectives within SFA, PHMA, and GHMA habitats could be expected to impact wild horses and burros whose HMAs/WHBTs overlap with these habitats. Prioritization of gathers within HMAs would directly and indirectly impact WHB. The following HMAs fall within SFAs: Owyhee, Little Owyhee, Rock Creek, and Massacre Lakes. These HMAs would have the highest priority for gathers each year to achieve and maintain AML. This focused management strategy would ensure that AML is maintained along with the necessary forage for the wild horses in these HMAs; however, it may increase the number of gathers needed to maintain AML, which could potentially increase the disturbance to the populations as well as possible disruption of herd dynamics. Prioritization could also put HMAs that fall within the lowest priority at risk for overpopulation; however, under this LUPA, provisions would allow for exceptions as needed for herd health-limiting impacts. Evaluation of AMLs and HMA/WHBT designations may result in the need to reduce wild horse and burro numbers within a HMA/WHBT to achieve Greater Sage-Grouse habitat objectives. The Proposed Plan when compared to Alternative A would require more intensive management, particularly within the boundaries of the SFA areas. The Proposed Plan would result in reduced disturbance (i.e., vegetation removal) when compared to Alternative A.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Wildland Fire Management						
Few management actions would be applied specific to Greater Sage-Grouse habitat protection. Therefore, impacts on fire management would continue to vary across the planning area based on site- specific habitat objectives for other resource concerns.	Focusing fire suppression in PHMA and GHMA would impose some limits on fuels treatments in this area, resulting in a higher level of protection but reduced management options in this area. It would also increase costs for fire management programs as compared with Alternative A because aggressive suppression response to conserve and protect would require more suppression resources. Restricting surface-disturbing activities in PHMA would decrease the chance for human-caused ignition as well as potential annual grass vectors in PHMA. Fuels management projects in PHMA would be designed to reduce wildfire threats in the greatest area, thereby decreasing risk of high- intensity fire in PHMA in the long term. Restrictions on the location of fuel breaks and location of other fuels treatments, however, would reduce management options and would increase costs of fuel management.	Alternative C would generally, have the broadest restrictions on fuel management activities extending to all occupied habitat by limiting fuel treatments to the interface of human habitation, and existing disturbances. This would impact the fire program's ability to efficiently manage fuels and could increase costs of vegetation management and fire suppression. Broader restrictions on resource uses and a higher level of protection for all occupied Greater Sage-Grouse habitat than Alternative A would further reduce opportunities for human- caused fires. Prohibiting livestock grazing within occupied Greater Sage-Grouse habitat would increase fine fuels and fire risk throughout occupied habitat. Reducing vegetation treatments that mimic the natural fire effects would increase the FRCC, resulting in an increased potential for large, intense wildfires. This increased potential for large wildland fire would increase costs associated with both fire suppression and post fire rehabilitation. An increase in fire size would increase the exposure to firefighters and public to the inherent risks associated with firefighting.	Impacts would be similar to those described under Alternative B, but with an added emphasis on region-specific habitat needs and variations in requirements for specific Greater Sage-Grouse habitat types resulting in more site-specific variation in fire management impacts. Alternative D also places added emphasis to pre- suppression planning, prevention, and educational objectives for fire suppression personnel. Alternative D would generally have broader restrictions on resource use and the highest level of protection for all occupied Greater Sage-Grouse habitat than Alternative A. This would further reduce opportunities for human-caused fires. Impacts from vegetation management would be similar to those described under Alternative B. Impacts from livestock grazing management would be similar to those described under Alternative B. Emphasizing fuels and habitat treatments in PHMA would result in a long-term reduction in risk of high- intensity fire in these areas, of particular importance in FRCC III.	Alternative E represents a comprehensive strategy to evaluate and manage Greater Sage-Grouse habitat and to reduce impacts from anthropogenic uses. Management actions would allow for some level of fuels treatments, providing greater flexibility for wildfire management. This alternative places added emphasis on a comprehensive wildfire management program that engages all interagency partners (federal, state, and local) to reduce the threats of catastrophic wildfire, rapidly suppress wildfires, and rehabilitate lands damaged by wildfire. Achieving "no net unmitigated loss" of Greater Sage-Grouse habitat by implementation of a strategy to avoid, minimize, and mitigate impacts on Greater Sage-Grouse would cause a shift in FRCC to a more historical regime. As shrub and grass cover becomes more continuous and ground cover is higher, the risk for large uncharacteristic fires would increase. Impacts from vegetation management would be similar to those described under Alternative B. Management under Alternative E for riparian areas would lessen impacts from fire by providing technical assistance, project success monitoring, and financial support to areas across the state that were previously burned and currently threatened by fires due to noxious weed infestations or fire fuels. Prepositioning and preventative actions would increase the likelihood of successful fire management actions with response to wildfire but would increase overall management costs.	Similar to Alternative B, this alternative would impose some limits on fuels treatments in this area, resulting in a higher level of protection but reduced management options. Alternative F also prioritizes fire suppression in only PHMA, while Alternative B includes both PHMA and GHMA. The effects would be the same as Alternative B, except there would be a slight reduction in fire suppression costs under this alternative. Maintaining or increasing sagebrush cover to at least 70 percent of the decision area may cause an increase in fire severity and size due to the increase in fuel loading over time. Alternative F also identifies the need to designate sagebrush reserves (e.g., ACECs and Special Conservation Areas), which would cause an increase in planning and implementation costs associated with special designations. Restrictions from vegetation management would impact the ability to efficiently manage fuels and could increase costs of vegetation management and limit fire suppression options. Impacts from livestock grazing management would be similar to those described under Alternative D.	Under the Proposed Plan, comprehensive strategies to manage Greater Sage-Grouse habitat across the planning area would result in more acres treated and protected than Alternative A. Impacts would be similar to those described under Alternative D, but with added emphasis on regional specific habitat needs and variations and requirements for specific Greater Sage-Grouse habitat types, resulting in more site-specific variation in fire management impacts. Additional fuels treatments and other habitat treatments would be permitted with an emphasis in maintaining, protecting, and expanding sagebrush ecosystems. Emphasis would be concentrated in PHMA; therefore, the long-term reduction in risk of high-intensity fire would occur in these areas, with particular importance to Condition Class II and III. Management under the Proposed Plan should also place added emphasis on pre-suppression planning prevention, fuels management, and educational objectives for fire suppression personnel as outlined in Appendix G [of the 2015 Final EIS], Greater Sage- Grouse Wildfire and Invasive Annual Grasses Assessment and Concepts of Resistance and Resilience (FIAT Report; Chambers et. al. In press.). This two-step process assesses the resistance to invasive species annual grasses and resilience after disturbance of those habitats to wildfire, cheatgrass invasion, and conifer species expansion. It then prioritizes focal habitats for conservation and restoration and identifies geospatially explicit management strategies to conserve Greater Sage-Grouse habitats. The assessment process sets the stage for:

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
(*see above*)	(*see above*)	(*see above*)	(*see above*)	Fuels reduction treatments would be similar to Alternative D, with added emphasis on coordination of state and local agencies and individual landowners.	(*see above*)	1a. Identification of Priority Areas for Conservation (PACs) 1b. Identification of Management Unit Applications of Invasives as described in Appendix G [of the 2015 Final EIS], page 4. Impacts on Fire Management would also be greater compared to Alternative D by adding more priority areas for fire suppression, fuels management, and post-fire rehabilitation, which would result in an increase in both fuels management and fire suppression costs and possibly increase fire fighter exposure and overall risk.
Livestock Grazing						
Management designed to address nonattainment of wildlife habitat standards would likely reduce permitted AUMs. Grazing management changes would include the timing, duration, or frequency of permitted use, including temporary closures. Current levels and seasons of use would continue pending completion of land health assessments. Forage availability may increase in the long term due to improved land health and forage productivity. Weed control treatments would increase forage availability in the long term by improving native plant productivity. Wildfire would remove livestock forage over the short term but can result in increases in forage post-fire. Impacts on livestock operations could also occur when a livestock grazing rest period is required following vegetation stabilization and rehabilitation treatments post-fire. These required rest periods may impact the ability of livestock operators to fully use permitted AUMs.	Land health assessments would be conducted on all allotments open to grazing; however, under this alternative, allotments overlapping PHMA would be the highest priority. Changes to permitted AUMs could occur on some or all PHMA habitat acres first. The effect would be less than under Alternative A due to the reduced area. Completion of land health assessments and permits would be prioritized within PHMA, particularly those with the best opportunity to conserve, enhance, or restore habitat for Greater Sage-Grouse. As a result, impacts on range management would be most likely to occur in these areas. Management actions (grazing decisions, AMP/Conservation Plan developments, or other agreements) to modify grazing management would be made to meet seasonal Greater Sage-Grouse habitat requirements Such changes would have the potential to decrease management options and, therefore, result in increased time and costs required for permittees/lessees.	No livestock grazing would be allowed on 16,526,600 acres in the decision area for a total of 0 AUMS in the decision area. This would force permittees/lessees to graze on private lands or give up their grazing operations.	Impacts from Greater Sage-Grouse management would be similar to those under Alternative A. Impacts from livestock grazing management would be greater than those under Alternative A. All PHMA and GHMA acres would be required to meet rangeland health standards, and range improvements would be evaluated to make sure they conserve, enhance, or restore Greater Sage-Grouse habitat. Wet meadow treatments may result in more restrictions to livestock grazing and the ability to continue existing terms and conditions of permits. Additional acres may be closed to grazing temporarily within allotments to allow for riparian areas and meadows to rest from grazing in order to improve vegetation composition for Greater Sage-Grouse habitat. Impacts from wildland fire management would be similar to those described under Alternative B.	Impacts from Greater Sage-Grouse management would be the similar to Alternative A. Alternative E stresses cooperative, seasonal adjustments to grazing use to ensure that they maintain or enhance the habitat in the SGMA. Under Alternative A, in contrast, BLM grazing permits are evaluated against Rangeland Health Standards, and grazing management changes must be implemented by the next grazing season, if necessary, when currently permitted use is determined to be causing a Greater Sage-Grouse habitat-related standard to be unmet or not making significant progress. Alternative E would result in positive impacts on Greater Sage-Grouse habitat in the SGMA where cooperation is present. Impacts from livestock grazing management would be the similar to Alternative A, as current BLM grazing management is required to meet many or all of the desired conditions outlined in Alternative E. Impacts from vegetation management would be the same as under Alternative A.	Impacts from Greater Sage-Grouse management would be the same as under Alternative A. This alternative rests 25 percent of occupied habitat each year. Also, utilization levels are limited to 25 percent. These actions would reduce permitted use drastically in occupied habitat. Range improvement construction would increase due to the need to fence out PHMA/GHMA areas from grazing use being permitted on adjacent areas. Impacts from vegetation management would be the same as under Alternative A. Impacts from wildland fire management would be the same as under Alternative A.	***BLM*** Impacts are similar to Alternative D, including impacts from meeting Greater Sage-Grouse habitat objectives in **Table 2-2**. All SFA, PHMA, and GHMA acres would be required to meet rangeland health standards, including Greater Sage-Grouse habitat objectives. However, management would be prioritized within allotments located within SFAs, followed by PHMAs and then GHMAS. This prioritization would require more intensive management of allotments that fall within these areas and reduce resources available for managing allotments outside of SFAs. Impacts are similar to Alternative D. The difference is that the designation of SFAs would require more intensive management of allotments that fall within these areas. All SFA, PHMA, and GHMA acres would be required to meet rangeland health standards, including Greater Sage-Grouse habitat standards.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
(*see above*)	Vegetation restoration may directly affect livestock grazing if treatments include restrictions on available grazing acreage or changes to permitted AUMs, grazing strategies, or season of use, which could result in increased cost to permittees. Required rest periods following treatments may impact the ability of livestock operators to fully utilize permitted AUMs. Impacts could occur should treatments for Greater Sage-Grouse habitat not match with vegetation objectives for livestock grazing; however, in most cases, treatment would improve forage conditions in the long term. Measures to protect sagebrush habitat might reduce the spread of wildfire and the associated disruption to livestock operations. Forage availability would be maintained or increased long term. Mechanical, manual, and chemical treatments would be utilized to prevent confer encroachment and prevent the spread of undesirable annual grass and weed species. These actions could improve forage in the long term.	(*see above*)	(*see above*)	Impacts from wildland fire management would be the same as under Alternative B.	(*see above*)	Range improvements would be evaluated to make sure they conserve, enhance, or restore Greater Sage-Grouse habitat. Wet meadow treatments may result in more restrictions to livestock grazing and the ability to continue existing terms and conditions of permits. Additional acres may be closed to grazing temporarily within allotments to allow for riparian areas and meadows to rest from grazing in order to improve vegetation composition for Greater Sage-Grouse habitat. Impacts from wildland fire management would be similar to those described under Alternative B. ***Forest Service*** The difference in impacts on livestock grazing under Forest Service management versus BLM management is that under the Forest Service Proposed Plan, term grazing permits would be amended with seasonal habitat restrictions in Greater Sage-Grouse habitat, resulting in additional adjustments in grazing strategies.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Recreation						
Existing recreation opportunities in the planning area would be maintained.	Only BLM SRPs and Forest Service SUPs that have neutral or beneficial effects would be allowed in approximately 9,599,100 acres of PHMA. This may restrict some types of permitted uses. As a result, some types of permitted activities (e.g., OHV races) that could negatively affect PHMA may be impacted, resulting in fewer opportunities to engage in those types of events and activities in those areas. However, opportunities for nonmotorized recreation, such as hiking, horseback riding, and hunting, in a more natural or primitive setting may be expanded and enhanced.	Impacts of Alternative C would be the same as under Alternative A.	Only BLM SRPs and Forest Service SUPs that have neutral or beneficial effects would be allowed on approximately 16,005,000 acres of both PHMA and GHMA. As a result, some types of permitted activities (e.g., OHV races) that could negatively affect PHMA/GHMA may be impacted, resulting in fewer opportunities to engage in those types of events and activities in those areas. Construction of new recreational facilities such as campgrounds, day-use facilities, and trailheads would be prohibited in PHMA and GHMA.	Impacts from Alternative E would be the same as under Alternative A.	Only BLM SRPs and Forest Service SUPs that have neutral or beneficial effects would be allowed on approximately 16,005,000 acres in PHMA. As a result, some types of permitted activities (e.g., OHV races) that could negatively affect PHMA/GHMA may be impacted, resulting in fewer opportunities to engage in those types of events and activities in those areas. Additional management actions that would seasonally prohibit camping and other nonmotorized recreation activities within four miles of active leks would decrease the area available for recreational opportunities such as camping, mountain biking, and hiking, resulting in seasonal reductions in recreational opportunities.	Impacts from the Proposed Plan would be the same as or similar to those under Alternative D, except the Proposed Plan would allow the construction of new recreation facilities in GHMA and construction of new recreational facilities in PHMA if there is a net conservation gain to Greater Sage-Grouse habitat such as diverting use away from critical areas.
Travel and Transportation Management						
The decision area is open to cross-country OHV travel except in areas designated as WSAs, WAs. In addition, all lands managed by CA BLM in the planning area and all forest service lands are limited to designated roads and trails. This provides greater than 12 million acres of open travel opportunities for OHV recreational users in the planning area.	There would be 5,739,500 acres in PHMA previously open to cross-country travel where motorized travel would be limited to existing routes. This would reduce opportunities for cross- country travel in the decision area. The 3 percent disturbance cap could restrict the amount of new routes that could be constructed; any routes constructed in excess of the disturbance cap would require mitigation necessary to offset the resulting loss of habitat. Impacts from implementation actions, such as evaluating the need for permanent or seasonal road closures, activity-level travel plans, limiting new route construction, and restoration of routes in PHMA would be analyzed in subsequent NEPA documents.	There would be 12,145,400 acres in PHMA and GHMA previously open to cross-country travel where motorized travel would be limited to existing routes. This would reduce opportunities for cross- country travel in the decision area. Impacts from implementation actions, such as evaluating the need for permanent or seasonal road closures in PHMA/GHMA would be analyzed in subsequent NEPA documents.	There would be 12,145,400 acres in PHMA and GHMA previously open to cross- country travel where motorized travel would be limited to existing routes. This would reduce opportunities for cross- country travel in the decision area. Upgrades to existing routes that would change the route category would be prohibited, and route construction would be limited to realignments of existing routes that minimize impacts on PHMA/GHMA. These actions would result in fewer upgrades to the travel network to accommodate current and future use. Impacts from implementation actions, such as evaluating the need for permanent or seasonal road closures in PHMA/GHMA, would be analyzed in subsequent NEPA documents.	Impacts from Alternative E would be the same as those under Alternative A.	Impacts would be the same as or similar to those under Alternative D, except Alternative F would further restrict the construction of new routes by not allowing new routes within a 4-mile buffer from leks. This would result in fewer new travel opportunities.	Impacts from the Proposed Plan would be the same as or similar to those under Alternative D.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Lands and Realty						
Authorizations Under Alternative A, the BLM and Forest Service would continue to administer ROWs under current management systems, and existing ROWs in the decision area would continue to provide access and utilities for permittees and lease-holders. No acres would be designated as ROW avoidance, while 1,884,300 acres would continue to be designated exclusion. All other lands within the decision area would continue to be open for land use authorization development, thereby allowing the BLM and Forest Service to accommodate future ROW demand. BLM -administered and National Forest System lands would continue to be available for multiple-use and single- use communication sites and road access ROW (or SUAs) on a case-by- case basis pursuant to Title V of FLPMA, and 43 CFR Part 2800 and 2900 regulations (BLM) and 36 CFR § 251 Subpart B (Forest Service). All new linear ROWs, fiber optic cables, transmission lines, pipelines, and communication sites would be encouraged to locate within designated corridors and existing sites. All LUA applications would be reviewed using the criteria of following existing corridors wherever practical and avoiding the proliferation of separate authorizations (e.g., through co-location). Where existing development is not present, co-location requirements can limit options for new development. ***Utility Corridors*** Currently there are 1,322,800 acres of utility corridors within the sub-region.	***Authorizations*** This alternative, which would designate PHMA as ROW exclusion areas and GHMA as avoidance areas while encouraging the BLM and Forest Service to take advantage of opportunities to remove, bury, or modify existing power lines in PHMA, would impose greater limitations on future authorizations compared to Alternative A. In PHMA, there would be limited to no opportunity for new ROW development. Exclusion areas would result in reconfigurations of proposed infrastructure, such as electrical transmission lines and pipelines, so as to avoid Greater Sage-Grouse habitat. While management under Alternative B encourages co-location, often co-location is not feasible. In ROW avoidance areas, RDFs (to be applied consistent with applicable law) and other Greater Sage-Grouse habitat mitigation requirements could increase project costs, lengthen agency review periods, and in some cases result in projects being withdrawn or relocated outside Greater Sage-Grouse habitat. In addition, ROW exclusion and avoidance designations could extend processing time for renewals of existing LUAs and make siting of new linear or site LUAs more difficult than under Alternative A. Exclusion and avoidance designations under Alternative B would also result in impacts on the location and design of communication towers on both BLM-administered and National Forest System lands. In PHMA, new facilities would be excluded	***Authorizations*** This alternative, which would designate all lands within the planning area as ROW exclusion areas, would impose the greatest limitations on future authorizations, including linear ROWs such as transmission lines and pipelines, and site authorizations such as communication facilities. For linear ROWs, this alternative could increase the length of these projects to avoid Greater Sage-Grouse habitat, thus increasing project costs. In some areas, there could be opportunities to co- locate new infrastructure with compatible ROW developments; however, these opportunities would likely be limited in scope and location and incur additional costs compared to Alternative A. ***Utility Corridors*** All utility corridors under Alternative C would be managed as ROW exclusion, thereby eliminating any incentive for placement of ROW infrastructure in those locations. This would impact the utility market by reducing the future service availability to customers. ***Land Tenure*** Requirements under Alternative C for the BLM and Forest Service to retain public ownership in PHMA with no exceptions would preclude opportunities to consolidate land ownership and improve land and resource management efficiency. Under Alternative C, the BLM and Forest Service would recommend all Greater Sage-Grouse habitat, including mineral split-estate, for mineral withdrawal.	***Authorizations*** The designation of PHMA and GHMA as ROW avoidance areas under Alternative D would allow ROW development to occur if development incorporates specific design and mitigation measures and stipulations that would result a net conservation gain of Greater Sage-Grouse habitat. These additional restrictions would impact processing time for the BLM and Forest Service and could increase costs for the applicants. Alternative D would have greater impacts on the lands and realty program than Alternative A. Under Alternative D, ROW authorizations in Greater Sage-Grouse habitat would be required to apply RDFs consistent with applicable law, such as retrofitting with anti- perching devices, to minimize impacts on Greater Sage-Grouse and its habitat. Application of RDFs consistent with applicable law could result in increased development costs and construction timelines. ***Utility Corridors*** New authorizations in designated corridors would be required to incorporate RDFs consistent with applicable law to minimize impacts on Greater Sage-Grouse habitat. This could reduce the incentives for locating development in corridors. ***Land Tenure*** Management actions under Alternative D that prioritize Greater Sage-Grouse habitat for acquisition and limit disposal of these lands would assist the BLM and Forest Service in prioritizing future land tenure and land ownership adjustments. Disposal and/or acquisitions of BLM-administered lands would	***Authorizations*** In California, impacts under this alternative would be the same as Alternative A. In Nevada, specific mitigation measures would be set in place to avoid, minimize, and mitigate impacts on breeding, nesting, brood- rearing, and wintering habitats. Proposed management to conserve Greater Sage-Grouse habitat would result in the modification of proposed ROW actions and/or incorporation of conditions to lessen any adverse effects on Greater Sage-Grouse and its habitat. Under Alternative E, ROW applicants would be required to incorporate Site- Specific Consultation-Based Design Features (see Appendix D [of the 2015 Final EIS]), such as reducing the disturbance footprint, seasonal use limitations, and co- location of structures. These measures could restrict infrastructure development in specific areas and could impact management and maintenance of existing and future development. Under Alternative E, in the State of Nevada only, the application of RDFs consistent with applicable law, such as consolidating ROWs within existing utility corridors and burying power lines, could affect lands and realty by limiting the availability of lands suitable for consolidated development. Requirements to bury transmission lines could result in the added cost of the development prohibiting completion or restricting the scope of the project. ***Utility Corridors*** For lands in California, impacts on utility corridors would be the same as Alternative A. For lands in Nevada, encouraging the use of	***Authorizations*** Impacts on land use authorizations under Alternative F would be similar to Alternative C, with the exception that new ROWs would be allowed if co-located with existing ROWs, particularly those within designated utility corridors. Although no areas in Greater Sage-Grouse habitat would be open to new ROW development, demand for new ROWs could be accommodated if co-located with existing ROWs. Restricting all new authorizations to co- location would minimize opportunities for new development compared to Alternative A and likely increase the complexity and costs of proposed ROWs in Greater Sage-Grouse habitat. Because existing infrastructure is limited to select locations in the planning area, other areas without existing ROWs would be excluded from future ROW development. The BLM and Forest Service would only authorize new communication infrastructure where it could be co-located in an existing site. When enhancements are needed, restrictions on new communication site leases would prevent the optimal transmittal of communication signals throughout the network. ***Utility Corridors*** Alternative F, which identifies corridors with existing ROW infrastructure as the desired location for future ROW development, would limit new ROWs to 1,322,800 acres (8 percent of the planning area). Limiting the amount of lands available to new ROW development to only 8 percent of the planning area would preclude	***Authorizations*** The Proposed Plan, which distinguishes between major and minor ROWs, would designate PHMA as ROW avoidance areas for major and minor ROWs. GHMA would be open to minor ROWs, while major ROWs would be avoided. In PHMA, new authorizations would be required to meet Greater Sage-Grouse screening criteria, which require the project to demonstrate a net conservation gain to Greater Sage-Grouse and its habitat, incorporate specific conditions, apply mitigation measures, noise stipulations, and RDFs, abide by lek buffer distances, and meet tall structure requirements. Proposed ROWs within GHMA would also be required to follow Greater Sage-Grouse screening criteria, including achievement of net conservation gain for Greater Sage-Grouse, RDFs, noise limitations, and seasonal buffers. Collectively, these screening criteria would impact BLM and Forest Service processing times and increase costs for the applicants. In some cases, this could restrict smaller ROW applicants from receiving a ROW due to financial feasibility. The Proposed Plan would exempt the Trans West Express transmission line from the requirements of this plan. Allowing the Trans West Express transmission line would enable the BLM and Forest Service to accommodate a portion of the future bulk transmission demand in the planning area. The previously authorized South West Intertie line would accommodate additional demand

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There would be no new corridors designated. Widths in existing corridors vary from 0.5 mile up to 3 miles wide. These corridors would continue to be the preferred location for new ROW development. ***Land Tenure*** Under Alternative A, approximately 766,300 acres of BLM lands (within PHMA and GHMA) would continue to be available for disposal. Land disposal, which must meet the criteria under FLPMA Section 203 and applicable LUPs, would improve BLM lands and realty program and overall BLM management efficiency. The Forest Service has not identified specific lands for exchange or disposal.	and only modifications to the existing communication tower network (e.g., expansion of existing facilities) in PHMA would be allowed. In GHMA, conditions on tower design (e.g., tower height) may prevent the effective transmittal of communication signals to adjacent towers. ***Utility Corridors*** Actions towards corridors under Alternative B would reduce the available lands open to entry for linear ROWs and could cause new linear ROWs to concentrate uses in existing corridors, causing existing designated corridors within Greater Sage-Grouse habitat to become full and subsequently unavailable for additional linear ROWs. This could impact the utility market by potentially reducing the service availability to customers. ***Land Tenure*** Alternative B, which would result in PHMA being retained in public ownership except where a more contiguous federal ownership pattern or more effective management of Greater Sage-Grouse habitat would result from the land tenure action, would limit land tenure actions compared to Alternative A. Recommending the withdrawal of 9,342,600 additional acres for locatable mineral entry in PHMA would decrease future demand for ROWs in those areas.	Eliminating locatable mineral development in Greater Sage-Grouse habitat would eliminate any demand for ancillary land use authorizations to support mineral development.	allow for more contiguous federal ownership patterns within the Greater Sage-Grouse habitat area, or where a land tenure adjustment would result in a net gain in the amount or quality of Greater Sage-Grouse habitat.	existing corridors for new ROW development could result in corridors eventually becoming overcrowded with ROWs and unfeasible for additional development, which could result in costly retrofitting of existing infrastructure to increase capacity or redirect new development to areas within or outside of Greater Sage-Grouse habitat. This could impact the utility market by potentially reducing the service availability to customers. ***Land Tenure*** Impacts on land tenure would be the same as Alternative A.	additional development in the remaining 92 percent. Concentrating new development in existing corridors could also preclude long-term development in those locations as corridors become overcrowded. The result could be costly retrofitting of existing infrastructure in the corridors to increase capacity. New development could also be redirected to areas outside of Greater Sage-Grouse habitat, thereby impacting the utility market by potentially reducing the service availability or increasing costs for customers. ***Land Tenure*** Impacts from land tenure and land ownership adjustments would be the same as Alternative B.	for north-south electricity transmission. Under the Proposed Plan, all new ROW development in PHMA, except the Trans West Express project, would contribute toward a 3 percent anthropogenic disturbance cap. Exceedance of the cap in any BSU would prohibit any future ground-disturbing authorizations in those areas. Impacts in BSUs where the cap exceeds 3 percent would be the same as Alternative C. ***Utility Corridors*** Under the Proposed Plan, existing utility corridors would be open for new ROWs in Greater Sage-Grouse habitat; however, 1,097,800 acres of existing utility corridors would be undesignated, and the width of the remaining 225,000 acres of designated corridors would be set at a maximum width of 3,500 feet. These actions towards corridors would reduce the available lands open to entry for linear ROWs and could cause new linear ROWs to concentrate in existing corridors. Over time, corridors could become overcrowded and unfeasible for additional ROW development. Costly retrofitting of existing infrastructure or redirecting new development to areas outside of Greater Sage-Grouse habitat could increase capacity. These added costs would negatively impact the utility market by potentially reducing the availability of affordable service to customers. ***Land Tenure*** Management under the Proposed Plan that prioritizes Greater Sage-Grouse habitat for acquisition and limits disposal would assist the BLM and Forest Service in prioritizing future land tenure and land ownership adjustments. By

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
(*see above*)	(*see above*)	(*see above*)	(*see above*)	(*see above*)	(*see above*)	allowing land tenure actions that result in the net conservation gain of Greater Sage-Grouse habitat, the BLM and Forest Service could carry out actions that consolidate land ownership or acquire lands with higher- quality Greater Sage-Grouse habitat. Recommending the withdrawal of SFAs (2,797,400 additional acres compared to Alternative A) for locatable mineral entry would decrease the short- and long-term demand for ROWs to support mineral development.
Renewable Energy						
Within existing PHMA/GHMA 1,884,200 acres of lands would be affected by wind ROW/SUA exclusion areas and 15,896,500 acres of lands would be affected by solar ROW exclusion or avoidance areas. All other lands with renewable energy potential would continue to be open for ROW and SUA applications on a case-by-case basis. Continuation of current management would have direct impacts on the ROW program by allowing new facilities to be constructed and continuing the demand for ROWs (e.g., transmission lines) to service renewable energy projects.	Under Alternative B, the management of PHMA (10,120,700 acres) as ROW/SUA exclusion areas and GHMA (6,405,900 acres) as wind ROW avoidance areas would eliminate or restrict wind energy development in Greater Sage-Grouse habitat. Management of areas as ROW exclusion would force development to occur outside PHMA and/or on private lands. Within avoidance areas, mitigation requirements (e.g., RDFs consistent with applicable law) could increase project costs, lengthen review periods, and create more complex projects. Requirements for siting projects in avoidance areas could also redirect wind energy development from federal to non-federal lands. Direct short- and long-term impacts on solar energy ROWs would be the same as Alternative A. Indirect impacts from restrictions on other ROWs (e.g., transmission lines) in Greater Sage-Grouse habitat could further restrict solar and wind ROW opportunities even where those ROWs are not excluded.	Under Alternative C, Greater Sage-Grouse habitat (16,526,600 acres) would be excluded from wind and solar ROW applications. While the exclusion area would eliminate development potential in PHMA, the areas most affected would be those areas of moderate to high potential for wind energy development, which are confined largely to mountain ridge tops. Excluding wind energy ROWs in Greater Sage-Grouse habitat would force development to occur on federal lands outside habitat and/or on private lands. Excluding other ROWs, such as transmission lines, would indirectly affect renewable energy development potential outside PHMA if that infrastructure is needed across Greater Sage-Grouse habitat to support renewable energy development on adjacent non-habitat lands. Determining lands of non- habitat would allow the BLM to be more transparent regarding lands that would have fewer restrictions for future development. Renewable energy companies would be able to identify what lands are available and open to development.	Direct short- and long-term impacts under Alternative D would be the same as Alternative C. Because Alternative D would have slightly fewer restrictions on other ROW types (e.g., transmission lines), the indirect effects on renewable energy development under Alternative D would be less in unmapped areas outside PHMA and GHMA.	In California, impacts under Alternative E would be the same as Alternative A. In Nevada, the BLM and Forest Service would avoid core, priority, and general habitat wherever possible and would only allow ROW development within these areas to occur if SETT consultation was completed and the appropriate mitigation measures were applied (e.g., through RDFs consistent with applicable law and the conservation credit system). These increased measures would restrict renewable energy development in specific areas and would impact management and maintenance of existing and future development. Limitations on new ROWs and above- ground linear features such as transmission lines would limit the BLM's and Forest Service's ability to accommodate demand for renewable energy ROW development, which in turn could restrict the availability of energy or service availability and reliability for communication systems.	Impacts on wind and solar energy ROWs within Greater Sage-Grouse habitat would be the same as Alternative C. Alternative F would also prohibit wind energy development within five miles of active leks, which could result in a larger area where wind and solar ROWs are excluded.	Under the Proposed Plan, the BLM and Forest Service would manage PHMA (10,296,100 acres) as ROW exclusion for utility-scale commercial wind and solar. GHMA (6,516,700 acres) would be managed as ROW avoidance for wind and exclusion for solar ROWs. Impacts on wind energy ROWs in PHMA and solar ROWs in PHMA and GHMA would be the same as Alternative D. Although new wind ROWs could be developed in GHMA, the BLM and Forest Service would only allow ROW development within avoidance areas to occur if the development meets the Greater Sage-Grouse screening criteria (Action SSS 1) and incorporates appropriate RDFs consistent with applicable law in design and construction (e.g., noise, tall structure, or seasonal restrictions). Facilities would have to be sited and developed in non-habitat or mitigated so that there is a net conservation gain to Greater Sage-Grouse and its habitat. Added restrictions in GHMA would increase project costs, design complexity, and agency review times compared to Alternative A The requirement to apply RDFs consistent with applicable law in

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
(*see above*)	(*see above*)	(*see above*)	(*see above*)	(*see above*)	(*see above*)	OHMA could increase project costs and agency review times for projects in those areas. Limitations on other types of new ROWs (e.g., transmission lines) under the Proposed Plan could indirectly limit the BLM's and Forest Service's ability to accommodate demand for renewable energy ROW development in GHMA and OHMA.
Minerals – Fluid						
This alternative is the least restrictive and would continue to allow fluid mineral development to continue on 14,642,300 acres with standard stipulations. It is projected that 100 new exploratory and development wells would be drilled during the life of the LUP. Of these new wells, 41 are expected to be producing oil and gas (see Appendix P [of the 2015 Final EIS]).	Overall, as a result of increased restrictions and limitations as compared to Alternative A, Alternative B would result in an increase in the magnitude and duration of effects on fluid minerals development over time with the closure of 61 percent (10,120,700 acres) of the decision area. Geophysical exploration would be permitted within PHMA areas with restrictions. These restrictions would likely reduce the amount of geophysical exploration within the decision area, which could reduce the amount of fluid mineral resources that are identified and developed.	The Forest Service and BLM would develop strategies to terminate existing leases and close the entire decision area to fluid mineral leasing. This would reduce the amount of fluid mineral resource exploration and development on existing leases within the decision area. No lands within the decision area would be available for new ROWs. Because federally managed lands are closed to leasing under this alternative, there would be no impacts on public lands. However, Alternative C could also decrease development of fluid mineral projects on private lands by decreasing the accessibility and availability to develop infrastructure (e.g., pipelines and transmission lines) on public lands.	All federal fluid minerals in PHMA and GHMA would be open to fluid mineral leasing subject to an NSO stipulation that provides no exception, modification, or waiver language. Geophysical exploration would be permitted within GHMA and PHMA areas; however, PHMA would be subject to restrictions. These restrictions would likely reduce the amount of geophysical exploration within the decision area, which could reduce the amount of fluid mineral resources that are identified and developed. Limitations on new ROWs and aboveground linear features, such as transmission lines, would limit the BLM's ability to accommodate demand for fluid mineral ROW development, which in turn could restrict the availability of fluid minerals.	Under Alternative E, all Greater Sage-Grouse habitat would be managed under moderate stipulations (TL and CSU) and would apply the avoid, minimize, and mitigate strategy as described in the state plan. These management requirements could increase cost and time to develop the resource compared to Alternative A.	Impacts would be the same as or similar to those under Alternative C. Overall, as a result of increased restrictions and limitations as compared to Alternative A, Alternative F would result in an increase in the magnitude and duration of effects on fluid minerals development over time with the closures of 100 percent of the decision area.	This alternative would require a 3 percent disturbance cap on anthropogenic surface-disturbing activities in PHMA and impose RDFs consistent with applicable law and a net conservation gain in both PHMA and GHMA. PHMA would be managed as NSO, and GHMA would be managed with CSU/TL restrictions. In PHMA and GHMA, geophysical exploration that does not result in crushing of sagebrush vegetation or does not create new or additional surface disturbance would be permitted.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Minerals – Locatable						
This alternative would be the least restrictive to locatable minerals because a larger percentage of the decision area (97 percent) would continue to be open to locatable mineral entry, and no additional restrictions would be applied to mining operations.	Total withdrawals (including lands currently withdrawn) under this alternative would increase to 57 percent (9,342,600 acres) of the decision area in comparison with Alternative A, thereby further limiting opportunities for locatable mineral development in the decision area.	Total withdrawals, including lands currently withdrawn, under this alternative would increase to 100 percent of the decision area in comparison with Alternative A, thereby, further limiting opportunities for locatable mineral development in the decision area.	This alternative would have the same percentage of the decision area open to locatable mineral entry as Alternative A. Additional restrictions and design features for locatable minerals would apply in Greater Sage-Grouse habitat. This could result in (1) reduced availability of locatable mineral resources, (2) reduced access to new or existing mines due to restrictions on use of the overlying surface lands, and (3) reduced efficiency and increased operational costs that make potential locatable mineral development economically infeasible.	Under Alternative E, the acres of federal mineral estate closed to mineral entry would be the same as Alternative A. However, the Nevada Conservation Credit System would be implemented, and additional restrictions would apply within areas of Greater Sage-Grouse habitat. Noise, structure height, and timing limitations would also apply, and mitigation may be required. Additional restrictions and design features for locatable minerals would apply in Greater Sage-Grouse habitat. This could result in (1) reduced availability of locatable mineral resources, (2) reduced access to new or existing mines due to restrictions on use of the overlying surface lands, and (3) reduced efficiency and increased operational costs that make potential locatable mineral development economically infeasible.	Impacts would be the same as under Alternative B.	The total area recommended for withdrawals or currently withdrawn under this alternative would increase to 20 percent (3,596,200 acres) of the decision area in comparison with Alternative A, thereby further limiting opportunities for locatable mineral development in the decision area in the event that withdrawals occur on areas that are recommended for withdrawal. This alternative would have a lesser impact than Alternatives B, C, or F since there are fewer acres and no active mines within the area recommended for withdrawal. Subject to valid existing rights and applicable law, additional restrictions and design features for locatable minerals would apply in Greater Sage-Grouse habitat. This could result in (1) reduced availability of locatable mineral resources, (2) reduced access to new or existing mines due to restrictions on use of the overlying surface lands, and (3) reduced efficiency and increased operational costs that make potential locatable mineral development economically infeasible.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Minerals – Salable						
Approximately 11 percent (1,884,300 acres) of federal mineral estate within existing habitat would continue to be closed to mineral material disposal. Road construction would likely decrease on BLM-administered and National Forest System surface in the decision area that would continue to be managed as ROW avoidance or exclusion under this alternative, which would result in a decrease in demand for mineral materials in those areas. Impacts from this decrease in demand would be mitigated where new ROWs could be co-located within existing ROWs to satisfy valid existing rights.	Approximately 61 percent (10,120,700 acres) of federal mineral estate within existing habitat would be closed to mineral material disposal. These closures would decrease access for local governments and members of the public to mineral material sites. Road construction would likely decrease on BLM- administered and National Forest System surface in the decision area that would be managed as ROW avoidance or exclusion under this alternative, which would result in a decrease in demand for mineral materials in those areas. Impacts from this decrease in demand would be mitigated where new ROWs could be co- located within existing ROWs to satisfy valid existing rights.	100 percent of federal mineral estate in existing habitat would be closed to mineral material disposal. These closures would decrease access for local governments and members of the public to mineral material sites. Road construction would likely decrease on BLM- administered and National Forest System surface in the decision area that would be managed as ROW avoidance or exclusion under this alternative, which would result in a decrease in demand for mineral materials in those areas. Impacts from this decrease in demand would be mitigated where new ROWs could be co- located within existing ROWs to satisfy valid existing rights.	16,526,600 acres of federal mineral estate in existing habitat would be closed to mineral material disposal. These closures would decrease access for local governments and members of the public to mineral material sites. Additional restrictions and design features for salable minerals development would apply in Greater Sage-Grouse habitat. This could result in (1) reduced availability of salable mineral resources, (2) reduced access to new or existing mines due to restrictions on use of the overlying surface lands, and (3) reduced efficiency and increased operational costs that make potential salable mineral development economically infeasible.	Under Alternative E, the acres of federal mineral estate closed to disposal would be similar to but greater than under Alternative A. However, the Nevada Conservation Credit System would be implemented, and additional restrictions would apply, within areas of Greater Sage-Grouse habitat. Noise, structure height, and timing limitations would also apply, and mitigation may be required. This may result in in decreased access for local governments and members of the public to mineral material sites and/or increase costs of mineral material development. Additional restrictions and design features for salable minerals development would apply in Greater Sage-Grouse habitat. This could result in (1) reduced availability of salable mineral resources, (2) reduced access to new or existing mines due to restrictions on use of the overlying surface lands, and (3) reduced efficiency and increased operational costs that make potential salable mineral development economically infeasible.	Impacts would be the same as under Alternative B.	Approximately 72 percent (16,812,800 acres) of federal mineral estate in existing habitat would be closed to mineral material disposal. These closures would decrease access for local governments and members of the public to mineral material sites. Additional restrictions and design features for salable minerals development would apply in Greater Sage-Grouse habitat. This could result in (1) reduced availability of salable mineral resources, (2) reduced access to new or existing mines due to restrictions on use of the overlying surface lands, and (3) reduced efficiency and increased operational costs that make potential salable mineral development economically infeasible.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Minerals – Non-energy Leasable						
Approximately 11 percent (1,884,300 acres) of federal mineral estate within existing habitat would continue to be closed to nonenergy leasable mineral development.	Approximately 61 percent (10,120,700 acres) of federal mineral estate within existing habitat would be closed to nonenergy leasable mineral development.	100 percent of federal mineral estate in existing habitat would be closed to non-energy leasable mineral development.	16,526,600 acres of federal mineral estate in existing habitat would be closed to nonenergy leasable mineral development. Additional restrictions and design features for nonenergy leasable mineral development would apply in Greater Sage-Grouse habitat. This could result in (1) reduced availability of nonenergy leasable mineral resources, (2) reduced access to new or existing mines due to restrictions on use of the overlying surface lands, and (3) reduced efficiency and increased operational costs that make potential nonenergy leasable mineral development economically infeasible.	Under Alternative E, the acres of federal mineral estate closed to nonenergy leasable mineral development would be similar to Alternative A. However, the Nevada Conservation Credit System would be implemented and additional restrictions would apply within areas of Greater Sage-Grouse habitat. Noise, structure height, and timing limitations would also apply, and mitigation may be required. Additional restrictions and design features for nonenergy leasable mineral development would apply in Greater Sage-Grouse habitat. This could result in (1) reduced availability of nonenergy leasable mineral resources, (2) reduced access to new or existing mines due to restrictions on use of the overlying surface lands, and (3) reduced efficiency and increased operational costs that make potential nonenergy leasable mineral development economically infeasible.	Impacts would be the same as under Alternative B.	Approximately 72 percent (16,812,800 acres) of federal mineral estate in existing habitat would be closed to nonenergy leasable mineral development. Additional restrictions and design features for nonenergy leasable mineral development would apply in Greater Sage-Grouse habitat. This could result in (1) reduced availability of nonenergy leasable mineral resources, (2) reduced access to new or existing mines due to restrictions on use of the overlying surface lands, and (3) reduced efficiency and increased operational costs that make potential nonenergy leasable mineral development economically infeasible.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Lands with Wilderness Characteristics						
This alternative would have the most impact to lands with wilderness characteristics because there are currently few restrictions on anthropogenic activities. Most lands, outside of designated wilderness, wilderness study areas, and lands managed by the Northern California District, remain open to cross-country travel, open to mineral development, and open to ROW development, with exception solar exclusion. Continued development would compromise the wilderness characteristics of naturalness, opportunity for solitude, and primitive recreation values on lands with wilderness characteristics.	This alternative would primarily protect lands with wilderness characteristics where they overlap with PHMA. Wilderness characteristics of naturalness, opportunity for solitude, and primitive recreation values would be protected in PHMA would be through limiting OHV travel to existing roads and trails, excluding ROW, and closing mineral development including recommending for locatable mineral withdrawal. GHMA would be afforded fewer restrictions except for imposing a ROW avoidance restriction, therefore wilderness characteristics of naturalness, opportunity for solitude and primitive recreation values could be compromised where they intersect with GHMA.	This alternative is the most restrictive for all of PHMA and GHMA in that all habitat would be managed as PHMA with exclusion for ROWs, closure to all mineral leasing and development, closure to livestock grazing, and all habitat would be recommended for withdrawal. In addition all lands would be limited to existing roads and trails for OHV use. Where lands with wilderness characteristics intersect with PHMA and GHMA, the wilderness characteristics of naturalness, opportunity for solitude, and primitive recreation values would be preserved because anthropogenic disturbances would be virtually eliminated.	This alternative restricts OHV travel to existing roads and trails in PHMA and GHMA, closes non-energy and salable minerals in all habitat, allows for fluid mineral leasing only under an NSO stipulation, and manages ROWs as either avoidance or exclusion areas. These management actions would help to retain the wilderness characteristics of naturalness, opportunity for solitude, and primitive recreation values associated with lands with wilderness characteristics where they intersect with Greater Sage-Grouse habitat. There would be no recommended withdrawal for locatable minerals, so mining activity would continue and could impact the wilderness characteristic values where they intersect with Greater Sage-Grouse habitat.	This alternative restricts OHV travel to existing roads and trails, but has no allocation restrictions. All anthropogenic activities would be allowed subject to the State of Nevada's Conservation Credit System which imposes stringent mitigation measures. Similar to Alternative A, activities allowed under this alternative could impact wilderness characteristics of naturalness, opportunity for solitude, and primitive recreation values where they intersect with Greater Sage-Grouse habitat.	This alternative has very restrictive management actions similar to Alternative C for PHMA, but is less restrictive in GHMA. Where lands with wilderness characteristics intersect with PHMA, the naturalness would be preserved because anthropogenic disturbances would be virtually eliminated. GHMA remains open to salable mineral development and non- energy mineral development, and is not recommended for withdrawal. These activities could impact wilderness characteristics of naturalness, opportunity for solitude, and primitive recreation values where they intersect with GHMA.	This alternative would primarily protect lands with wilderness characteristics where they overlap with PHMA. Protections of natural values in PHMA would be through limiting OHV travel to existing roads and trails, closing lands to salable and non-energy leasable mineral development, allowing for fluid mineral leasing under a strict NSO stipulation, recommending for locatable mineral withdrawal within the SFA, and imposing ROW avoidance and exclusion management actions. In addition, a 3% disturbance cap protocol would be applied as well as other restrictive screening criteria. These management actions would help to retain the naturalness, opportunities for solitude, and primitive recreation values associated with lands with wilderness characteristics where they intersect with Greater Sage-Grouse habitat. GHMA would be afforded fewer restrictions and the naturalness, opportunities for solitude, and primitive recreation values of lands with wilderness characteristics could be compromised where they intersect with GHMA.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Areas of Critical Environmental Concern						
Management decisions for the 29 existing ACECs containing Greater Sage-Grouse habitat in the planning area would continue to provide supplemental support for the protection of existing ACEC relevance and importance values and Greater Sage-Grouse habitat within the boundaries of the existing ACECs.	Under Alternative B, approximately 115,300 acres in 22 existing ACECs will be subject to additional management protections from Greater Sage-Grouse management prescriptions. Between existing ACEC management and proposed Greater Sage-Grouse management the more restrictive management prescription will take precedence.	Under Alternative C management prescriptions for approximately 9,458,000 acres (PHMA) in 18 proposed ACECs would provide specific protection and management efforts for Greater Sage-Grouse compared with Alternative A. Management decisions for Greater Sage-Grouse may benefit and compliment management decisions protecting relevance and importance values on 115,300 acres in 22 existing ACECs. Between existing ACEC management and proposed Greater Sage-Grouse ACEC management, the more restrictive management prescription will take precedence.	Under Alternative D, impacts would be similar to those in Alternative A because management prescriptions in the majority of existing ACECS are the same or more restrictive than proposed Greater Sage-Grouse management. Between existing ACEC management and proposed Greater Sage-Grouse management, the more restrictive management prescription will take precedence.	Under Alternative E, impacts would be similar to those in Alternative D because total acreage and number of existing ACECs affected and other Greater Sage-Grouse habitat is the same. However, because proposed management prescriptions under this alternative would be less restrictive than Alternative D, effects on existing ACECs would be minimal. Between existing ACEC management and proposed Greater Sage-Grouse management, the more restrictive management prescription will take precedence.	Under Alternative F, management prescriptions for approximately 878,700 acres (PHMA) in 9 proposed ACECs would provide specific protection and management efforts for Greater Sage-Grouse compared with Alternative A. As with Alternative B and Alternative C, 22 existing ACECs would be beneficially impacted by more restrictive management prescriptions. Between existing ACEC management and proposed Greater Sage-Grouse ACEC management, the more restrictive management prescription will take precedence.	Under the Proposed Plan, impacts would be similar to Alternatives A, B, D, and E in that no proposed ACECs would be designated. Like Alternative D, the management prescriptions of existing ACECs is the same or more restrictive than proposed Greater Sage-Grouse management prescriptions. However, those ACECs that contain SFAs will benefit from the fluid mineral NSO with no exception, modification, or waiver stipulation and the recommended mineral withdrawal in the event that the areas are withdrawn. Between existing ACEC management and proposed Greater Sage-Grouse management, the more restrictive management prescription will take precedence.
Water Resources						
Under Alternative A, there are currently areas designated as PHMA and GHMA. However, the LUPs do not contain any special designations pertaining to managing Greater Sage-Grouse, and there are no consistent goals or objectives for management of Greater Sage-Grouse habitat within the LUPs. The impacts from Greater Sage-Grouse management would continue to be the same as those resulting from current management identified in existing LUP documents, land health standards, and applicable agency policy or guidance. Management of projects and activities within habitat would be done on a case-by-case basis.	Alternative B generally reduces land disturbances and would result in fewer impacts on water resources associated with a particular use compared with Alternative A. Alternative B does identify goals and objectives for enhancing and protecting Greater Sage-Grouse habitat, particularly from anthropogenic disturbances. Protecting Greater Sage-Grouse habitat would result in few land disturbances and could result in reduced impacts on water quality. Protection measures may also include protecting existing water sources from future use and result in increases to water availability.	Management under Alternative C would reduce land disturbances and would result in fewer impacts on water resources associated with a particular use compared with Alternative A. This alternative identifies more exclusion areas for ROWs, closes more areas to leasable and salable minerals, withdraws more areas for locatables and makes more areas unavailable to grazing. It also recommends more passive restoration. Reduction of surface disturbance activities through either exclusion or avoidance would reduce potential for soil erosion, thereby reducing impacts on water quality and reducing the need for water for project use, reducing impacts on water quantity.	Management under Alternative D would reduce land disturbances and would result in fewer impacts on water resources associated with a particular use compared with Alternative A. RDFs identified for Alternative D, including removing water developments that are negatively impacting habitat, removing or modifying developments that are negatively impacting riparian habitat, and requiring vegetation reclamation from ground-disturbing activities, would all reduce impacts on water resources. Reduction of surface- disturbing activities through either exclusion or avoidance would reduce potential for soil erosion, thereby reducing impacts on water quality and reducing the need for water for project use, reducing impacts on water quantity.	Alternative E identifies Greater Sage-Grouse management areas and discusses collaboration through the ecosystem council, monitoring of habitat, predation controls, a mitigation banking program, mitigation of habitat, and a requirement of net conservation gain. Mitigation of habitat, specifically restoration or creation of habitat, could reduce impacts on water resources, but the result would be dependent on the actions occurring and location of the work.	Alternative F generally constrains resource use and would decrease any impacts on water resources associated with a particular use compared with Alternative A. Under this alternative, there would be a 3 percent cap on disturbance within Greater Sage-Grouse habitat. Once the cap is met, no new activities that would result in land disturbance would be authorized. Reduction of surface- disturbing activities through either exclusion or avoidance would reduce potential for impacts to water resources.	The Proposed Plan combines aspects of Alternative D and the revised Alternative E and would result in fewer impacts on water resources associated with a particular use compared with Alternative A. Of the acres designated as PHMA, some acres are identified as SFAs, which will be managed as PHMA, recommended for withdrawal from the mining act, managed as NSO for mineral leasing and prioritized for management and conservation activities. OHMA is unmapped habitat that is potentially suitable. Protecting Greater Sage-Grouse habitat would result in few land disturbances and could result in reduced impacts to water resources.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
(*see above*)	(*see above*)	(*see above*)	Management under Alternative D, for leasable minerals, would list stipulations for NSO in PHMA and GHMA for currently unleased areas and require site-specific conservation measures for reducing land disturbance on leased areas. In OHMA, nonenergy leasables would be managed as open, and oil and gas and geothermal resources would be managed as open subject to standard stipulations. Although NSO stipulations may result in decreases in surface water impacts by reducing erosion potential and on-site spills, it would not necessarily result in a decrease in groundwater impacts. Potential impacts of drilling and extracting of fluid resources on groundwater aquifers would remain the same. RDFs associated with reducing surface disturbance, vegetation reclamation, and stream crossings would all reduce erosion potential, thereby reducing impacts on water resources.	(*see above*)	(*see above*)	(*see above*)

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Tribal Interests						
This alternative could lead to decreased opportunities for tribes to maintain traditional cultural practices and values such as observing lekking behavior if the nonestablishment of PHMA/GHMA acres leads to future decreases in Greater Sage-Grouse populations. This alternative is expected to maintain tribal access to pine nutting areas and observing lekking behavior because future access to these areas would likely be maintained at current levels. Comprehensive travel and transportation management would maintain current tribal access to important pine nutting areas and juniper trees used to maintain traditional tribal cultural practices and values.	Greater Sage-Grouse management goals and objectives could lead to increased opportunities for tribes to maintain traditional cultural practices and values such as observing lekking behavior. Because this alternative proposes ROW avoidance in PHMA and/or GHMA, this could result in decreased opportunities for tribes to maintain traditional practices through restrictions imposed on access to pine nutting areas and observing lekking behavior. However, exceptions to tribes to access current areas used for traditional practices could be granted in future site-specific NEPA analyses. While this alternative would limit motorized travel to existing roads within PHMA, current tribal access to important pine nutting areas and juniper trees used to maintain traditional tribal cultural practices and values would be maintained.	Greater Sage-Grouse management goals and objectives could lead to increased opportunities for tribes to maintain traditional cultural practices and values such as observing lekking behavior. Because this alternative proposes ROW avoidance in PHMA and/or GHMA habitat, this could result in decreased opportunities for tribes to maintain traditional practices through restrictions imposed on access to pine nutting areas and observing lekking behavior. However, exceptions to tribes to access current areas used for traditional practices could be granted in future site-specific NEPA analyses. This alternative would limit motorized travel to existing roads within PHMA; however, current tribal access to important pine nutting areas and juniper trees used to maintain traditional tribal cultural practices and values would likely be maintained.	Greater Sage-Grouse management goals and objectives could lead to increased opportunities for tribes to maintain traditional cultural practices and values such as observing lekking behavior. Because this alternative proposes ROW avoidance in PHMA and/or GHMA habitat, this could result in decreased opportunities for tribes to maintain traditional practices through restrictions imposed on access to pine nutting areas and observing lekking behavior. However, exceptions to tribes to access current areas used for traditional practices could be granted in future site-specific NEPA analyses. Impacts from travel and transportation would be the same as under Alternative C.	Greater Sage-Grouse management goals and objectives could lead to increased opportunities for tribes to maintain traditional cultural practices and values such as observing lekking behavior. This alternative is expected to maintain tribal access to pine nutting areas and observing lekking behavior because future access to these areas would likely be maintained at current levels. Impacts from travel and transportation would be the same as under Alternative D.	Greater Sage-Grouse management goals and objectives could lead to increased opportunities for tribes to maintain traditional cultural practices and values such as observing lekking behavior. Because this alternative proposes ROW avoidance in PHMA and/or GHMA habitat, this could result in decreased opportunities for tribes to maintain traditional practices through restrictions imposed on access to pine nutting areas and observing lekking behavior. However, exceptions to tribes to access current areas used for traditional practices could be granted in future site-specific NEPA analyses. Impacts from travel and transportation would be the same as under Alternative B.	Management under the Proposed Plan would establish collaborative management goals and objectives within PHMA/GHMA that could stabilize or increase Greater Sage-Grouse populations in the future. If successful, these management goals and objectives could lead to increased opportunities for tribes to maintain traditional cultural practices and values such as observing lekking behavior. This alternative would manage permitted livestock grazing to maintain PHMA and GHMA in order to help meet all life-cycle requirements of Greater Sage-Grouse. This could increase tribal opportunities to observe Greater Sage-Grouse behavior if this strategy leads to stabilization or increases in Greater Sage-Grouse populations. However, this alternative could reduce tribal economic benefits if their current AUMs are reduced in the future in order to meet these management goals. The Proposed Plan would manage and minimize effects of land use actions on PHMA and GHMA but would allow for corridors and ROWs that result in a net conservation gain of habitat. Tribes would be able to maintain traditional practices by accessing pine nutting areas and observing lekking behavior. Restricting new development and land use authorizations near leks would likely maintain traditional tribal cultural practices and values.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Climate Change						
The impacts from Greater Sage-Grouse management would continue to be the same as those resulting from current management identified in existing LUP documents, land health standards, and applicable agency policy or guidance. Management of projects and activities within habitat would be done on a on climate change would be negligible at the landscape scale; however, there may be more noticeable impacts at the project-site level depending on project-specific activities and mitigation actions.	The NTT report did not address climate change, therefore impacts are the same as under Alternative A.	Alternative C generally constrains resource use and would decrease any GHG emissions associated with a particular use compared with Alternative A. This alternative identifies more exclusion areas for ROWs, closes more areas to leasable and salable minerals, withdraws more areas for locatables, and makes more areas unavailable to grazing. It also recommends more passive restoration, which may or may not help with climate change resiliency.	Alternative D generally constrains resource use and would decrease any GHG emissions associated with a particular use compared with Alternative A.	Alternative E identifies Greater Sage-Grouse management areas and discusses collaboration through the ecosystem council, monitoring of habitat, predation controls, a mitigation banking program, mitigation of habitat, and a requirement of net conservation gain. Mitigation of habitat, specifically restoration or creation of habitat, could reduce impacts on climate change, but the result would be dependent on the actions occurring and location of the work.	Alternative F generally constrains resource use and would decrease any GHG emissions associated with a particular use compared with Alternative A. Under this alternative, there would be a 3 percent cap on disturbance within Greater Sage-Grouse habitat. Once the cap is met, no new activities that would result in land disturbance would be authorized. Reduction of surface- disturbing activities through either exclusion or avoidance would reduce potential for GHG emissions as well as reduced surface disturbances, allowing for management areas to be more resilient to climate change.	Management under the Proposed Plan would constrain resource use and would decrease any GHG emissions associated with a particular use compared with Alternative A. Of the acres designated as PHMA, some acres are identified as SFAs, which will be managed as PHMA, recommended for withdrawal from the mining act, managed as NSO for mineral leasing and prioritized for management and conservation activities. OHMA is unmapped habitat that is potentially suitable for Greater Sage-Grouse. Protecting Greater Sage-Grouse habitat would result in few land disturbances and could result in reduced GHG emissions.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Socioeconomic and Environmental Justice						
Under Alternative A, existing opportunities for grazing, recreation, mineral development, lands and realty (including renewable energy development), and travel would not be affected. There would be no change in annual output, annual jobs, or annual earnings. There would be no changes in the distribution of impacts among communities and groups of interest from management of BLM-administered and National Forest System lands when compared to current management. No disproportionately high and adverse impacts on minority or low- income populations would be expected from changes in management.	Under Alternative B, restrictions to oil and gas, geothermal, and wind energy development opportunities would result in reduced growth in output, employment, and earnings compared to Alternative A. Alternative B would also impose limitations and added costs to future economic investments through restrictions to ROW development, including new roadways, and to travel compared with Alternative A. Economic activity attributable to grazing on federal lands with Greater Sage-Grouse habitat is likely to be broadly similar to Alternative A. Although lands unconditionally open to grazing would be the same as under Alternative A, there would likely be some reduction in economic activity due to grazing on federal lands within Greater Sage-Grouse habitat, but to what extent is unknown. The economic effect from recreational activity is not possible to quantify, but if there is a difference versus Alternative A, it is likely to be small. Reductions in economic activity from locatable and salable minerals would be expected but are also not possible to quantify. Compared to Alternative A, Alternative B would tend to favor conservation interest and have adverse effects on development interests. No disproportionately high and adverse impacts on minority or low-income populations would be expected from changes in management.	Adverse impacts on output, employment, and earnings would be greater in Alternative C than any other alternative. Alternative C would impose the most limitations and added costs to future economic investments through ROW and travel restrictions. Livestock grazing on federal lands would be restricted to those allotments with no Greater Sage-Grouse habitat, which would account for about 80 percent of the output, employment, and earnings reductions under Alternative C when compared to Alternative A. The economic effect from recreational activity would be the same as Alternative A. Reductions in economic activity from salable minerals would be the same as under Alternative B, and reductions from locatable minerals would be potentially greater than under Alternative B, but these are not possible to quantify. Alternative C would carry the greatest potential of impacts to specific communities, would favor conservation interests and would have adverse effects on grazing interests. Disproportionately high and adverse impacts on low-income populations would be expected related to employment/earnings impacts from ranching and grazing in Lassen and White Pine Counties and northern portions of Nye County.	Under Alternative D, growth in output, employment, and earnings would be expected to be slightly lower than under Alternative B. ROW development and travel under Alternative D would also face restrictions, but these would be more limited than under Alternatives B and C, except for wind and solar development. Economic activity due to grazing on federal lands within Greater Sage-Grouse habitat would be similar to Alternative B. The economic effect from recreational activity would be similar to Alternative B, and locatable minerals would be similar to Alternative A. Reductions in economic activity from salable minerals would be the same as under Alternatives B and C. Like Alternative B, Alternative D would tend to favor conservation interests and have adverse effect on development interests. No disproportionately high and adverse impacts on minority or low-income populations would be expected from changes in management.	Growth in output, employment, and earnings under Alternative E would be expected to be slightly lower than under Alternative A but higher than all other alternatives. Note that restrictions in Alternative E would affect Nevada only. Limitations and added costs to future economic investments through restrictions to ROW development and travel would be slightly more than under Alternative A and less than all other alternatives. Economic activity due to grazing on federal lands within Greater Sage-Grouse habitat would be similar to Alternatives B and D. The economic effect from recreational activity, locatable minerals, and salable minerals would be the similar to Alternative A. Alternative E would benefit energy and mineral interests the most. No disproportionately high and adverse impacts on minority or low- income populations would be expected from changes in management.	Under Alternative F, growth in output, employment, and earnings would be expected to be the second lowest, higher only than under Alternative C. Restrictions to ROW development and travel would add costs and limit future economic investments similar to Alternative C. Alternative F would impose the most limitations and added costs to future economic investments through ROW and travel restrictions Alternative F would also reduce economic activity due to grazing on federal lands because of the action to rest a portion of PHMA and GHMA each year and limit utilization levels. The economic effect from recreational activity, locatable minerals, and salable minerals would be similar to Alternatives B. Alternative F would carry the second greatest potential of impacts to specific communities after Alternative C, would favor conservation interests, and would have adverse effects on grazing interests. Disproportionately high and adverse impacts on low- income populations would be expected related to employment/earnings impacts from ranching and grazing in Lassen and White Pine Counties and northern portions of Nye County.	Growth in output, employment and earnings is expected as a result of the Proposed Plan, which would be lower than Alternatives A and E, and slightly lower than Alternatives B and D, but higher than Alternatives F and C. Limitations and added costs to future economic investments through restrictions to ROW development and travel would be similar to Alternative D. Economic activity due to grazing on federal lands within Greater Sage-Grouse habitat would be similar to Alternatives B, D, and E. The economic effect from recreational activity would be similar to Alternatives B, D, and F. Reductions in economic activity from locatable minerals could occur but would be less than under Alternatives B and F. Reduction in economic activity from locatable minerals would be the same as under Alternatives B, C, D, and F. As with Alternatives B and D, the Proposed Plan would tend to favor conservation interests and would have an adverse effect on development interests. No disproportionately high and adverse impacts on minority or low-income populations would be expected from changes in management.

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4.3.2 Management Alignment Alternative

Table 4-3, below, summarizes if and how decisions in the Management Alignment Alternative were considered in the 2015 Final EIS. Issues needing further analysis are analyzed under the resource/resource use headings in this chapter.

Table 4-3
Impacts from Management Alignment Alternative

Plan Alignment Issue	Considered in 2015 Final EIS
Modifying HMA Boundaries	As part of the proposed action for Alternative E in the 2015 Final EIS, as defined in Action E-SSS-AM 9 found on page 2-197: "Greater Sage-Grouse management categories must be evaluated every 3-5 years, based on new or improved spatial data through a scientifically based, peer-reviewed process. Adjustments of the mapped management categories within the population management zone would be made without further analysis." The impacts on resources associated with Alternative E are contained in Chapter 4 of the 2015 Final EIS. Note: If the most current Greater Sage-Grouse HMA boundaries are adopted, the following changes would occur: PHMA: 44,000 acre decrease GHMA: 27,300 acre increase OHMA: 1,007,600 acre decrease
Removing Sagebrush Focal Areas	Alternatives B through F in the 2015 Final EIS did not include SFAs as a management area. The impacts on resources associated with Alternatives B through F are contained in Chapter 4 of the 2015 Final EIS.
Adaptive Management	Adaptive Management was analyzed as part of the 2015 Final EIS; see Section 2.7.1 on page 2-75.
Allocation Exception Process	Exceptions were outlined in the 2015 Final EIS according to specific resource uses or conditions. These are summarized in Section 2.5 of this document (No-Action Alternative) under the heading Issue: Allocation Exception Process. Although specific exceptions, modifications, and waivers were only analyzed for certain land uses, the 2015 Final EIS analyzed a range of alternatives that took into account the various impacts from different types of management actions associated with these land use allocations. Note: The No-Action Alternative of the 2015 Final EIS allowed for the disposal of lands within Greater Sage-Grouse HMAs.
Mitigation	The mitigation standard (net conservation gain) was analyzed in Alternative E of the 2015 Final EIS, including the use of the Nevada Conservation Credit System. See Sections 4.4.8, page 4-42; Section 4.5.8, page 4-85; Section 4.6.8, page 4-126; Section 4.9.7, page 4-186; Section 4.13.8, page 4-265; and Section 4.15, page 4-286.
Seasonal Timing Restrictions	Applying limited seasonal timing restrictions was analyzed in Alternative C of the 2015 Final EIS. See Sections 4.4.6; 4.5.6; 4.6.6; 4.9.5; 4.10.6; 4.13.6; 4.14.6; and 4.18.6.
Modifying Habitat Objectives	The Habitat Objectives (Table 2-2) for Greater Sage-Grouse were analyzed in the 2015 Final EIS. See Section 2.6.2, page 2-17 for additional information and Sections 4.4.7; 4.4.8; 4.4.10; and 4.5.9 for the analysis of Habitat Objectives under the Proposed RMPA/Final EIS and Alternatives A, B, D, E, and F of the 2015 Final EIS.

4.3.3 Proposed Plan Amendment

Table 4-3, above, summarizes if and how decisions in the Management Alignment Alternative were considered in the 2015 Final EIS. While there have been minor changes between the Proposed Plan

Amendment and the Management Alignment Alternative, the analysis completed in 2015, and hence, **Table 4-3** remains applicable to both the Management Alignment Alternative and the Proposed Plan Amendment.

4.4 INCOMPLETE OR UNAVAILABLE INFORMATION

The Council on Environmental Quality (CEQ) established implementing regulations for NEPA, requiring that a federal agency identify relevant information that may be incomplete or unavailable for evaluating reasonably foreseeable significant adverse impacts in an EIS (40 CFR 1502.22). If the information is essential to a reasoned choice among alternatives, it must be included or addressed in an EIS, unless the cost of obtaining such information is exorbitant. Knowledge and information is, and would always be, incomplete, particularly with infinitely complex ecosystems considered at various scales.

The best available information pertinent to the decisions to be made was used in developing the 2015 Final EIS as well as this Proposed RMPA/Final EIS. The BLM made a considerable effort to acquire and convert resource data into digital format from the BLM and outside sources (e.g., NDOW, USGS, etc.).

Under the FLPMA, the inventory of public land resources is ongoing and continuously updated; however, certain information was unavailable for use in developing the Proposed RMPA/Final EIS. This was because inventories either had not been conducted or were incomplete.

Some of the major types of data that are incomplete or unavailable are the following:

- Comprehensive planning area-wide inventory of wildlife and special status species occurrence and condition
- GIS data used for disturbance calculations on private lands
- Site-specific surveys of cultural and paleontological resources
- Lack of quantifiable social or economic effects specific to counties, from the Statewide Socioeconomic Baseline Data collection for Nevada that is currently being developed by the University of Nevada, Reno

For these resources, estimates were made concerning their number, type, and significance, based on previous surveys and existing knowledge.

In addition, some impacts could not be quantified, given the proposed management actions. Where there was this gap, impacts were projected in qualitative terms or, in some instances, were described as unknown. Subsequent site-specific, project-level analyses would provide the opportunity to collect and examine site-specific inventory data to determine appropriate application of RMP-level guidance. In addition, the BLM and other agencies in the planning area continue to update and refine information used to implement this plan.

4.5 IMPACTS ON GREATER SAGE-GROUSE AND GREATER SAGE-GROUSE HABITAT

4.5.1 No-Action Alternative with the Inclusion of SFAs (No-Action Alternative)

Under this alternative, 2,767,552 acres of Greater Sage-Grouse HMAs would be designated as SFAs and would be recommended for withdrawal from location and entry under the Mining Law of 1872 for 20 years, subject to valid existing rights. The potential for future mining operations that would affect Greater Sage-Grouse and its habitat would be reduced because additional protections from habitat disturbance and fragmentation associated with mining would be placed on some of the most important landscapes for Greater Sage-Grouse conservation (as identified by the USFWS; BLM 2016b).

Based on the reasonably foreseeable development (RFD) scenario, estimates for the number and size of future mines and exploration projects in the planning area over the proposed 20-year withdrawal would not be substantially different (see **Table 4-4**, below). The difference, therefore, between the nature and type of effects on Greater Sage-Grouse described in Section 4.4.10 of the 2015 Final EIS would be negligible. A withdrawal within the SFA could have beneficial impacts on Greater Sage-Grouse by potentially reducing mining activities that may cause disturbance to Greater Sage-Grouse and its habitat within and adjacent to the withdrawal areas.

Table 4-4
Estimated Number of Mines and Exploration Projects

State	Inclusion of SFA		No SFA	
	Mines	Exploration	Mines	Exploration
Nevada	1	32	3	78
California	N/A	N/A	N/A	N/A

Source: BLM 2016b

4.5.2 Management Alignment Alternative

Adopting the changes proposed in the Management Alignment Alternative would be consistent with both Nevada and California's overall objective to provide for the long-term conservation of Greater Sage-Grouse by protecting the habitat upon which the species depends. Despite minor differences between the actions described in this alternative and those analyzed in the 2015 Final EIS, the difference between the nature and type of impacts described would be negligible. These impacts are discussed in Section 4.4 of the 2015 Final EIS. Alignment with the states' conservation and management strategies would improve coordination and opportunities for enhanced management.

The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. This would ensure that current and future renditions of HMA boundaries accurately reflect Greater Sage-Grouse habitat on the ground and guide management actions appropriately. As the boundaries are updated, the land use plan allocations associated with each HMA (see **Table 2-1**) would be adjusted to match the newest USGS map model (Coates et al. 2016). This would help to conserve the species by ensuring allocations and any of their associated restrictions are applied in the appropriate areas, while allowing infrastructure and economic development to occur in areas that would not affect the species.

The allocation exception process would be updated and standardized, to allow for the consideration of projects within PHMA, GHMA, and OHMA provided they meet the prescribed criteria, as described in **Table 2-2**. Because these criteria ensure that projects are either in unsuitable Greater Sage-Grouse habitat; do not result in direct, indirect, or cumulative impacts on Greater Sage-Grouse; or can be offset, with the exception of those needed for public health and safety, no new impacts on Greater Sage-Grouse and its habitat are anticipated above those analyzed in the 2015 Final EIS.

Adaptive management hard and soft triggers would be updated as summarized and described in **Table 2-2** and **Appendix E**. This update would ensure that the BLM is utilizing the best available science, data and decision support tools to guide management at the appropriate spatial scale. Impacts on Greater Sage-Grouse and its habitat would be beneficial as a result of this update to adaptive management triggers, providing the ability to detect declining populations and/or habitat and change management on the ground.

The State of Nevada adopted a mitigation standard of net benefit (net conservation gain). Consistent with the State approach, this standard would be retained in the Management Alignment Alternative (and the No-Action Alternative), with additional clarification regarding implementation provided in Appendix F of the 2018 Draft RMPA/EIS. The improved coordination among state and federal partners, along with using consistent metrics for tracking changes in habitat quality and quantity over time, is anticipated to benefit the species through enhanced knowledge of baseline conditions and restoration/reclamation/mitigation effectiveness.

Beneficial impacts were identified for addressing seasonal timing restrictions and modifying indicators and their values in the Habitat Objectives (Table 2-2 of the 2015 ARMPA/ROD) in the 2015 Final EIS, in coordination with the state wildlife agencies and other partners and others as described in **Table 2-2**. The criteria established for modifying or removing seasonal timing restrictions to ensure that these protections are still applied where applicable and allow for beneficial Greater Sage-Grouse projects (i.e., juniper and/or pinyon removal, riparian restoration projects, reseeding, etc.) to be implemented in an expedited manner. Modifying the Habitat Objectives would improve the accuracy of Greater Sage-Grouse habitat management by using the best available science to inform Greater Sage-Grouse seasonal habitat requirements.

SFAs would not be designated under this alternative and therefore not recommended for withdrawal from location and entry under the Mining Law of 1872; however, they would still be managed according to their underlying Greater Sage-Grouse HMAs and associated allocations and management decisions (PHMA, GHMA, or OHMA). Impacts on Greater Sage-Grouse would be consistent with those described in 2015 because SFAs presented no additional conservation or management restrictions above PHMA with the exception of the withdrawal recommendation discussed above. Given the subsequent information obtained through the 2016 SFA Draft EIS's associated Mineral Potential Report and Socioeconomic Impacts Analysis (BLM 2016b), the October 4, 2017, *Notice of Cancellation of Withdrawal Application and Withdrawal Proposal* explained that "the BLM determined the proposal to withdraw 10 million acres was unreasonable in light of the data that showed that mining affected less than 0.1 percent of Greater Sage-Grouse-occupied range."

4.5.3 Proposed Plan Amendment

Adopting the changes in the Proposed Plan Amendment would result in similar impacts and outcomes as described in section 4.5.2 for the Management Alignment Alternative. The Proposed Plan Amendment would remain consistent with both Nevada and California's overall objective to provide for the long-term conservation of Greater Sage-Grouse by protecting the habitat upon which the species depends. Despite minor differences between the actions described in the Proposed Plan Amendment and those analyzed in the 2015 Final EIS, the difference between the nature and type of impacts described would be negligible. These impacts are discussed in Section 4.4 of the 2015 Final EIS. Alignment with the states' conservation and management strategies would improve coordination and opportunities for enhanced management.

Under the Proposed Plan Amendment, the adaptive management strategy would be revised as summarized and described in **Table 2-2** and **Appendix E**. The adaptive management strategy presented in the Proposed Plan Amendment has been modified to better align with the strategy approved by the State of Nevada's Sagebrush Ecosystem Council on July 17, 2018 and August 30, 2018. Habitat triggers have been replaced with a system of adaptive management warnings related to fire risk, wildland fire, anthropogenic and natural disturbances. If these warnings justify a response, this would be considered an adaptive management habitat trigger. Impacts on Greater Sage-Grouse and its habitat from this change to the adaptive management strategy would be beneficial, providing the ability to detect declining populations and/or habitat and change management on the ground with other Federal, state, and local partners. These warnings would also allow BLM to assess the threats that are present and widespread across the Nevada and Northeastern California Sub-region, which are wildfire and invasive plant species.

In accordance with the state of Nevada's adopted goal of seeking a net conservation gain for Greater-Sage Grouse, the Proposed Plan Amendment retains net conservation gain as a goal for the planning area, however, the mitigation standard that applies to third party actions is modified to reflect BLM's determination that compensatory mitigation must be voluntary unless required by other applicable law but in recognition that states may require mandatory compensatory mitigation in accordance with state law. Consistent therewith, the BLM would continue to require appropriate mitigation to adequately conserve Greater Sage-Grouse and its habitat and would pursue a net conservation gain as a broader planning goal and objective in alignment with State management plans and policy. The BLM would not deny a proposed authorization in Greater Sage-Grouse habitat solely on the grounds that the proponent has not proposed or agreed to undertake voluntary compensatory mitigation.

The BLM would continue to apply the mitigation hierarchy as described in the CEQ Regulations at 40 CFR 1508.20; however, the BLM would focus on avoiding, minimizing, rectifying or reducing impacts over time. Compensation, which involves replacing or providing substitute resources for the impacts (including payment) would only be considered when voluntarily offered by a proponent, in coordination with the States of Nevada and California; however, when authorizing third-party actions that would result in direct, indirect, or cumulative impacts on Greater Sage-Grouse or their habitat, the BLM would require those impacts to be quantified using the most current version of the State of Nevada's Habitat Quantification Tool (HQT) to ensure consistency in tracking/reporting changes to Greater Sage-Grouse habitat quality and quantity. The Proposed Plan Amendment also removes Appendix F, Mitigation, of the 2015 ROD/ARMPA and clarifies how the BLM would apply the mitigation hierarchy to comply with current policy and guidance.

The BLM has determined that FLPMA does not require the BLM to mandate public land users to provide compensatory mitigation as a condition of obtaining authorization for the use of the public lands. The BLM further determined that FLPMA does not limit the ability of public land users to voluntarily offer to provide compensatory mitigation, for public land users to provide compensatory mitigation to satisfy state recommendations or standards, or for the BLM to take such voluntary or state-focused efforts into account when assessing the overall environmental impact of a proposed action. Consistent with that determination and with BLM IM 2018-093, *Compensatory Mitigation*, the

Proposed Plan Amendment clarifies how voluntary compensatory mitigation or a state recommended mitigation should be considered in the management of Greater Sage-Grouse habitat. This clarification aligns the Proposed Plan Amendment with BLM policy and the scope of compensatory mitigation authority expressly provided by FLPMA.

Compensatory mitigation is meant to be an additional tool that, in the best circumstances, can attempt to offset residual impacts remaining after applying other mitigation actions. It does not supplant other tools under the mitigation hierarchy, including avoiding and minimizing on-site impacts.

Further, it is impossible to predict the amount of compensatory mitigation that might voluntarily occur in the future and the environmental consequences of that compensatory mitigation. Therefore, analysis of the environmental impact of compensatory mitigation is more appropriate for future project-specific NEPA, where it is possible to assess any project-specific compensatory mitigation that is offered voluntarily or to satisfy state recommendations or standards, in addition to the benefits already gained through other forms of mitigation, including avoidance, minimization, and rectification measures applicable to the specific project and site.

Thus, the effects of these changes to the BLM's approach to compensatory mitigation are speculative and nominal at most. The BLM would continue to ensure consistency of its actions and authorizations with the land use planning level goals and objectives of the Proposed Plan Amendments. The implementation of compensatory mitigation actions would be directed by MOAs that describe how the BLM would align with State authorities and incorporated in the appropriate NEPA analysis subsequent to the Proposed Plan Amendment. While the conservation benefit of compensatory mitigation may be limited when weighed against the threats to Greater Sage-Grouse, particularly in the Great Basin region where wildland fire remains a key threat, the BLM is committed to implementing state-imposed mitigation recommendations to help minimize the impacts of anthropogenic disturbance and habitat fragmentation throughout the range of Greater Sage-Grouse.

Further, the BLM is committed to implementing beneficial habitat management actions to reduce the threats of fire and invasive species to Greater Sage-Grouse. The BLM has committed resources to habitat restoration and has treated 2.6 million acres of Greater Sage-Grouse habitat range-wide over the past 5 years. In fiscal year 2019, the BLM funded approximately $38 million in Greater Sage-Grouse management actions resulting in approximately 632,000 acres of treated habitat. In Fiscal Year 2020, the BLM invested approximately $37 million in the implementation of habitat management projects resulting in approximately 584,000 acres of treated habitat.

In 2015, the USFWS determined Greater Sage-Grouse was "not warranted" for listing under the Endangered Species Act. The USFWS found that BLM's 2015 land use plans were adequate regulatory mechanisms and that the species no longer warranted listing under the Act. At the time of that decision, USFWS acknowledged the RMP requirements that compensatory mitigation achieve a net gain standard. The BLM is not proposing any action that would preclude proponents from offering compensatory mitigation; it is clarifying the BLM's reliance on voluntary compensatory mitigation consistent with federal law.

Anecdotally, the existing conservation credit systems, banks, and exchanges designed to offset impacts to Greater Sage-Grouse or its habitat have had mixed success. The BLM is aware of three mitigation banks (one commercial bank agreement in Wyoming and two single-user bank agreements with mining companies in Nevada) and one exchange system in Colorado specific to Greater Sage-Grouse currently in operation. However, the BLM does not have access to data or information that would further assess the relative benefit provided by these systems.

In all designated Greater Sage-Grouse habitat, the BLM would ensure both mitigation and management actions that achieve the planning-level management goals and objectives identified in this RMPA. The BLM has a variety of tools available to effective achieve those management goals such as restoration projects and habitat improvements.

The BLM would continue plan effectiveness monitoring to provide the data needed to evaluate BLM actions toward reaching the goals and objectives set forth in the RMPAs. Effectiveness monitoring methods would encompass multiple larger scales, from areas as large as the WAFWA MZ to the scale of this RMPA. Effectiveness data used for these larger-scale evaluations would include all lands in the area of interest, regardless of surface management, and would help inform where finer-scale evaluations are needed.

The criteria established for modifying or removing seasonal timing restrictions has been revised in the Proposed Plan Amendment through the addition of an exception to modify or waive seasonal timing restrictions to allow for priority routine administrative functions (consistent with the exceptions proposed for allocations). Prior to permitting this exception, BLM would still be required to coordinate with NDOW and/or CDFW to ensure the seasonal lifecycle periods that are necessary for the Greater Sage-Grouse are protected, while still allowing these types of functions to occur in a timely manner. Due to the fact that it would be speculative to anticipate at the land use planning level how often and when this exception would be pursued on a project-by-project basis, impacts would be more appropriate at the project scale.

4.6 Impacts on Vegetation and Soils

4.6.1 No-Action Alternative with the Inclusion of SFAs (No-Action Alternative)

Under this alternative, 2,767,552 acres of Greater Sage-Grouse habitat management areas would be designated as SFAs, and would be recommended for withdrawal from location and entry under the Mining Law of 1872 for 20 years, subject to valid existing rights. Under this alternative, less mining activity would be authorized (see **Table 4-4**, above), thus reducing the overall potential for disturbance associated with mining activities.

The reduction in overall disturbance would provide a positive benefit to vegetation and soils; however, because localized disturbance from mining activities requires reclamation and is only one factor affecting the extent and condition of vegetation and soils, the designation of SFAs is unlikely to result in a substantially different outcome for vegetation and soils as those described in Section 4.5.10 of the 2015 Final EIS.

4.6.2 Management Alignment Alternative

Adopting the changes proposed in the Management Alignment Alternative would not substantially alter vegetation and soil resources because they would continue to be managed according to their underlying habitat management area and associated allocations and management decisions (PHMA, GHMA, or OHMA). Despite minor differences between the actions described in this alternative and those analyzed in the 2015 Final EIS, the difference between the nature and type of impacts described would be negligible. These impacts are discussed in Section 4.5 of the 2015 Final EIS.

The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. The allocations associated with each HMA (**Table 2-2**) would be adjusted based on updates to the USGS map model (Coates et al. 2016). The allocation exception process would be updated and standardized, as described in **Table 2-2**, to allow for the consideration of projects within HMAs, provided they meet prescribed criteria.

Adaptive management hard and soft triggers would be updated as summarized and described in **Table 2-2** and **Appendix E**. The mitigation standard (net conservation gain) would be retained in the Management Alignment Alternative (and the No-Action Alternative), with additional clarification regarding implementation provided in Appendix F of the 2015 ARMPA/ROD. Seasonal timing restrictions and modifying Habitat Objectives (Table 2-2 of the 2015 ARMPA/ROD) indicators and values would be addressed in coordination with state wildlife agencies and other partners as described in **Table 2-2**. SFAs would not be designated under this alternative and therefore not recommended for withdrawal from location and entry under the Mining Law of 1872; however, they would still be managed according to their underlying HMA and associated allocations and management decisions (PHMA, GHMA, or OHMA).

4.6.3 Proposed Plan Amendment

Adopting the changes in the Proposed Plan Amendment would result in similar impacts on vegetation and soil resources as described in section 4.6.2 for the Management Alignment Alternative, except that under the Proposed Plan Amendment, the adaptive management strategy would be revised as summarized and described in **Table 2-2** and **Appendix E**. Impacts on vegetation and soil resources from the modifications identified in **Appendix E** would be beneficial, providing the ability to address fire risk in a collaborative and expeditious manner, which would beneficially impact vegetation and soil resources. The proposed adaptive management strategy would allow BLM to assess the threats that are present and widespread across the Nevada and Northeastern California Sub-region, which are wildfire and invasive plant species.

The criteria established for modifying or removing seasonal timing restrictions has been revised in the Proposed Plan Amendment through the addition of an exception to modify or waive seasonal timing restrictions to allow for routine administrative functions (consistent with the exceptions proposed for allocations). Due to the fact that it would be speculative to anticipate at the land use planning level how often and when this exception would be pursued on a project-by-project basis, impacts would be more appropriate at the project scale.

4.7 Impacts on Land Use and Realty

4.7.1 No-Action Alternative with the Inclusion of SFAs (No-Action Alternative)

The designation of SFAs would be specific to recommending lands for withdrawal from location and entry under the Mining Law of 1872. Because this would not alter the underlying allocations for land use and realty associated with Greater Sage-Grouse HMAs, the nature and type of effects on land use and realty described in Section 4.13.10 of the 2015 Final EIS (BLM 2015a) would be the same as under this alternative.

4.7.2 Management Alignment Alternative

Adopting the changes proposed in the Management Alignment Alternative would result in boundary adjustments for where land use and realty allocations are applied. Given the relatively minor shift in PHMA (-0.5 percent) and GHMA (+0.5 percent), these changes would not result in discernible differences from the No-Action Alternative. The decrease in OHMA (-17 percent) would have negligible impacts on land use and realty, as there are limited allocation decisions tied to OHMA; therefore, the difference between the nature and type of impacts described would be negligible. These impacts are discussed in Section 4.13 of the 2015 Final EIS (BLM 2015a).

The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. The land use plan allocations associated with each HMA (**Table 2-2**) would be adjusted to align with the USGS map model, as updated (Coates et al. 2016). The allocation exception process would be updated and standardized, as described in **Table 2-2**, to allow for the consideration of projects within HMAs, provided they meet the prescribed criteria.

Adaptive management hard and soft triggers would be updated as summarized and described in **Table 2-2** and **Appendix E**. The mitigation standard (net conservation gain) would be retained in the Management Alignment Alternative and the No-Action Alternative, with additional clarification regarding implementation provided in Appendix F of the 2018 Draft RMPA/EIS. Seasonal timing restrictions and modifying Habitat Objectives (Table 2-2 of the 2015 ARMPA/ROD) indicators and values would be addressed in coordination with state wildlife agencies and other partners as described in **Table 2-2**. SFAs would not be designated under this alternative and therefore not recommended for withdrawal from location and entry under the Mining Law of 1872; however, they would still be managed according to their underlying habitat management area designation and associated allocations and management decisions (PHMA, GHMA, or OHMA).

4.7.3 Proposed Plan Amendment

Adopting the changes in the Proposed Plan Amendment would result in similar impacts on land use and realty resources as described in section 4.7.2 for the Management Alignment Alternative. The adjustments made between the Management Alignment Alternative and the Proposed Plan Amendment regarding adaptive management and seasonal timing restrictions would have no measurable effects on the land use and realty program.

4.8 IMPACTS ON RENEWABLE ENERGY RESOURCES

4.8.1 No-Action Alternative with the Inclusion of SFAs (No-Action Alternative)

The designation of SFAs would be specific to recommending lands for withdrawal from location and entry under the Mining Law of 1872. Because this would not alter the underlying allocations for renewable energy resources associated with Greater Sage-Grouse HMAs, the nature and type of effects on renewable energy resources described in Section 4.14.10 of the 2015 Final EIS would be the same as under this alternative.

4.8.2 Management Alignment Alternative

Adopting the changes proposed in the Management Alignment Alternative would result in boundary adjustments for where renewable energy allocations are applied. Given the relatively minor shift in

PHMA (-0.5 percent) and GHMA (+0.5 percent), these changes would not result in discernible differences from the No-Action Alternative. The decrease in OHMA (-17 percent) would make additional areas available for solar development in Nevada only, but this is not expected to result in increased development proposals based on the reasonably foreseeable development scenarios discussed in the 2015 Final EIS.

Therefore, the difference between the nature and type of impacts described would not be discernable without specific, new applications or project proposals, regarding development in those areas. These impacts are discussed in Section 4.14 of the 2015 Final EIS.

The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. The land use plan allocations associated with each HMA (**Table 2-2**) would be adjusted to align with USGS map model as updated (Coates et al. 2016). The allocation exception process would be updated and standardized, as described in **Table 2-2**, to allow for the consideration of projects within HMAs, provided they meet prescribed criteria.

Adaptive management hard and soft triggers would be updated as summarized and described in **Table 2-2** and **Appendix E**. The mitigation standard (net conservation gain) would be retained in the Management Alignment Alternative (and the No-Action Alternative), with additional clarification regarding implementation provided in Appendix F of the 2018 Draft RMPA/EIS. Seasonal timing restrictions and modifying Habitat Objectives (Table 2-2 of the 2015 ARMPA/ROD) indicators and values would be addressed in coordination with state wildlife agencies and other partners as described in **Table 2-2**. SFAs would not be designated under this alternative and therefore not recommended for withdrawal from location and entry under the Mining Law of 1872; however, they would still be managed according to their underlying habitat management area designation and associated allocations and management decisions (PHMA, GHMA, or OHMA).

4.8.3 Proposed Plan Amendment

Adopting the changes in the Proposed Plan Amendment would result in similar impacts on renewable energy resources as described in section 4.8.2 for the Management Alignment Alternative. The adjustments made between the Management Alignment Alternative and the Proposed Plan Amendment regarding adaptive management and seasonal timing restrictions would have no measurable effects on renewable energy resources.

4.9 Impacts on Minerals and Energy

4.9.1 No-Action Alternative with the Inclusion of SFAs (No-Action Alternative)

The nature and type of effects on leasable minerals (geothermal and oil and gas), salable minerals, and solid (non-energy) leasable minerals as described in Section 4.15.10 of the 2015 Final EIS would be the same. The inclusion of SFAs would be specific to recommending lands for withdrawal from location and entry under the Mining Law of 1872, which would not affect the land use allocations associated with leasable minerals.

The withdrawal of 2,767,552 acres of BLM-administered lands in Nevada from location and entry under the Mining Law of 1872 for a period of 20 years would reduce the estimated number of future mines and exploration projects in the state (BLM 2016b). Because this withdrawal would not apply to valid existing rights, the designation of SFAs is only expected to reduce the number of new mines from three down to one during the initial 20- year withdrawal. As identified in Table 4-7 of the 2016 SFA Draft EIS, exploration projects would see a sharper decline with the inclusion of SFAs, dropping from an estimated 78 new projects down to 32 during the initial 20-year withdrawal.

When compared with the Management Alignment Alternative, which does not include SFAs, the withdrawal of 2,767, 552 acres to locatable minerals would reduce access and availability of geology and mineral resources in Nevada because the number of new mines would be reduced by 33 percent and the number of exploration projects would be reduced by 41 percent (BLM 2016b). The reduction in mining activity would also result in socioeconomic impacts, which are discussed below in **Section 4.10.1**.

4.9.2 Management Alignment Alternative

Adopting the changes proposed in the Management Alignment Alternative would result in boundary adjustments for where minerals and energy allocations are applied. Given the relatively minor shift in PHMA (-0.5 percent) and GHMA (+0.5 percent), these changes would not result in discernible differences from the No-Action Alternative. The decrease in OHMA (-17 percent) would be negligible, as there are limited allocation decisions tied to OHMA; therefore, the difference between the nature and type of impacts described would be negligible. These impacts are discussed in Section 4.15 of the 2015 Final EIS.

The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. The land use plan allocations associated with each HMA (**Table 2-2**) would be adjusted to align with USGS map model as updated (Coates et al. 2016). The allocation exception process would be updated and standardized, as described in **Table 2-2**, to allow for the consideration of projects within HMAs, provided they meet prescribed criteria.

Adaptive management hard and soft triggers would be updated as summarized and described in **Table 2-2** and **Appendix E**. The mitigation standard (net conservation gain) would be retained in the Management Alignment Alternative (and the No-Action Alternative), with additional clarification regarding implementation provided in Appendix F of the 2018 Draft RMPA/EIS.

Seasonal timing restrictions and modifying Habitat Objectives (Table 2-2 of the 2015 ARMPA/ROD) would be addressed in coordination with state wildlife agencies and other partners as described in **Table 2-2**. SFAs would not be designated under this alternative and therefore not recommended for withdrawal from location and entry under the Mining Law of 1872; however, they would still be managed according to their underlying habitat management area designation and associated allocations and management decisions (PHMA, GHMA, or OHMA).

4.9.3 Proposed Plan Amendment

Adopting the changes in the Proposed Plan Amendment would result in similar impacts on minerals and energy resources as described in section 4.9.2 for the Management Alignment Alternative. The adjustments made between the Management Alignment Alternative and the Proposed Plan Amendment regarding adaptive management and seasonal timing restrictions would have no measurable effects on the minerals and energy program.

4.10 IMPACTS ON SOCIOECONOMICS

4.10.1 No-Action Alternative with the Inclusion of SFAs (No-Action Alternative)

The withdrawal of 2,767,552 acres of BLM-administered lands in Nevada from location and entry under the Mining Law of 1872 for a period of 20 years would have additional socioeconomic impacts beyond those described in Section 4.21 and 4.22 of the 2015 Final EIS. Based on the RFD scenario presented in the 2016 SFA Draft EIS, withdrawal would lead to broad economic impacts on the national and international mining industry (BLM 2016b). While extensive areas of BLM-administered lands in Nevada would remain open to mining, the mining industry could be adversely affected from having less potential locations to explore and develop.

The economic impacts in Nevada would differ considerably depending on whether the one new mine that was developed was a large gold/silver mine or a smaller barite mine. The best estimate is that future mines would support $133 million in annual output, 267 to 388 jobs, and between $20.5 and $35.7 million in annual labor income. Relative to the Management Alignment Alternative, which does not include SFAs, withdrawal would support between 414 to 739 fewer jobs in Nevada (primarily Elko, Humboldt, and Washoe Counties), and between $25.8 and $56.5 million less in annual labor income (BLM 2016b).

SFA designation would also reduce the number of exploration projects from 78 to 32 based on RFD scenarios for Nevada. As a result, exploration expenditures would be expected to fall by approximately 41 percent (approximately $3.8 million, as opposed to $9.1 million; BLM 2016b). The reduction in future mining operations could have tangible social impacts in Elko and Humboldt Counties. In particular, the potential reduction in future employment opportunities in the mining sector could lead to an increase in future unemployment and/or potential future out migration of some of the workers in that sector. Intangible social impacts from the SFA designation could be larger than the tangible social impacts, particularly outside of Elko and Humboldt Counties.

4.10.2 Management Alignment Alternative

Adopting the changes proposed in the Management Alignment Alternative, and not recommending SFAs for withdrawal, could lead to a corresponding increase in populations and employment for the counties that would see new mine development. Within the analysis area, the projected economic impacts from operation of future mines would result in 801 jobs, a labor income of $62 million, and approximately $12 million in state/local tax revenue. With the exception of not including SFAs, the difference between the nature and type of impacts described would be negligible given the similarity of the alternatives. These impacts are discussed in Section 4.21 of the 2015 Final EIS and 4.3.6 of the 2016 SFA Draft EIS (BLM 2016b).

The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. The land use plan allocations associated with each habitat management area (**Table 2-2**) would be adjusted to align with USGS map model as updated (Coates et al. 2016). The allocation exception process would be updated and standardized, as described in **Table 2-2**, to allow for the consideration of projects within Greater Sage-Grouse HMA, provided they meet prescribed criteria.

Adaptive management hard and soft triggers would be updated as summarized and described in **Table 2-2** and **Appendix E**. The mitigation standard (net conservation gain) would be retained in the Management Alignment Alternative (and the No-Action Alternative), with additional clarification regarding implementation provided in **Appendix E** (Adaptive Management).

Seasonal timing restrictions and modifying Habitat Objectives (Table 2-2 of the 2015 ARMPA/ROD) would be addressed in coordination with state wildlife agencies and other partners as described in **Table 2-2**. SFAs would not be designated under this alternative and therefore not recommended for withdrawal from location and entry under the Mining Law of 1872; however, they would still be managed according to their underlying habitat management area designation and associated allocations and management decisions (PHMA, GHMA, or OHMA).

4.10.3 Proposed Plan Amendment

Adopting the changes in the Proposed Plan Amendment would result in similar impacts on socioeconomics across the sub-region as described in section 4.10.2 for the Management Alignment Alternative. The adjustments made between the Management Alignment Alternative and the Proposed Plan Amendment regarding adaptive management and seasonal timing restrictions would be beneficial to state and local economies, as state and local administrative functions (in coordination with state wildlife agencies and other partners) may be permitted to move forward with shortened and/or waived seasonal timing restrictions, thus allowing these projects to occur in a more expeditious manner. In addition, threats to Greater Sage-Grouse habitat would be addressed in a more collaborative and expeditious manner based on the refinements outlined in the adaptive management strategy (**Appendix E**), which would benefit local economies that are impacted by similar threats such as wildfire and invasive plant species.

4.11 Impacts on Livestock Grazing

4.11.1 No-Action Alternative with the Inclusion of SFAs (No-Action Alternative)

The designation of SFAs would be specific to recommending lands for withdrawal from location and entry under the Mining Law of 1872. Because this would not alter the underlying allocations for livestock grazing associated with Greater Sage-Grouse HMAs, the nature and type of effects on livestock grazing described in Section 4.10.10 of the 2015 Final EIS would be the same as under this alternative.

4.11.2 Management Alignment Alternative

Despite minor differences between the actions described in the Management Alignment Alternative and those analyzed in the 2015 Final EIS, the difference between the nature and type of impacts described would be negligible. These impacts are discussed in Section 4.10 of the 2015 Final EIS.

The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. The land use plan allocations associated with each HMA (**Table 2-2**) would be adjusted to align with the USGS map model as updated (Coates et al. 2016). The allocation exception process would be updated and standardized, as described in **Table 2-2**, to allow for the consideration of projects within HMAs, provided they meet prescribed criteria.

Adaptive management hard and soft triggers would be updated as summarized and described in **Table 2-2** and **Appendix E**. The mitigation standard (net conservation gain) would be retained in the

Management Alignment Alternative (and the No-Action Alternative), with additional clarification regarding implementation provided in Appendix F of the 2018 Draft RMPA/EIS.

Seasonal timing restrictions and modifying Habitat Objectives (Table 2-2 of the 2015 ARMPA/ROD) would be addressed in coordination with state wildlife agencies and other partners as described in **Table 2-2**. SFAs would not be designated under this alternative and therefore not recommended for withdrawal from location and entry under the Mining Law of 1872; however, they would still be managed according to their underlying HMA designation and associated allocations and management decisions (PHMA, GHMA, or OHMA).

4.11.3 Proposed Plan Amendment

Adopting the changes in the Proposed Plan Amendment would result in similar impacts on livestock grazing as described in section 4.11.2 for the Management Alignment Alternative. The adjustments made between the Management Alignment Alternative and the Proposed Plan Amendment regarding adaptive management and seasonal timing restrictions would have no measurable effects on the livestock grazing program.

4.12 Impacts on Comprehensive Travel Management

4.12.1 No-Action Alternative with the Inclusion of SFAs (No-Action Alternative)

The designation of SFAs would be specific to recommending lands for withdrawal from location and entry under the Mining Law of 1872. Because this would not alter the underlying allocations for travel and transportation management associated with Greater Sage-Grouse HMAs, the nature and type of effects on travel and transportation management described in Section 4.12.10 of the 2015 Final EIS would be the same as under this alternative.

4.12.2 Management Alignment Alternative

Adopting the changes proposed in the Management Alignment Alternative would result in boundary adjustments for where travel and transportation allocations are applied. Given the relatively minor shift in PHMA (-0.5 percent) and GHMA (+0.5 percent), these changes would not result in discernible differences from the No-Action Alternative. The decrease in OHMA (-17 percent) would have negligible impacts on Comprehensive Travel Management, as there are limited allocation decisions tied to OHMA; therefore, the difference between the nature and type of impacts described would be negligible. These impacts are discussed in Section 4.12 of the 2015 Final EIS.

The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. The land use plan allocations associated with each habitat management area (**Table 2-2**) would be adjusted to align with the USGS map model as updated (Coates et al. 2016). The allocation exception process would be updated and standardized, as described in **Table 2-2**, to allow for the consideration of projects within HMAs, provided they meet the prescribed criteria.

Adaptive management hard and soft triggers would be updated as summarized and described in **Table 2-2** and **Appendix E**. The mitigation standard (net conservation gain) would be retained in the Management Alignment Alternative (and the No-Action Alternative), with additional clarification regarding implementation provided in Appendix F of the 2018 Draft RMPA/EIS. Seasonal timing restrictions and modifying Habitat Objectives (Table 2-2 of the 2015 ARMPA/ROD) would be addressed in coordination with state wildlife agencies and other partners as described in **Table 2-2**. SFAs would not be designated under this alternative and therefore not recommended for withdrawal from location and entry under the Mining Law of 1872; however, they would still be managed according to their underlying HMA designation and associated allocations and management decisions (PHMA, GHMA, or OHMA).

4.12.3 Proposed Plan Amendment

Adopting the changes in the Proposed Plan Amendment would result in similar impacts on comprehensive travel management as described in section 4.12.2 for the Management Alignment Alternative. The adjustments made between the Management Alignment Alternative and the Proposed Plan Amendment regarding adaptive management and seasonal timing restrictions would have no measurable effects on the comprehensive travel management program.

4.13 Cumulative Effects Analysis

This section presents the anticipated cumulative impacts on the environment that could occur from implementing the alternatives presented in **Chapter 2**. A cumulative impact is the impact on the environment that results from the incremental impact of the action, when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such actions.

Cumulative impacts can result from individually minor, but collectively significant actions taking place over time. The cumulative impacts resulting from the implementation of the alternatives in this Proposed RMPA/Final EIS may be influenced by other actions, as well as activities and conditions on other public and private lands, including those beyond the planning area boundary. These include the concurrent Forest Service planning effort to amend land management plans for National Forests in Idaho, Montana, Nevada, Utah, Colorado, and Wyoming, which were previously amended in September 2015 to incorporate conservation measures to support the continued existence of the Greater Sage-Grouse. As a result, the sum of the effects of these incremental impacts involves determinations that often are complex, limited by the availability of information and, to some degree, subjective.

This Proposed RMPA/Final EIS incorporates by reference the analysis in the 2015 Final EIS and the 2016 SFA Draft EIS, which comprehensively analyzed the cumulative impacts associated with these planning decisions under consideration in that process. The 2015 Final EIS, and to some degree the 2016 SFA Draft EIS evaluated the cumulative impacts associated with the No-Action Alternative in this Proposed RMPA/Final EIS. The Management Alignment Alternative's and Proposed Plan Amendment's impacts are effectively within the range of effects analyzed by the 2015 Final and 2016 SFA Draft EISs. The 2015 Final EIS is quite recent, and the BLM has determined that conditions in the Nevada and Northeastern California Sub-region have not changed significantly based, in part, on the USGS science review (see **Chapter 3**), as well the BLM's review of additional past, present, and reasonably foreseeable actions in 2018. Conditions on public land have changed little since the 2015 Final EIS, and to the extent that there have been new actions or developments, the impacts associated with those actions or developments are in line with the projections in the 2015 Final EIS regarding reasonably foreseeable future actions and effects. Additionally, changes that have occurred on a smaller scale, like wildfires, received prompt responses. Since the nature and context of the cumulative effects scenario has not appreciably changed since 2015, and the 2015 analysis covered the entire range of the Greater Sage-Grouse, the BLM's consideration of cumulative effects in the 2015 Final EIS adequately addresses most, if not all, of the planning decisions to be made through this planning effort.

While the cumulative impacts analysis in the 2015 Final EIS offers a comprehensive foundation for this planning effort, the BLM is improving upon that analysis by integrating additional quantitative analysis specific to this planning effort. The purpose of this additional analysis is to facilitate a comparison of allocation decisions between the No-Action and Management Alignment Alternatives and the Proposed Plan Amendment at scales beyond the individual planning areas associated with the 2018 amendment process. Our analysis focuses on the relevant changes in habitat delineations and allocation decisions each BLM state office is proposing and how those changes may impact our understanding of cumulative effects at the WAFWA MZ scale.

Conservation and management partners sought to work in advance of the 2015 USFWS listing decision to develop conservation objectives for the Greater Sage-Grouse that could help direct conservation and management actions for the species. Upon further review of the best available science and commercial information, the USFWS concluded in 2010 that the Greater Sage-Grouse warranted protection under the Endangered Species Act (ESA). Two factors leading to the decision to list the species as "warranted but precluded" were threats to habitat and the inadequacy of existing regulatory mechanisms. In 2012, at the request of the Sage Grouse Task Force team (SGTF), state and federal representatives produced a report that identified the most significant areas for Greater Sage-Grouse conservation, the principal threats within those areas, and the degree to which such threats need to be reduced or ameliorated to conserve the Greater Sage-Grouse so that it would not be in danger of extinction or likely to become so in the foreseeable future.

A principal component of Greater Sage-Grouse management is the implementation of mitigation actions to ameliorate the threats and impacts on Greater Sage-Grouse and its habitats. In 2015, the USFWS determined Greater Sage-Grouse was "not warranted" for listing under the ESA. The USFWS found that BLM's 2015 LUPs were adequate regulatory mechanisms and that the species no longer warranted listing under the ESA. At the time of that decision, the USFWS acknowledged the RMP requirements that compensatory mitigation achieve a net gain standard. The BLM is not proposing any action that would preclude proponents from offering compensatory mitigation; it is clarifying the BLM's reliance on voluntary compensatory mitigation consistent with federal law.

While the BLM has more than 90 RMPs, 9 strategies, and 45 agreements in active use that contain or address compensatory mitigation, the BLM has identified only limited implementation of compensatory mitigation consistent with the 2015 Greater Sage-Grouse Plans. Using data gathered in 2017, the BLM identified 13 Greater Sage-Grouse projects across 5 BLM states with a mandatory compensatory mitigation component or net gain standard implemented between October 2008 and June 2017. The most common compensatory mitigation actions used by the BLM in those cases were habitat restoration, habitat improvements, rangeland improvements, and invasive species control – actions consistent with the BLM's own investment in management actions as described previously. In many cases, it is still too soon in the implementation of these mitigation actions to measure the effectiveness or degree of benefit each action provides.

Currently BLM has six state-specific RMPA efforts that are all aligning compensatory mitigation with their relevant State authorities. All of the Proposed Plan Amendments modify the existing standard for compensatory mitigation, but maintain that the BLM would pursue conservation efforts as a broader planning goal and objective. Cumulatively, if the BLM is implementing planning decisions across the broader range, such actions would preclude any cumulative impacts from modifying the net conservation gain standard at the project level.

The BLM has updated certain data that it collected and evaluated in the 2015 Final EIS concerning the 2015 plan allocation decisions to reflect maintenance-related changes, adaptive management responses, and refined source data. The BLM used these data to represent the No-Action Alternative for the current plan analysis. The BLM also identified 2015 data which are not subject to change in any alternatives associated with the 2018 planning process. These data were carried forward as the alternative allocation decision data. The BLM also provided allocation decision data representing changes included in the Management Alignment Alternative in the Proposed RMPA/Final EIS, which were then used in the comparative analysis.

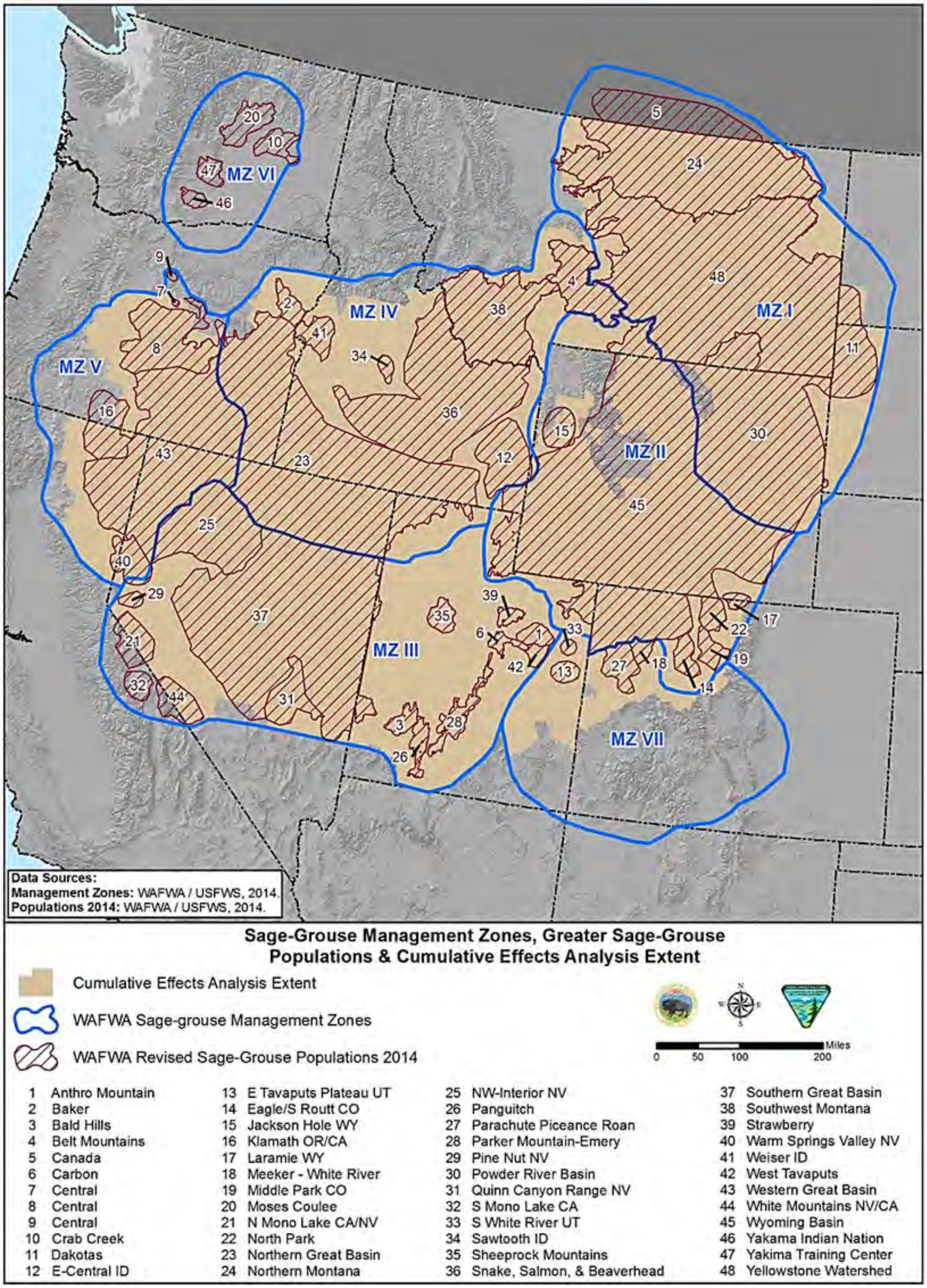
The BLM analyzed cumulative effects at two levels in the 2019 planning process. Each State analyzed cumulative effects across the Greater Sage-Grouse range by considering, for all BLM states, reasonably foreseeable future actions and their effects in every WAFWA Management Zone (MZ; excluding WAFWA MZ VI). Each state further analyzed cumulative effects at the WAFWA MZ level for their state. See **Sections 4.13.1** and **Appendix G** for the range wide analysis, which addresses the cumulative effects from reasonably foreseeable future actions across all WAFWA MZs, including those that do not connect directly to Nevada and California. See the Nevada/California WAFWA MZ analysis in **Sections 4.13.5, 4.13.6, and 4.13.7** below. Both analyses use WAFWA MZs. The Nevada/California WAFWA MZ analysis included MZs III, IV and V which include all or portions of Nevada, California, Oregon, Idaho, and Utah (**Figure 4-1**).

4.13.1 Range-wide Cumulative Effects Analysis - Greater Sage-Grouse

The 2015 ARMPA/ROD is the No-Action Alternative in this SEIS and was part of the cumulative impact analysis for Greater Sage-Grouse at the WAFWA MZ scale in the 2015 Final EIS (see Table 4-4 of the 2015 Final EIS). Additionally, the cumulative impacts anticipated from the Management Alignment Alternative and the Proposed Plan Amendment presented in this SEIS are entirely within the range of effects analyzed by the 2015 Final EIS. While the analysis for the 2015 Final EIS is quite recent, the BLM has reviewed conditions in Nevada and northeastern California to verify that they have not changed significantly. Conditions on BLM-administered lands have changed little since the 2015 Final EIS, and to the extent that there have been new actions or developments, the impacts associated with those actions or developments are in line with the projections in the 2015 Final EIS regarding reasonably foreseeable future actions and effects.

The BLM's assessment that conditions and cumulative impacts have not changed significantly is based, in part, on the USGS science review (see **Chapter 3**) and the BLM's review of additional past, present, and reasonably foreseeable actions in 2018. Since the nature and context of the cumulative effects scenario have not appreciably changed since 2015, and the 2015 plans included analysis by WAFWA MZ across the entire range of the Greater Sage-Grouse, the cumulative effects analysis in the 2015 Final EIS applies to this planning effort and provides a foundation for the BLM to identify any additional cumulative impacts.

Figure 4-1 – Cumulative Effects Analysis Extent, Sage-Grouse Management Zones and Populations



The remainder of this chapter and related appendices includes additional quantitative analysis using the existing cumulative impacts across the range and integrating additional quantitative analysis specific to this planning effort to provide a comprehensive range-wide view of cumulative impacts. The purpose of this additional analysis is to facilitate a comparison of allocation decisions between the No-Action and Management Alignment Alternatives and the Proposed Plan Amendment at scales beyond the individual planning areas associated with the 2018 amendment process. The analysis focuses on the relevant changes in habitat delineations and allocation decisions each BLM state office is proposing and how those changes may affect the understanding of cumulative effects at the WAFWA MZ scale across the Greater Sage-Grouse's range.

Under the Management Alignment Alternative, the recommendation to withdraw SFAs from location and entry under the Mining Law of 1872 would be removed, as the EIS process considering the proposed withdrawal was canceled on October 11, 2017. In its 2016 SFA Draft EIS, the BLM quantified the possible adverse effects from locatable mineral exploration and mining on the approximately 10 million acres of SFAs proposed for withdrawal, finding that they would be limited to approximately 9,000 acres rangewide of surface disturbance over 20 years, with approximately 0.58 percent of Greater Sage-Grouse male birds possibly affected per year. The other action alternatives evaluated in the 2016 SFA Draft EIS similarly demonstrated negligible benefit of the proposed withdrawal to Greater Sage-Grouse and its habitat.[1]

The cumulative effects of implementing the Management Alignment Alternative are as described in the 2016 SFA Draft EIS, under the No-Action Alternative, in which SFAs are not carried forward for withdrawal. Greater Sage-Grouse would not be affected as a result of the removal of the recommendation to withdraw SFAs from location and entry under the Mining Law of 1872, as the recommendation itself does not have any on-the-ground effects. Conservation benefits of a future withdrawal would be minimal, as documented in the 2016 SFA Draft EIS and as explained above; therefore, there would be negligible cumulative impacts associated with the decision to remove the SFA designation. The direct and indirect impact analysis specifically enumerates how each BLM allocation decision to apply NSO stipulations and waivers, exceptions, or modifications overlaps with the SFA designation.

4.13.2 Why Use the WAFWA Management Zone?

The WAFWA represents state and provincial fish and wildlife agencies and supports sound resource management and building partnerships to conserve wildlife for the use and benefit of all citizens, now and in the future. The BLM is analyzing habitats and allocation decisions at the scale of the six WAFWA-delineated Greater Sage-Grouse MZs within which the plan amendments are occurring to enable the decision maker to understand the impacts on Greater Sage-Grouse at a biologically meaningful scale. **Appendix G** includes a map that depicts the WAFWA MZs across the range of the Greater Sage-Grouse. The MZs were delineated based on floristic provinces (identified by Connelly et al. 2004) within which the vegetative communities comprising Greater Sage-Grouse habitat as well as the Greater Sage-

[1]Importantly, mining operations that do occur are subject to regulation under the BLM's surface management regulations at 43 CFR 3809. These regulations ensure that operators comply with environmental standards in conducting exploration, mining, and reclamation. For example, the BLM must approve a plan of operations for locatable mining operations on public lands, which includes compliance with the NEPA, National Historic Preservation Act, and ESA. Plans of operation must also include those measures to meet specific performance standards and to prevent unnecessary or undue degradation of the lands (43 CFR 3809.411).

Grouse populations are responding similarly to environmental factors and management decisions (Stiver et al. 2006).

The cumulative effects analysis area for Greater Sage-Grouse extends beyond a state, political, or planning area boundary to reflect the WAFWA MZs because they encompass areas with similar issues, threats, and vegetative conditions important Greater Sage-Grouse habitat management. Each suite of threats to specific Greater Sage-Grouse populations have been identified in the USFWS's 2013 Conservation Objectives Team (COT) Report, the 2015 Regional RODs (BLM 2015c), and the USFWS' 2010 Listing Decision. The 2015 Regional RODs (BLM 2015c) identify how planning level allocation decisions address the identified threats to populations, which are aggregated in this analysis by MZs. The threats vary geographically and may have more or less impact on Greater Sage-Grouse and its habitat in some parts of the MZs, depending on such factors as climate, land use patterns, and topography.

Table 4-5 shows the resource and location of applicable cumulative effects analysis from 2015 Final EIS. Unless otherwise addressed in this chapter, the cumulative effects of the alternatives analyzed in this SEIS are covered by the 2015 Final EIS and the 2016 SFA Draft EIS. This includes the incremental impacts across the range of BLM- and Forest Service-administered lands being amended in concurrent plan amendment efforts. See the 2015 Final EIS for additional information.

Table 4-5
Cumulative Effects Analysis Incorporated by Reference

Resource Topic	Location of Cumulative Effects Analysis and Updated Impacts Analysis
Greater Sage-Grouse	Chapter 5, Section 5.1 of the 2015 Final EIS and Chapter 4 of the 2016 SFA Draft EIS, Section 4.5.9. Additional information regarding Greater Sage-Grouse is included in **Chapter 4**, **Section 4.5**, of this SEIS.
Vegetation and Soils	Chapter 5, Section 5.4 of the 2015 Final EIS and Chapter 4 of the 2016 SFA Draft EIS, Section 4.4.9. Additional information regarding Vegetation and Soils is included in **Chapter 4**, **Section 4.6**, of this SEIS.
Land Use and Realty	Chapter 5, Section 5.12 of the 2015 Final EIS. Additional information regarding Land Use and Realty is included in **Chapter 4**, **Section 4.7**, of this SEIS.
Renewable Energy	Chapter 5, Section 5.13 of the 2015 Final EIS. Additional information regarding Renewable Energy is included in **Chapter 4**, **Section 4.8**, of this SEIS.
Minerals and Energy	Chapter 5, Section 5.14 of the 2015 Final EIS and Chapter 4 of the 2016 SFA Draft EIS, Section 4.2.9. Additional information regarding Minerals and Energy is included in **Chapter 4**, **Section 4.9**, of this SEIS.
Socioeconomics	Chapter 5, Section 5.19 of the 2015 Final EIS and Chapter 4 of the 2016 SFA Draft EIS, Section 4.3.13. Additional information regarding Socioeconomics is included in **Chapter 4**, **Section 4.10**, of this SEIS.
Livestock Grazing	Chapter 5, Section 5.9 of the 2015 Final EIS. Additional information regarding Livestock Grazing is included in **Chapter 4**, **Section 4.11**, of this SEIS.
Comprehensive Travel Management	Chapter 5, Section 5.11 of the 2015 Final EIS. Additional information regarding Comprehensive Travel Management is included in **Chapter 4**, **Section 4.12**, of this SEIS.

The sum of past, present, and reasonably foreseeable actions listed in **Appendix G** represent cumulative effects across the range of Greater Sage-Grouse habitat and HMAs. These effects are important to consider for future management of the species as a whole and are not solely being analyzed at the local or state level.

This section describes the threats to Greater Sage-Grouse and its habitat. The magnitude of change between the No-Action Alternative and Proposed Plan Amendment, by decision, is represented in pie charts and tables within this section and in **Appendix G**. Those effects, in addition to synthesizing the plan decisions and comparing the current condition to the condition that would be in effect when the proposed plans are finalized, allow for a comparison of the change in management direction within MZs and across planning regions.

Habitat fragmentation and disturbance from energy development, mining, and infrastructure remain the greatest threat to Greater Sage-Grouse in the Rocky Mountain region. Wildfire threat remains a concern in the Rocky Mountain Region and is the greatest threat to Greater Sage-Grouse in the Great Basin Region as well as invasive plant species. Between 2008 and 2018, wildfires burned an average of 900,000 acres per year in Greater Sage-Grouse habitat range-wide; this is within the range of projected wildland fire analyzed in the 2015 Final EIS. The BLM has committed resources to habitat restoration and has treated 1.4 million acres of Greater Sage-Grouse habitat range-wide over the past 5 years.

The interagency (including the BLM) WAFWA-led Wildfire and Invasive Species Working Group reviewed recent information for their May 2018 Gap Report Update to the Wildfire and Invasive Plant Species in the Sagebrush Biome: Challenges That Hinder Current and Future Management and Protection report (Mayer 2018). They found that all of the original challenges related to control and reduction of the invasive annual grass/fire cycle were still relevant (policy, fiscal, and science challenges) and they pointed to three new gaps involving program capacity, resource specialists, and developing guidelines on drought and climate adaption to manage sagebrush ecosystems.

The increased flexibility proposed in these Proposed Plan Amendments can allow for responsible development of other uses in Greater Sage-Grouse HMAs and may reduce costs to proponents but is not expected to result in a large increase in development proposals on public land. Similarly, the increased protections from the 2015 Final EIS have not resulted in a large decrease in right-of way (ROW) applications or an increase in rejected applications; therefore, the changes proposed under the Management Alignment Alternative and Proposed Plan Amendment are not expected to result in large changes to the rate of development across the range, or in its economy.

Some 350 obligate species of plants and wildlife rely on the sagebrush steppe ecosystems and coexist with Greater Sage-Grouse. They may be similarly affected by development or disturbance; however, nothing in the considered alternatives would lessen the BLM's authority or responsibility to provide for the needs of special status species, as described in BLM's land use plans, policies, and laws, including Manual 6840, the ESA, and FLPMA. Increased flexibility for other uses within Greater Sage-Grouse habitat does not necessarily increase potential impacts on other wildlife or plant species. Site-specific NEPA analysis, including an evaluation of impacts on special status species, is required for on-the-ground projects within the planning area.

4.13.3 Cumulative Effects on Greater Sage-Grouse: Management Zone I

In addition to the analysis in the 2015 Final EIS in Table 4-4, other anticipated incremental impacts are discussed below in association with planning issues being analyzed in this SEIS.

MZ I encompasses portions of Wyoming, Montana, North Dakota, and South Dakota. Montana is currently not undergoing a plan amendment process; therefore, none of the proposed changes described in this section apply to Greater Sage-Grouse in Montana. Under the Proposed Land Use Plan Amendments in WAFWA MZ I, PHMA and GHMA designations would not change from those identified in the No-Action Alternative. In addition, no changes in allocations are proposed in either of the planning areas in this MZ. Approximately 16 percent of the planning area across MZ I is designated as PHMA, and 38 percent is GHMA. Future adjustments to PHMA and GHMA in MZ I would be based on best available science and to align with the respective states' delineations for Greater Sage-Grouse HMAs.

Wyoming's current planning effort, and Montana's existing plans, incorporate management flexibility to allow for site specific adjustments to land use plan authorizations for adaptive management strategies, livestock grazing management, and other proposed land uses. The use and application of compensatory mitigation in the planning area would follow the respective State plans, resulting in greater consistency across the MZs. For these actions, cumulative impacts on Greater Sage-Grouse habitat and populations across MZ I would be consistent with those impacts described in the 2015 Final EISs for the then Proposed Plan Amendments. The currently Proposed Plan Amendment changes from the No-Action Alternative are minor, and still maintain prescriptive management for Greater Sage-Grouse habitat across the MZ for surface disturbing activities. Disturbance from energy development, mining, and infrastructure, as well as the resulting habitat fragmentation, remain the greatest threat to Greater Sage-Grouse in the Rocky Mountain Region. Because the land use prescriptions and allocations are not proposed for change in Wyoming's land use plan amendment, there would be no additional cumulative impact on Greater Sage-Grouse populations or habitat within MZ I.

A summary of potential cumulative impacts by proposed management action is presented below.

Impacts on Greater Sage-Grouse as a result of surface disturbance would likely be greater where development and disturbance are more intense and in areas where development overlaps sensitive habitats. The degree of impact would depend on the timing of development activities and whether the amount of development activity and disruption outpaces successful reclamation and revegetation efforts in disturbed areas. Increased flexibility for updating HMAs across MZ I would not result in any additive impacts on Greater Sage-Grouse and could result in beneficial impacts as a result of consistent management across the MZ. Any future modifications of HMAs would be documented using the appropriate level of NEPA if applicable, that would provide analysis regarding any potential impacts; however, because the underlying HMA allocations and the respective restrictions on those allocations put in place to conserve Greater Sage-Grouse would not change, and any proposed updates would reflect the most recent knowledge concerning Greater Sage-Grouse habitat utilization and distribution, there would be no appreciable additive impact from the implementation of this aspect on Greater Sage-Grouse habitat or population.

Approximately 99 percent of GHMA and PHMA habitat in MZ I is open to livestock grazing, and this is not proposed for change in Wyoming's proposed land use plan amendment; Montana is also not proposing any changes to livestock management at this time; therefore, no additional cumulative impacts beyond those identified in the 2015 Final EISs are anticipated. In general, livestock can influence habitat by modifying plant biomass, plant height and cover, and plant species composition. As a result, livestock grazing could cause changes in habitat. Changes in plant composition could occur in varying degrees and could change vegetation structure, affecting cover for nesting birds; however, grazing can be used to reduce fuel loads and reduce the risk of wildfire and can also be managed to reduce the spread of invasive grasses.

Much of the landscape in MZ I is adapted to withstand grazing disturbance, having been grazed by bison before the West was settled. In addition, the BLM has applied Standards for Rangeland Health since 1997 in order to enhance sustainable livestock grazing and wildlife habitat, while protecting watersheds and riparian ecosystems. Under proposed management in MZ I, the BLM would be able to adjust forage levels to meet rangeland health standards based on site-specific information that would inform livestock management decisions. While the Proposed Plan Amendment in Wyoming would remove the Greater Sage-Grouse specific language in Management Action 4 (see Table 2-1, Permit Renewals, in the 2018 Wyoming Proposed RMPA/Final EIS), the wildlife/special status species standards are emphasized. As Greater Sage-Grouse habitat would continue to be considered at the implementation level with site-specific analysis, following management prescriptions analyzed in the 2014 and 2015 Final EISs, no additive impact of this change is anticipated.

Adaptive Management, Mitigation, and Prioritization of Leasing

Similarly, no appreciable additive impacts are anticipated from Wyoming establishing a process whereby adaptive management actions are reviewed and reversed once the identified causal factor is resolved. This process would ensure that the BLM is utilizing the best available science and decision support tools to guide management at the appropriate spatial scale, thus improving the BLM's assessment and response to ever-changing conditions that could affect Greater Sage-Grouse populations and habitat. It would ensure that once causal factors are resolved, management reverts to pre-adaptive management actions. Because any specific response to tripping a hard or soft trigger would be based on the causal factors responsible, presuming a specific response to unknown future conditions would be speculative at best and not reasonably foreseeable. As Montana is not proposing to change any part of its adaptive management process, and Wyoming did not identify any additional direct or indirect impacts as a result of this proposed change, there are no additional cumulative impacts associated with the proposed changes to adaptive management implementation.

Under the Proposed Plan Amendment in Wyoming, language would be added to clarify how implementation-level decisions would be guided regarding mitigation and prioritization of fluid mineral leasing to better align with state conservation plans and management strategies. As identified in the direct and indirect effects section of this SEIS, impacts on Greater Sage-Grouse would be minor as a result of these changes and could include localized detrimental impacts in some areas and beneficial impacts in others, but they would not affect Greater Sage-Grouse conservation. As a result, there would be no appreciable additive impact from the implementation of these clarifications on Greater Sage-Grouse habitat or populations across MZ I.

The BLM's Proposed Plan Amendments in MZ I are also unlikely to preclude the reasonably foreseeable actions listed in **Appendix G** from proceeding. Some small, localized populations may be at continued risk due to reasonably foreseeable infrastructure and energy development projects over the next 20 years, when combined with unplanned events such as wildfires, drought, and an associated decline in Greater Sage-Grouse habitat quality; however, the Proposed Plan Amendments retain conservation measures that would be applied consistent with State management plans. They would continue proactive habitat restoration efforts being completed by private, local, state, and federal partners across the MZs, to adequately conserve and manage Greater Sage-Grouse habitat.

4.13.4 Cumulative Effects on Greater Sage-Grouse: Management Zone II/VII

In addition to the analysis in the 2015 Final EIS in Table 4-4, other anticipated incremental impacts are discussed below in association with planning issues being analyzed in this SEIS.

MZ II/VII encompasses portions of Wyoming, Colorado, Utah, Montana, and Idaho. Under the Proposed Plan Amendments in this MZ, PHMA would decrease by 1 percent and GHMA would decrease by 1 percent, compared to the acreage values in the No-Action Alternative. The proposed change in HMA acres reflects changes in Utah, where PHMA would be reduced by approximately 35,000 acres and GHMA (826,000 acres) would be removed in an effort to align with the Sage-Grouse Management Areas identified by the State of Utah. In Idaho, approximately 50,000 acres would change from PHMA to Important Habitat Management Area (IHMA) for population monitoring purposes as a result of a tripped adaptive management trigger; however, the habitat would continue to be managed as PHMA, which results in no net change to overall acreages included in the HMAs. Across this MZ, no other modifications to HMAs are currently proposed. Montana is currently not undergoing a plan amendment process; therefore, none of the proposed changes described in this section apply to Greater Sage-Grouse in Montana.

In Colorado, in the No-Action Alternative, PHMA within 1 mile of active leks is closed to leasing. The Proposed Plan Amendment would open PHMA within 1 mile of active leks to leasing, subject to NSO stipulations with restrictive criteria for waivers, exceptions, and modifications. Although this allocation change would make additional acres available to leasing, the impact on Greater Sage-Grouse and its habitat is likely to be minimal because surface disturbance, fragmentation, and indirect habitat loss would not be expected to increase due to restrictions on surface disturbance. Additionally, better coordination with the State provides more of an all-lands approach that, due to multiple jurisdictions with regulatory authority over land and mineral ownership, may result in better landscape-scale protections for Greater Sage-Grouse and its habitat.

For the remainder of the planning areas within MZ II and VII, RMP allocations tied to HMAs did not change between the No-Action and the Proposed Plan Amendment.

The decrease in PHMA and GHMA as a result of better alignment with the State of Utah's Greater Sage-Grouse management plan between the No-Action and the Proposed Plan Amendment would have negligible to minimal impacts on Greater Sage-Grouse and its habitat in the context of the entire MZ. The reduction of PHMA was associated with timbered mountains that do not include Greater Sage-Grouse habitat. The removal of GHMA in MZ II/VII effects populations where the BLM has very little decision space (surface or mineral estates) or areas with very small populations that are already heavily affected by existing oil and gas development resulting in infrastructure at a density above what science has indicated Greater Sage-Grouse need to persist. Additionally, the relevant distribution of land use plan allocations associated with these HMA changes would not significantly change (0-3 percent; see **Appendix G**).

The planning efforts being undertaken in this MZ would incorporate management flexibility in Colorado, Utah, and Idaho plans that would allow exceptions to allocation decisions similar to flexibility already in the Wyoming and Montana plans. These changes would allow for site-specific adjustments for land use authorizations based on site conditions. In addition, there would be adjustments to existing adaptive management strategies for all plans in this MZ. Within this MZ, all plans would remove the recommendation to withdraw SFAs from location and entry under the Mining Law of 1872, and they would make slight adjustments to habitat objectives, and Colorado and Idaho plans would identify new exceptions to seasonal timing restrictions to provide for consideration of site-specific conditions already present in the Utah, Wyoming and Montana plans.

Despite these actions, cumulative impacts on Greater Sage-Grouse populations and habitat across MZs II/VII would be consistent with those impacts identified in the 2015 Final EISs for the then Proposed Plan Amendments. The currently Proposed Plan Amendments changes from the No-Action Alternative would be minor. Disturbance from energy development, mining, and infrastructure, as well as the resulting habitat fragmentation, remain the greatest threat to Greater Sage-Grouse in the Rocky Mountain Region. Because the land use prescriptions within designated HMAs and the allocations associated with those HMAs are not being proposed for change in any plan in MZs II/VII, there would be no additional cumulative impacts on Greater Sage-Grouse across this MZ.

A summary of potential cumulative impacts by proposed management action is presented below.

Impacts on Greater Sage-Grouse as a result of surface disturbance would likely be greater where development and disturbance are more intense and in areas where development overlaps sensitive habitats. The degree of impact would depend on the timing of development activities and whether the amount of development activity and disruption outpaces successful reclamation and revegetation efforts in disturbed areas. Increased flexibility for updating HMAs across MZs II/VII would not result in any additive impacts on Greater Sage-Grouse and could result in beneficial impacts as a result of consistent management across the zone. Future modifications of HMAs would be documented using the appropriate level of NEPA analysis, if applicable, that would provide analysis regarding any potential impacts; however, because the underlying HMA allocations and the respective restrictions on those allocations put in place to conserve Greater Sage-Grouse would not change, and any proposed updates would reflect the most recent knowledge concerning Greater Sage-Grouse habitat utilization and distribution, there would be no appreciable additive impact from the implementation of this aspect on Greater Sage-Grouse habitat or population.

The allocation exception process would be updated in Colorado, Utah, and Idaho to simplify the various exemptions contained in the 2015 Final EIS. While the availability of exceptions to land use plan allocations attached to PHMA and GHMA could increase the possibility of leasing, permitting, or ground-disturbing activities within a given HMA, the established criteria would ensure that projects are either in unsuitable Greater Sage-Grouse habitat; do not result in direct, indirect, or cumulative impacts on Greater Sage-Grouse; benefit Greater Sage-Grouse or its habitat; or can be offset, with the exception of those needed for public health and safety. There would be no appreciable additive impact, therefore, from the implementation of this action on Greater Sage-Grouse or the resources/uses analyzed herein, as compared with the No-Action Alternative.

In MZ II/VII, approximately 216,000 acres of PHMA in Wyoming and 164,000 acres of PHMA in Utah were recommended for withdrawal from location and entry under the 1872 Mining Law in the current RMPs. This recommendation, if implemented through a future separate withdrawal action supported by its own NEPA analysis, would apply to approximately 3 percent of the MZ. The proposed change to the withdrawal recommendation itself would not have any on-the-ground effects; the conservation benefits of a future withdrawal would be minimal, as documented in the 2016 SFA Draft EIS and as explained above.

Approximately 99 percent of GHMA and PHMA in MZ II/VII is open to livestock grazing; this is not proposed for change in any states' Proposed Plan Amendments; therefore, no additional cumulative impacts beyond those identified in the 2015 Final EISs are anticipated. In general, livestock can influence habitat by modifying plant biomass, plant height and cover, and plant species composition. Improper livestock grazing could cause changes in habitat. Changes in plant composition could occur in varying degrees and could change the vegetation structure, affecting cover for nesting birds; however, proper grazing can be used to reduce fuel loads and reduce the risk of wildfire and can also be managed to reduce the spread of invasive grasses. Specific impacts on Greater Sage-Grouse habitat from livestock grazing are incorporated by reference from the 2015 Final EIS. All ongoing planning efforts in MZ II/VII would make slight adjustments to habitat objectives. In Wyoming and Utah, they would provide for more flexibility for making site-specific adjustments to livestock grazing management if the site-specific monitoring indicated adjustments were necessary.

Under the Proposed Plan Amendments, language would be added to clarify how some implementation level decisions, including mitigation, prioritization of fluid mineral leasing, disturbance caps, and clarification of required design features would be guided to better align with state conservation plans and management strategies. As identified in the direct and indirect effects section of this SEIS, impacts on Greater Sage-Grouse would be minor as a result of these changes and could include localized detrimental impacts in some areas and beneficial impacts in others, but would not cumulatively compromise Greater Sage-Grouse conservation efforts throughout the individual states. As a result, there would be no appreciable additive impact from the implementation of these clarifications on Greater Sage-Grouse habitat or populations across this MZ.

Similarly, no appreciable additive impacts are anticipated from updating the adaptive management process as described in the Proposed Plan Amendments. In Wyoming and Utah, this process would be updated at the implementation level to ensure that adaptive management actions are reviewed and reversed once the identified causal factor is resolved. In all states in this MZ, this update would ensure that the BLM is using the best available science and decision support tools to guide management at the appropriate spatial scale, thus improving the BLM's assessment and response to ever-changing conditions that could affect Greater Sage-Grouse populations and/or habitat. Because any specific response to tripping a hard or soft trigger would be based on the causal factors responsible, presuming a specific response to unknown future conditions would be speculative and not reasonably foreseeable.

In Idaho, removal of the project disturbance cap would not result in any changes to allocation decisions; rather, it would allow the BLM to cluster development in PHMA and IHMA only after meeting the anthropogenic disturbance screening criteria and the disturbance development criteria. Lek buffer modifications would also not result in any allocation changes. Some lek buffers would be increased as a result of the Proposed Plan Amendment, but, in some cases, the lek buffers may be smaller than those identified in the No-Action Alternative. The existing disturbance screening criteria and the disturbance development criteria, however, would highly restrict development activities in both PHMA and IHMA; therefore, the changes in lek buffer sizes would have no additive effect.

The BLM's Proposed Plan Amendments in MZ II/VII are also unlikely to preclude the reasonably foreseeable actions listed in **Appendix G** from proceeding. Some small, localized populations may be at continued risk due to reasonably foreseeable infrastructure and energy development projects over the next 20 years, when combined with unplanned events such as wildfire, drought, and an associated decline in Greater Sage-Grouse habitat quality. The Proposed Plan Amendments, however, retain conservation measures that would be applied consistent with State management plans. They continue proactive habitat restoration efforts being completed by private, local, state, and federal partners across the MZ, to adequately conserve and maintain Greater Sage-Grouse habitat.

The Rawlins Field Office in Wyoming approved a RMP Amendment for Visual Resource Management and the expansion of the Blowout Penstemon Area of Critical Environmental Concern (ACEC) during this Greater Sage-Grouse planning effort (BLM 2018c). The visual resource management decisions are implementation level decisions which would be applied on a project-specific basis and do not represent changes in allocations, thus would not have cumulative impacts for Greater Sage-Grouse in MZ II. The Blowout Penstemon ACEC has been expanded from approximately 17,000 acres to 29,000 acres (an increase of approximately 12,000 acres) and was originally established in the 2008 Rawlins RMP to protect the endangered blowout penstemon (*Penstemon haydenii*). The expanded ACEC is closed to new oil and gas leasing and is an exclusion area for wind energy development, as well as being closed to mineral material disposals. These management decisions are the only changes in allocations and would only impact a small portion of the Rawlins Field Office and MZ II. A small portion of the ACEC overlaps with Greater Sage-Grouse PHMA and these more restrictive land uses in the ACEC would serve to further protect Greater Sage-Grouse PHMA. There would be no additional cumulative impacts on Greater Sage-Grouse in MZ II as a result of the Rawlins RMP Amendment.

4.13.5 Cumulative Effects on Greater Sage-Grouse: Management Zone III

In addition to the analysis in the 2015 Final EIS in Table 4-4, other anticipated incremental impacts are discussed below in association with planning issues being analyzed in this SEIS.

This area encompasses portions of California, Nevada, and Utah. Under the Proposed Plan Amendments in Nevada, northeastern California, and Utah, PHMA would decrease by 1 percent, GHMA would decrease by 2 percent, and for Nevada and northeastern California only, OHMA would decrease by 2 percent, as compared to the acreages identified in the No-Action Alternative. The proposed change in HMA acres between the No-Action and the Proposed Plan Amendment in Nevada and northeastern California is based on adjustments made to habitat modeling used to delineate HMAs and improve alignment with the State of Nevada's delineations for HMAs, which the State of Nevada adopted in December 2015. In Utah, GHMA (approximately 860,000 acres) were removed in the Proposed Plan Amendment in an effort to align with the HMAs identified by the State of Utah. Following this HMA modification, planning-level allocation decisions have also been adjusted in the Proposed Plan Amendment to reflect the distribution of HMA in the Nevada and Northeastern California Sub-region.

In both planning areas within this MZ, land use plan allocations tied to HMAs did not change between the alternatives. The decrease in PHMA, GHMA, and OHMA within MZ III between the No-Action Alternative and the Proposed Plan Amendment would therefore have negligible to minimal impacts on Greater Sage-Grouse and its habitat in the context of the entire MZ. This is because the relevant distribution of land use plan allocations associated with these HMAs is not significantly changing (0-3 percent decrease; see **Appendix G**).

Both planning efforts' Proposed Plan Amendments in MZ III incorporate management flexibility that would allow exceptions to allocation decisions within PHMA, GHMA, and OHMA in Nevada and northeastern California. In both planning areas, it would allow for site specific adjustments for land use authorizations and adjustments to existing adaptive management strategies. Under both sets of Proposed Plan Amendments, the BLM would remove the recommendation to withdraw SFAs from location and entry under the Mining Law of 1872, make adjustments to habitat objectives, and identify exceptions or modifications to seasonal timing restrictions. The cumulative impacts of these proposed changes to Greater Sage-Grouse populations across MZ III would be consistent with the cumulative impacts analyzed and disclosed in the 2015 Final EISs. Moreover, these proposed changes, which focus on anthropogenic disturbances, would have only a minor or limited effect on efforts to manage and conserve Greater Sage-Grouse in this MZ, where wildfire, invasive plants, and conifer encroachment are the greatest threats to the Greater Sage-Grouse and its habitat.

The BLM's Proposed Plan Amendments in MZ III are also unlikely to preclude the reasonably foreseeable actions listed in **Appendix G** from proceeding. Some small, localized populations may be at continued risk due to the reasonably foreseeable future infrastructure and energy development projects over the next 20 years, when combined with unplanned events such as wildfires, drought, and an associated decline in Greater Sage-Grouse habitat quality. The Proposed Plan Amendments, however, retain conservation measures in combination with continued proactive habitat restoration efforts being completed by private, local, state, and federal partners across the MZ to adequately conserve and maintain Greater Sage-Grouse habitat.

A summary of potential cumulative impacts by proposed management action is presented below.

Under the Management Alignment Alternative and Proposed Plan Amendment, HMA boundaries in Nevada and northeastern California would be adopted or revised to incorporate the best available science (Coates et al. 2016). Because the underlying HMA allocations put in place to conserve Greater Sage-Grouse would not change, and these updates reflect the most recent knowledge concerning Greater Sage-Grouse habitat utilization and distribution, there would be no appreciable additive impact from the implementation of this aspect on Greater Sage-Grouse or the resources/uses analyzed herein.

Similarly, no appreciable additive impacts are anticipated from updating the adaptive management process as described in the Management Alignment Alternative and Proposed Plan Amendment. This update would ensure that the BLM is utilizing the best available science and decision support tools to guide management at the appropriate spatial scale, thus improving the BLM's assessment and response to ever-changing conditions that could affect Greater Sage-Grouse populations and habitat. Because any specific response to tripping a hard or soft trigger would be based on the causal factors responsible, presuming a specific response to unknown future conditions would be speculative at best and not reasonably foreseeable.

Under the Management Alignment Alternative and Proposed Plan Amendment, the allocation exception process would be updated to simplify the various exemptions contained in the 2015 Final EIS. While the availability of exceptions to land use plan allocations attached to PHMA and GHMA could increase the possibility of leasing, permitting, or ground-disturbing activities within a given HMA, the established criteria would ensure that projects are either in unsuitable Greater Sage-Grouse habitat; do not result in direct, indirect, or cumulative impacts on Greater Sage-Grouse; or can be offset, with the exception of those needed for public health and safety. There would be no appreciable additive impact, therefore, from the implementation of this action on Greater Sage-Grouse or the resources/uses analyzed herein, as compared with the No-Action Alternative.

Under the Management Alignment Alternative and Proposed Plan Amendment, language would be added to clarify how implementation level decisions would be guided regarding mitigation, seasonal timing restrictions, and modifying habitat objectives to better align with state conservation plans and management strategies. As these updates did not result in any new identifiable direct or indirect impacts, there would be no appreciable additive impact from the implementation of this aspect on Greater Sage-Grouse or the resources/uses analyzed herein, as compared with the No-Action Alternative.

4.13.6 Cumulative Effects on Greater Sage-Grouse: Management Zone IV

In addition to the analysis in the 2015 Final EIS in Table 4-4, other anticipated incremental impacts are discussed below in association with planning issues being analyzed in this SEIS.

MZ IV encompasses portions of Idaho, Nevada, Montana, Oregon, Utah, and a small portion of Wyoming. Under the Proposed Plan Amendment PHMA would decrease by 2 percent, IHMA would decrease by 0 percent, GHMA would decrease by 0 percent, and OHMA would decrease by 1 percent, as compared with the acreage identified in the No-Action Alternative. The proposed changes in HMA acres between the No-Action Alternative and the Proposed Plan Amendment in Nevada and Northeastern California Sub-region is based on adjustments made to habitat modeling used to delineate HMA and to improve alignment with the State of Nevada's delineations for HMA. In Idaho, minor proposed changes in HMAs are based on cleaning up habitat mapping errors, removing non-Greater Sage-Grouse habitat that is being managed as PHMA as a result of SFA designation in the 2015 Final EIS, and reallocating an area of PHMA to IHMA because there was no historic lek routes in the PHMA polygon. This made it impossible to apply the adaptive management framework in that polygon. HMA are not proposed to change in Wyoming, Utah, or Oregon in MZ IV.

The direct and indirect effects of proposed management changes in the Wyoming, Idaho, Utah, Nevada, California and Oregon Proposed Plan Amendments are disclosed in each state's Proposed RMPA/Final EISs. Change in allocation decisions is a better indicator to determine how changes across a MZ would affect Greater Sage-grouse populations; therefore, this cumulative effects analysis relied on changes in planning allocations as the metric to measure cumulative effects in MZ IV. See **Appendix G** for a description of MZ IV. Idaho comprises 50 percent of the MZ while Wyoming only comprises 0.3 percent.

In all planning areas within MZ IV, land use plan allocations tied to HMA would not change between the No-Action and Proposed Plan Amendment. The decrease in PHMA, GHMA, and OHMA within MZ IV between the No-Action Alternative and the Proposed Plan Amendment would therefore have negligible to minimal impacts on Greater Sage-Grouse and its habitat in the context of the entire MZ, as the relevant distribution of land use plan allocations associated with these HMAs is not significantly changing (0-2 percent, see **Appendix G**).

Each planning efforts' Proposed Plan Amendment in MZ IV incorporate management flexibility that would allow exceptions to allocation decisions within HMA and would allow for site specific adjustments for land use authorizations and adjustments to existing adaptive management strategies. Under all

Proposed Plan Amendments, the BLM would remove the recommendation to withdraw SFAs from location and entry under the Mining Law of 1872, make adjustments to habitat objectives, and identify new exceptions to seasonal timing restrictions. The cumulative impacts of these proposed changes on Greater Sage-Grouse populations across MZ IV would be consistent with cumulative impacts described in the 2015 Final EIS. Moreover, these proposed changes, which focus on anthropogenic disturbances, would have only a minor or limited effect on efforts to manage and conserve Greater Sage-Grouse in this MZ, where wildfire, invasive plants, and conifer encroachment are greater threats to the Greater Sage-Grouse and its habitats.

The BLM's Proposed Plan Amendments in the MZ are also unlikely to preclude the reasonably foreseeable actions listed in **Appendix G** from proceeding. Some small, localized populations may be at continued risk due to reasonably foreseeable future infrastructure and energy development projects over the next 20 years, when combined with unplanned events such as wildfires, drought, and associated decline in Greater Sage-Grouse habitat quality; however, the Proposed Plan Amendments retain conservation measures in combination with continued proactive habitat restoration efforts being completed by private, local, state, and federal partners across the MZ to adequately conserve and manage Greater Sage-Grouse habitats.

A summary of potential cumulative impacts by proposed management action is presented below.

The proposed plans vary from state to state as does each state contribution to MZ IV. Montana is not engaging in an amendment process therefore they would not be contributing to any cumulative effects. Wyoming has approximately 4,000 acres of PHMA and 20,000 Acres of GHMA within MZ IV making their potential contribution to cumulative effects within the 80 million acre MZ IV negligible.

The portion of Utah that is within MZ IV is an isolated area with little or no development potential for fluid minerals and is predominantly used for livestock grazing. The reasonably foreseeable development scenario for the area predicts zero wells. The changes proposed in Utah's proposed plan would have no additive effect on Greater Sage-Grouse habitats within MZ IV.

The Oregon RMPA would change access on 21,959 acres in all or portions of key Research Natural Areas (RNAs) from unavailable to grazing to available for grazing. No other States within MZ IV are proposing changes to grazing allocation decisions. This change would not add measurably to other actions occurring within the approximately 80 million acres in MZ IV.

The area of MZ IV that includes Utah is extremely isolated. The dominant use is grazing. Grazing management would follow rangeland health. Changes to Utah's **Table 2-2** that incorporate local science would benefit Greater Sage-Grouse and ensure that grazing management is conducted properly and would not add cumulatively to Greater Sage-Grouse effects. The area continues to be a ROW avoidance area and is closed to wind energy development. The reasonably foreseeable development scenario for the area predicts zero wells so the change to limited exceptions waivers and modifications are moot. The changes proposed in Utah's proposed plan would not add measurably to other actions occurring within the approximately 80 million acres in MZ IV.

Nevada and Northeastern California's proposed plan would revise the habitat management area boundaries to incorporate the best available science (Coates et al. 2016), but would not change the allocations associated with each HMA. Nevada and Northeastern California would also update its adaptive management process to ensure that the BLM is utilizing the best available science and decision support tools to guide management at the appropriate spatial scale. These changes would not be measurably different compared to other actions occurring in MZ IV.

In Idaho, removal of the project disturbance cap would not result in any changes to allocation decisions; rather, it would allow the BLM to cluster development in PHMA and IHMA only after meeting the anthropogenic disturbance screening criteria and the disturbance development criteria. Lek buffer modifications would also not result in any allocation changes. Some lek buffers would be increased as a result of the Proposed Plan Amendment, but, in some cases, the lek buffers may be smaller than those identified in the No-Action Alternative. The existing disturbance screening criteria and the disturbance development criteria, however, would ensure that impacts from development activities in both PHMA and IHMA would not result in a net loss to Greater Sage-Grouse habitat.

Within MZ IV, Oregon would retain its SFA designations while Idaho and Nevada would remove SFA designations. Under the proposed plan in Idaho and Nevada, the NSO stipulation without waivers, exceptions and modifications would change to NSO with limited exceptions. The exception criteria could ensure that projects are either in unsuitable Greater Sage-Grouse habitat; do not result in direct, indirect, or cumulative impacts on Greater Sage-Grouse; or can be offset, with the exception of those needed for public health and safety. There would be no appreciable additive impact, therefore, from the implementation of this action on Greater Sage-Grouse or the resources/uses analyzed herein, as compared with the No-Action Alternative.

Under the proposed plan, language would be added to clarify how implementation level decisions would be guided regarding mitigation, seasonal timing restrictions, and modifying habitat objectives to better align with state conservation plans and management strategies. As these updates did not result in any new identifiable direct or indirect impacts, there would be no appreciable additive impact from the implementation of this aspect on Greater Sage-Grouse or the resources/uses analyzed herein, as compared with the No-Action Alternative.

4.13.7 Cumulative Effects on Greater Sage-Grouse: Management Zone V

In addition to the analysis in the 2015 Final EIS in Table 4-4, other anticipated incremental impacts are discussed below in association with planning issues being analyzed in this SEIS.

MZ IV encompasses portions of California, Oregon and Nevada. All proposed changes to HMAs and recommended SFAs for withdrawal within this MZ occur in Nevada and northeastern California. The Oregon amendment did not propose any changes in the extent of PHMA or GHMA. Oregon removed the recommendation for a withdrawal of SFA under a plan maintenance action in May 2018, prior to the start of the 2019 planning process. That action resulted in no difference between No-Action and Management Alignment Alternatives and the Proposed Plan Amendment in terms of withdrawals.

Under the Proposed Plan Amendment in Nevada and northeastern California, PHMA would decrease by 1 percent, GHMA would decrease by 2 percent, and for Nevada and northeastern California only, OHMA would decrease by 2 percent, as compared with the acreages identified in the No-Action Alternative. The proposed change in HMA acres between the No-Action Alternative and the Proposed Plan Amendment in Nevada and northeastern California is based on adjustments made to habitat modeling used to delineate HMA and improve alignment with the State of Nevada's delineations for HMA, which the State of Nevada adopted in December 2015. Following this HMA modification, planning level allocation decisions have also been adjusted to reflect the distribution of habitat in Nevada and Northeastern California Sub-region. Future adjustments to HMA in Nevada and Northeastern California would be based on best available science and to align with the respective states' delineations for Greater Sage-Grouse habitat.

In Oregon, the only proposed decision under the Management Alignment Alternative and Proposed Plan Amendment would retain livestock grazing within key Research Natural Areas. The Management Alignment Alternative and Proposed Plan Amendment would result in allowing livestock grazing on 21,959 acres within the Oregon planning area. In the context of the entire MZ, this change would have negligible to no effects on Greater Sage-Grouse populations. Well-managed grazing practices are compatible with sagebrush ecosystems and Greater Sage-Grouse persistence.

A summary of potential cumulative impacts by proposed management action is presented below.

Under the Nevada and northeastern California Proposed Plan Amendment, the Management Alignment Alternative and Proposed Plan Amendment would increase PHMA by less than 1 percent, decrease GHMA by 1 percent and decrease OHMA by 2 percent. This change in HMA acres between the No-Action and Management Alignment Alternative and Proposed Plan Amendment would be the result of improved habitat modeling used to delineate HMAs using the best available science and to align with the State of Nevada's delineations for HMA (adopted by the State of Nevada in December 2015). Following this HMA modification, planning level allocation decisions have also been adjusted to reflect the distribution of habitat in Nevada and northeastern California.

The Management Alignment Alternative and Proposed Plan Amendment for the Nevada and Northeastern California Sub-region would also remove the recommendation for a withdrawal in the SFA; allow exceptions to allocation decisions within PHMA, GHMA, and OHMA; modify the existing adaptive management strategy; make adjustments to habitat objectives; and identify exceptions to seasonal timing restrictions. Removing the recommendation to withdraw SFAs from location and entry under the Mining Law of 1872 would result in a 3 percent decrease of acres recommended for withdrawal (see **Appendix G**). The largest percent allocation change between the alternatives within the MZ would be consistent with those impacts described in the 2015 Final EIS for the then Proposed Plan Amendments because the Management Alignment Alternatives and Proposed Plan Amendment changes from the No-Action Alternative are minor and deal largely with anthropogenic disturbances. The greatest threats to populations in this MZ would remain wildfire, invasive plants, and conifer encroachment.

The decreases in GHMA and OHMA within MZ V between the No-Action Alternative and Management Alignment Alternative and Proposed Plan Amendment would therefore have negligible to no effect on Greater Sage-Grouse populations and their habitat in the context of the entire MZ, as the relevant distribution of land use plan allocations associated with these HMAs would result in an estimated 2.5 to 3 percent decrease, all within Nevada and northeastern California (see **Appendix G**).

The BLM's Proposed Plan Amendments in MZ V are unlikely to preclude the reasonably foreseeable actions listed in **Appendix G** from proceeding. Overall, the Proposed Plan Amendments retain conservation measures in combination with continued proactive habitat restoration efforts being completed by private, local, state, and federal partners across the MZ; however, smaller populations, particularly those at the edge of the species range, would remain at highest risk of extirpation (Aldridge et al. 2008; Garton et al. 2011), which the reasonably foreseeable actions may exacerbate as unplanned events such as wildfire, drought, and other natural disturbances lead to declines in Greater Sage-Grouse habitat quality.

Under the Management Alignment Alternative and Proposed Plan Amendment, HMA boundaries in the Nevada and Northeastern California Sub-region would be adopted or revised to incorporate the best available science (Coates et al. 2016). Because the underlying HMA allocations put in place to conserve Greater Sage-Grouse would not change, and these updates reflect the most recent knowledge concerning Greater Sage-Grouse habitat use and distribution, there would be no appreciable additive impact from the implementation of this aspect on Greater Sage-Grouse or the resources/uses analyzed herein.

Similarly, no appreciable additive impacts are anticipated from updating the adaptive management process as described in the Management Alignment Alternative and Proposed Plan Amendment. This update would ensure that the BLM is utilizing the best available science and decision support tools to guide management at the appropriate spatial scale, thus improving the BLM's assessment and response to ever-changing conditions that could affect Greater Sage-Grouse populations and habitat. Because any specific response to tripping a hard or soft trigger would be based on the causal factors responsible, presuming a specific response to unknown future conditions would be speculative at best and not reasonably foreseeable.

Under the Management Alignment Alternative and Proposed Plan Amendment, the allocation exception process would be updated to simplify the various exemptions contained in the 2015 Final EIS. While the availability of exceptions to land use plan allocations attached to PHMA and GHMA could increase the possibility of leasing, permitting, or ground-disturbing activities within a given HMA, the established criteria would ensure that projects are either in unsuitable Greater Sage-Grouse habitat; do not result in direct, indirect, or cumulative impacts on Greater Sage-Grouse; or can be offset, with the exception of those needed for public health and safety. There would be no appreciable additive impact from the implementation of this action on Greater Sage-Grouse or the resources/uses analyzed herein, as compared with the No-Action Alternative.

Under the Management Alignment Alternative and Proposed Plan Amendment, language would be added to clarify how implementation-level decisions would be guided regarding mitigation, seasonal timing restrictions, and modifying habitat objectives to better align with state conservation plans and management strategies. As these updates did not result in any new identifiable direct or indirect impacts, there would be no appreciable additive impacts from the implementation of this aspect on Greater Sage-Grouse or the resources/uses analyzed herein, as compared with the No-Action Alternative.

4.14 Irreversible and Irretrievable Commitment of Resources

Section 102(2)(C) of NEPA requires a discussion of any irreversible or irretrievable commitments of resources from an alternative, should it be implemented. An irreversible commitment of a resource is one that cannot be reversed, such as the extinction of a species or loss of a cultural resource site without proper documentation. An irretrievable commitment of a resource is one in which the resource or its use is lost for a period of time, such as extraction of oil and gas. Should oil and gas deposits underlying Greater Sage-Grouse habitat be extracted, that oil and gas resource would be lost.

4.15 Unavoidable Adverse Impacts

Section 102(C) of the NEPA requires disclosure of any adverse environmental impacts that could not be avoided should the proposal be implemented. Unavoidable adverse impacts are those that remain following the implementation of mitigation measures, or impacts for which there are no mitigation measures. Some unavoidable adverse impacts may occur from implementing this SEIS; others are a result of public use of BLM-administered lands in the planning area.

This section summarizes major unavoidable impacts discussions of the impacts of each management action (in the discussion of alternatives) and provides greater information on specific unavoidable impacts.

Surface-disturbing activities could result in unavoidable adverse impacts. Although these impacts would be mitigated to the extent possible, unavoidable impacts would be inevitable under both the No-Action and Management Alignment alternatives and the Proposed Plan Amendment.

Impacts from permanent conversion of areas to other uses, such as transportation and mineral and energy development or off-highway vehicle use, would be greater under the Management Alignment Alternative and Proposed Plan Amendment, but overall minimal for both alternatives. The No-Action and Management Alignment Alternatives and the Proposed Plan Amendment would place restrictions on many types of development, which would most likely result in fewer visual intrusions and fewer instances of unavoidable wildlife habitat loss.

Wildlife, livestock, wild horses and burros, and other herbivores consume vegetation and affect soils through hoof action and possible compaction. When these impacts are kept at appropriate levels, natural processes such as plant growth and recovery, freeze-thaw periods, and microbial activity in the soil surface result in the recovery from these impacts and maintain site stability and health. Vegetation treatments promoting recovery of Greater Sage-Grouse habitats would result in the destruction of the target species, be it annual grass, noxious weed, or encroachment of juniper. Some level of competition for forage between wildlife, livestock, and wild horses would occur. Instances of displacement, harassment, and injury to these species could also occur. The No-Action and Management Alignment Alternatives and the Proposed Plan Amendment would place restrictions on development and surface-disturbing activities, which would minimize the likelihood of displacement, harassment, and/or injury.

Development of mineral resources and general use of the decision area would introduce additional ignition sources into the planning area, which would increase the probability of wildland fire and the need for its suppression. These activities, combined with continued fire suppression, would also affect the overall composition and structure of vegetation communities; this could increase the potential for high-intensity wildland fires. Restrictions on development under both alternatives would be expected to decrease the potential for ignitions in the decision area; however, impacts would be greater under the No-Action Alternative.

Numerous land use restrictions imposed throughout the decision area to protect Greater Sage-Grouse habitat and other important values, by their nature, affect the ability of operators, individuals, and groups who use the public lands to do so without limitations. Although attempts would be made to minimize these impacts, unavoidable adverse impacts could occur under the No-Action and Management Alignment Alternatives and the Proposed Plan Amendment.

4.16 Relationship Between Local Short-Term Uses and Long-Term Productivity

Section 102(C) of NEPA requires a discussion of the relationship between local, short-term uses of human environment and the maintenance and enhancement of long-term productivity of resources. As described in the introduction to this chapter, short-term is defined as anticipated to occur within the first 5 years of implementation of the activity and long-term as lasting beyond 5 years to the end of or beyond the life of this SEIS.

Surface-disturbing activities, including transportation and utility corridor construction, and mineral resource development would result in the greatest potential for impacts on long-term productivity. Management prescriptions and required design features (RDFs) are intended to minimize the effect of short-term commitments and to reverse changes over the long-term. These prescriptions and the associated reduction of impacts would be greater under the No-Action Alternative for resources such as vegetation and wildlife habitat; however, some impacts on long-term productivity might occur, despite the prescriptions intended to reduce impacts on Greater Sage-Grouse and its habitat.

Rights of ways (ROWs) and short-term use of an area to foster energy and mineral development would result in long-term loss of soil productivity and vegetation diversity. Impacts would persist as long as surface disturbance and vegetation loss continue. In general, the loss of soil productivity would be directly at the point of disturbance; even so, long-term vegetation diversity and habitat value could be reduced due to fragmentation and the increased potential for invasive species to spread from the developments or disturbances. The No-Action and Management Alignment Alternatives and the Proposed Plan Amendment would provide for long-term productivity through restrictive allocations that limit development in many areas and through the application of other restrictions on development, such as disturbance caps, RDFs, and other management prescriptions.

ROWs and the short-term use of Greater Sage-Grouse habitat for energy and mineral development could impair the long-term productivity of Greater Sage-Grouse and its habitat and that of other species. This could occur by displacing the species from primary habitats and removing components of these habitats that might not be restored for 20 years or longer. These short-term uses could also affect the long-term sustainability of some special status species. The potential for these impacts, however, would be minimal under the No-Action and Management Alignment Alternatives and the Proposed Plan Amendment. The short-term resource uses associated with mineral development (oil and gas seismic exploration, natural gas test well drilling, and the noise associated with these activities) would have adverse impacts on the long-term productivity of Greater Sage-Grouse and its habitat. This would be the case if these resource uses were to infringe on Greater Sage-Grouse seasonal habitats such as lekking, nesting, brood-rearing, and winter habitats. These activities, though short term individually, could have collective long-term impacts on Greater Sage-Grouse and its habitat if they were to increase in the long-term.

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Chapter 5. Consultation and Coordination

5.1 Public Involvement During the 2020 NEPA Process

5.1.1 Public Comments on the DSEIS

The BLM accepted comments on the DSEIS for 90 days after the NOA publishes in the *Federal Register*.

5.2 American Indian Tribal Consultation

Various federal laws require the BLM to consult with American Indian tribes during the NEPA process. This section documents the specific consultation and coordination undertaken throughout the process of developing the 2018 Final EIS. No new consultation is being initiated because no new decisions are being considered as the FSEIS solely updates NEPA analysis to clarify the approach taken in the 2018 Final EIS.

In addition to formal government-to-government consultations, in the fall of 2017, the Nevada and California BLM mailed letters to the tribes listed below, inviting them to participate as a cooperating agency in the planning process.

- Pahrump Paiute Tribe
- Paiute-Shoshone Tribe of the Fallon Reservation and Colony, Nevada
- Pit River Tribe of California
- Pyramid Lake Paiute Tribe of the Pyramid Lake Reservation, Nevada
- Reno-Sparks Indian Colony
- Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada
- Summit Lake Paiute Tribe
- Susanville Indian Rancheria
- Te-Moak Tribe of Western Shoshone Indians of Nevada
- Walker River Paiute Tribe of the Walker River Reservation, Nevada
- Washoe Tribe of Nevada and California
- Winnemucca Indian Colony of Nevada
- Yerington Paiute Tribe of the Yerington Colony and Campbell Ranch, Nevada
- Yomba Shoshone Tribe of the Yomba Reservation, Nevada

The Duckwater Shoshone Tribe of the Duckwater Reservation, Walker River Paiute Tribe of the Walker River Reservation, and the Washoe Tribe of Nevada and California formally accepted the Nevada and California BLM's invitation to be cooperating agencies. The Washoe Tribe of Nevada and California executed a Memorandum of Understanding (MOU) with the Nevada and California BLM to be a cooperating agency and also attended and participated in the cooperating agency meeting held on March 21, 2018. On March 28, 2018, Nevada and California BLM followed up (via email) with those tribes that did not respond to the fall invitation to become cooperators.

5.3 List of Preparers

An interdisciplinary team of staff from the BLM, in collaboration with Environmental Management and Planning Solutions, Inc. prepared the SEIS.

Name	Role/Responsibility
Jonathan Beck	Team Lead
Ryan Hathaway	Team Lead *(former)*
J. Vaca	Wildlife Biologist
Arlene Kosic	California Greater Sage-Grouse Implementation Lead
Carolyn Sherve	NV Greater Sage-Grouse Implementation Coordinator (detail)
Matt Magaletti	Acting Supervisor, Great Basin NEPA Support Team, Reno

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Glossary

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. The results are used to modify management policy, strategies, and practices.

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.

Anthropogenic Disturbance. The direct loss or fragmentation of habitat due to human development and increased human activity causing the displacement of individuals through avoidance behavior (Holloran 2005).

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.

Best Management Practices (BMPs). A suite of techniques that guide or may be applied to management actions to aide 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 within Greater Sage-Grouse habitat that contains relevant and important habitats that are used as the basis for comparative calculations to support evaluation of changes to habitat and populations. For adaptive management (A**ppendix D**) BSUs are defined as nested lek clusters with similar climate and vegetation conditions.

Breeding Habitat. Habitats utilized by Greater Sage-Grouse for leks, pre-laying, nesting, and early brood-rearing.

Compensatory Mitigation. Compensating for the residual impacts by replacing or providing substitute resources or environments (40 CFR 1508.20).

Connectivity. The degree to which habitats for a species are continuous or interrupted across a spatial extent. Habitats defined as continuous are within a prescribed distance over which a species can successfully conduct key activities (e.g., effective dispersal distances of seeds or juveniles and mean distances moved for foraging, nesting, and brood-rearing). Habitats defined as interrupted are outside the prescribed distance (Wisdom et al. 2003).

Controlled Surface Used (CSU). 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.

Cooperating Agency. Assists the lead federal agency in developing an environmental assessment or environmental impact statement. These can be any agency with jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6). Any tribe or federal, state, or local government jurisdiction with such qualifications may become a cooperating agency by agreement with the lead agency.

Council on Environmental Quality (CEQ). An advisory council to the President of the US established by the National Environmental Policy Act of 1969. It reviews federal programs to analyze and interpret environmental trends and information.

Cumulative Effects. The direct and indirect effects of a proposed project alternative's incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action.

Decision Area. Public lands and mineral estate managed by the US Department of Interior, Bureau of Land Management that are within the planning area and are encompassed by all designated habitat.

Direct Impacts. Direct impacts are caused by an action or implementation of an alternative and occur at the same time and place.

Disturbance. Any relatively discrete event in time that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment (White and Pickett 1985). See also *Anthropogenic Disturbance.*

Early Brood-Rearing Habitat. Upland sagebrush sites relatively close to nest sites, typically characterized by high species richness, with an abundance of forbs and insects, where Greater Sage-Grouse hens raise chicks fewer than 21 days old (Connelly et al. 2000). Optimum early brood-rearing habitat consists of sagebrush stands and an herbaceous understory of grasses and forbs.

Ecological Site (ES). A conceptual division of the landscape that is defined as a distinctive kind of land, based on recurring soil, landform, geological, and climate characteristics. It differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and to respond similarly to management actions and natural disturbances (Caudle et al. 2013).

Ecological Site Descriptions (ESD). The documentation of the characteristics of an ecological site. It includes the data used to define the distinctive properties and characteristics of the ecological site; the biotic and abiotic characteristics that differentiate the site (i.e., climate, physiographic, and soil characteristics and plant communities); and the ecological dynamics of the site that describes how changes in disturbance processes and management can affect the site. An ESD also provides interpretations about the land uses and ecosystem services that a particular ecological site can support and management alternatives for achieving land management.

Ecological Site Potential. The plant community that can be supported in an area, given its edaphic[1] and climatic potential (Habich 2001).

Environmental Impact Statement (EIS). A detailed statement prepared by the responsible official in which a major federal action that significantly affects the quality of the human environment is described, alternatives to the proposed action are provided, and effects are analyzed.

Fluid Minerals. Oil, gas, coal bed natural gas, and geothermal resources.

General Habitat Management Area(s) (GHMA). An area that is likely to be occupied seasonally or year-round outside of a Priority Habitat Management Area and where management would apply to sustain the Greater Sage-Grouse populations. GHMA may include active leks, seasonal habitats, and fragmented or marginal habitat.

Geographic Information System (GIS). Computer hardware, software, data, people, and applications that capture, store, edit, analyze, and display a potentially wide array of geospatial information.

Habitat. An area with a combination of resources (such as space, food, cover, and water) and environmental conditions (such as temperature, precipitation, and the presence or absence of predators and competitors) that promotes occupancy by individuals of a given species and allows those individuals to survive and reproduce (Morrison et al. 1998).

Habitat Fragmentation. When connected natural areas are disjointed by habitat removal or converted to urban or agricultural land or physical barriers, such as fences and roadways, are constructed. Habitat fragmentation bisects the landscape and leaves smaller, more isolated land for wildlife, causing local and population level changes to native flora and fauna.

Habitat Management Area(s) (HMA). The spatial extent of Greater Sage-Grouse habitat management areas in Nevada and Northeastern California (specific to BLM-administered lands) in this RMPA; includes PHMA, GHMA, and Other Habitat Management Area(s) (OHMA).

Habitat Suitability. The relative appropriateness of a certain ecological area for meeting the life requirements of an organism (i.e., space, food, cover, and water). Categories of habitat suitability include suitable, marginal, potential, unsuitable, and non-habitat. Definitions of categories are included in this glossary (Stiver et al. 2015).

Impact. The effect, influence, alteration, or imprint caused by an action.

Indirect Impacts. Indirect impacts result from implementing an action or alternative but usually occur later in time or are removed in distance and are reasonably certain to occur.

Landscape. A mosaic of landforms, vegetation, and land uses; a heterogeneous land area that is often hierarchically structured and varies in extent with the organisms being studied and the purpose for defining a landscape (Urban et al. 1987; Liu and Taylor 2002).

[1] Of, produced by, or influenced by the soil.

Late Brood-Rearing Habitat. Habitats characterized by succulent forbs next to or intermixed with sagebrush. Hens typically move their chicks to more mesic conditions, such as higher elevation sagebrush communities, wet meadow complexes, or agricultural fields. In general, a sagebrush ecosystem with a good understory of grasses and forbs and associated wet meadow areas, where succulent grasses and insects are available.

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 non-energy minerals, such as phosphate, sodium, potassium, and sulfur. Geothermal resources are also leasable under the Geothermal Steam Act of 1970.

Lease Stipulation. A modification of the terms and conditions on a standard lease form at the time of the lease sale.

Lek. A traditional display area where two or more male Greater Sage-Grouse have attended in 2 or more of the previous 5 years. The area is typically in an open site in or next to sagebrush-dominated habitats (Connelly et al. 2003). Generally, lek sites are traditional, with the same lek sites used year after year (Scott 1942; Batterson and Morse 1948; Wiley 1978; Autenrieth 1981). Taller sagebrush on the outskirts of the leks is necessary as a food source, escape cover, nesting cover for females, and loafing cover during the day (Patterson 1952; Gill 1965; Klebenow 1985). Lek status as defined by the NDOW and CDFW as follows:

Active Lek—2 or more male observed at least twice in the last 5 years
Pending Lek—2 or more males observed only once in the last 5 years
Inactive—0 or 1 male observed during every visit (minimum two visits) in the last 5 years
Historic—0 or 1 male observed during every visit (minimum five visits) in the last 30 years

Lek Cluster. A group of leks in the same vicinity, among which Greater Sage-Grouse may interchange over time, and representing a group of closely related individuals.

Long-Term Effect. The effect could occur for an extended period after implementation of the alternative. The effect could last several years or more.

Management Decision. A decision made by the BLM to manage public lands. Management decisions include both land use plan decisions and implementation decisions.

Marginal Habitat. An area that supports the species but has generally lower survival rates and reproductive success by comparison and may or may not have the potential to become suitable in the future (Cooperrider et al. 1986).

Minimization Mitigation. Minimizing impacts by limiting the degree or magnitude of the action and its implementation (40 CFR 1508.20 [b]).

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 and have not been incorporated into a proposed action of an alternative (H-1790).

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.

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, 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.

Non-habitat. An area in the historical distribution of Greater Sage-Grouse that is unoccupied, does not currently provide habitat, and does not have the potential to provide habitat in the foreseeable future (fewer than 100 years) (Stiver et al. 2015).

Other Habitat Management Area(s) (OHMA). Areas with appropriate environmental conditions for Greater Sage-Grouse that are less used by Greater Sage-Grouse or have marginal habitat suitability.

Planning Area. The geographical area for which resource management plans are developed and maintained regardless of jurisdiction.

Planning Criteria. The standards, rules, and other factors developed by managers and interdisciplinary teams for their use in forming judgments about decision making, analysis, and data collection during planning. Planning criteria streamlines and simplifies the resource management planning actions.

Planning Issues. Concerns, conflicts, and problems with the existing management of public lands. Frequently, issues are based on how land uses affect resources. Some issues are concerned with how land uses can affect other land uses, or how the protection of resources affects land uses.

Policy. This is a statement of guiding principles, or procedures, designed and intended to influence planning decisions, operating actions, or other affairs of the BLM. Policies are established interpretations of legislation, executive orders, regulations, or other presidential, secretarial, or management directives.

Potential Habitat. An area that is currently unoccupied but has the potential for occupancy in the foreseeable future (fewer than 100 years) through succession or restoration (Stiver et al. 2015).

Priority Habitat Management Area(s) (PHMA). Areas that have been identified as having the highest conservation value to maintaining sustainable Greater Sage-Grouse populations. These areas are occupied seasonally or year-round and include breeding, late brood-rearing, and winter concentration areas.

Rectifying Mitigation. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment (40 CFR 1508.20)

Reducing Mitigation. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action (40 CFR 1508.20)

Resilience. Ability of a species or its habitat to recover from stresses and disturbances. Resilient ecosystems regain their fundamental structure, processes, and functioning when altered by stresses, such as increased carbon dioxide, nitrogen deposition, and drought, and to disturbances, such as land development and fire (Allen et al. 2005; Holling 1973).

Resistance. Capacity of an ecosystem to retain its fundamental structure, processes and functioning or to remain largely unchanged, despite stresses, disturbances, or invasive species (Folke et al. 2004).

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.

Resource Management Plan (RMP). A land use plan as prescribed by the Federal Land Policy and Management Act that establishes, for a given area of land, land-use allocations, coordination guidelines for multiple-use, objectives, and actions to be achieved.

Short-Term effect. The effect occurs only during or immediately after implementation of the alternative.

State-and-Transition Model. A method to organize and communicate complex information about the relationships between vegetation, soil, animals, hydrology, disturbances (fire, lack of fire, grazing and browsing, drought, unusually wet periods, insects, and disease), and management actions on an ecological site (Caudle et al. 2013).

Stipulation (general). A term or condition in an agreement or contract.

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 the lease. Typical lease stipulations include no surface occupancy, timing limitations, and controlled surface use. Lease stipulations are developed through the land use planning process.

Suitable Habitat. An area that provides environmental conditions necessary for successful survival and reproduction to sustain stable populations (Cooperrider et al. 1986; Morrison et al. 1998).

Unsuitable Habitat. An area that does not currently provide one or more of the life requisites and therefore does not provide habitat but may provide habitat sometime in the foreseeable future (fewer than 100 years) through succession or restoration (Stiver et al. 2015).

Winter Habitat. Characterized by highly variable sagebrush canopy cover. In general, winter movements are related to severity of winter weather, topography, and vegetation cover. Consists of sagebrush that is at least 10 to 12 inches above snow level in order to provide both food and cover for wintering Greater Sage-Grouse.

Index

Appendix A
Maps

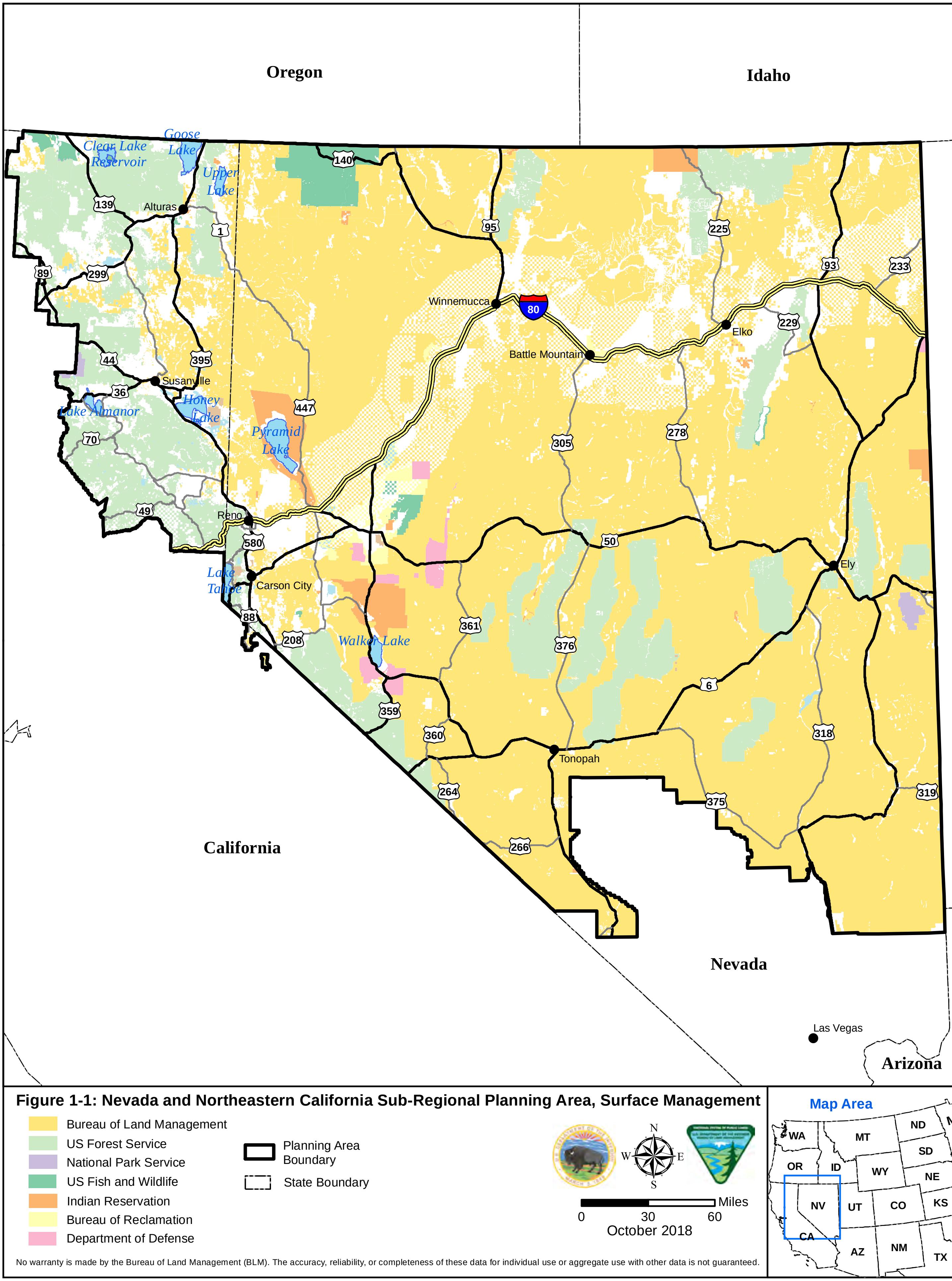


Figure 1-1: Nevada and Northeastern California Sub-Regional Planning Area, Surface Management

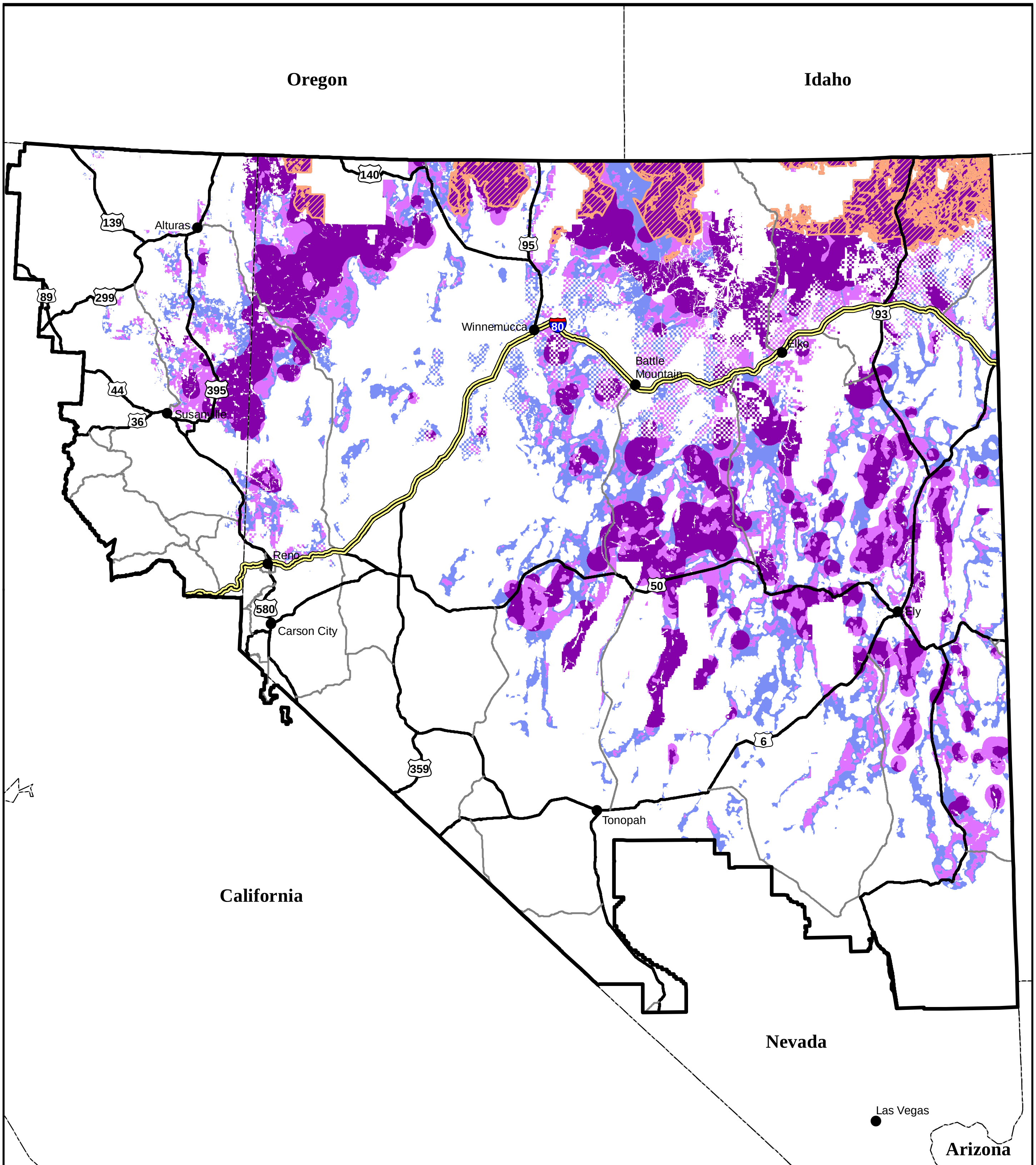


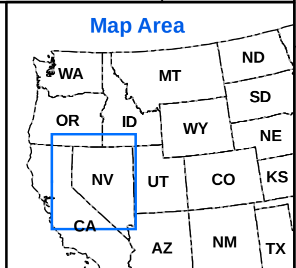
Figure 2-1a: Nevada and Northeastern California Habitat Management Areas on BLM Managed Public Lands (No Action)

Sagebrush Focal Areas (SFAs)
Priority Habitat Management Areas (PHMAs)
General Habitat Management Areas (GHMAs)
Other Habitat Management Areas (OHMAs)
Planning Area Boundary
State Boundary

0 30 60 Miles

October 2018

Map Area



Habitat Management Areas (PHMA, GHMA, and OHMA) were derived from modeling efforts (Coates et al., 2014).
No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

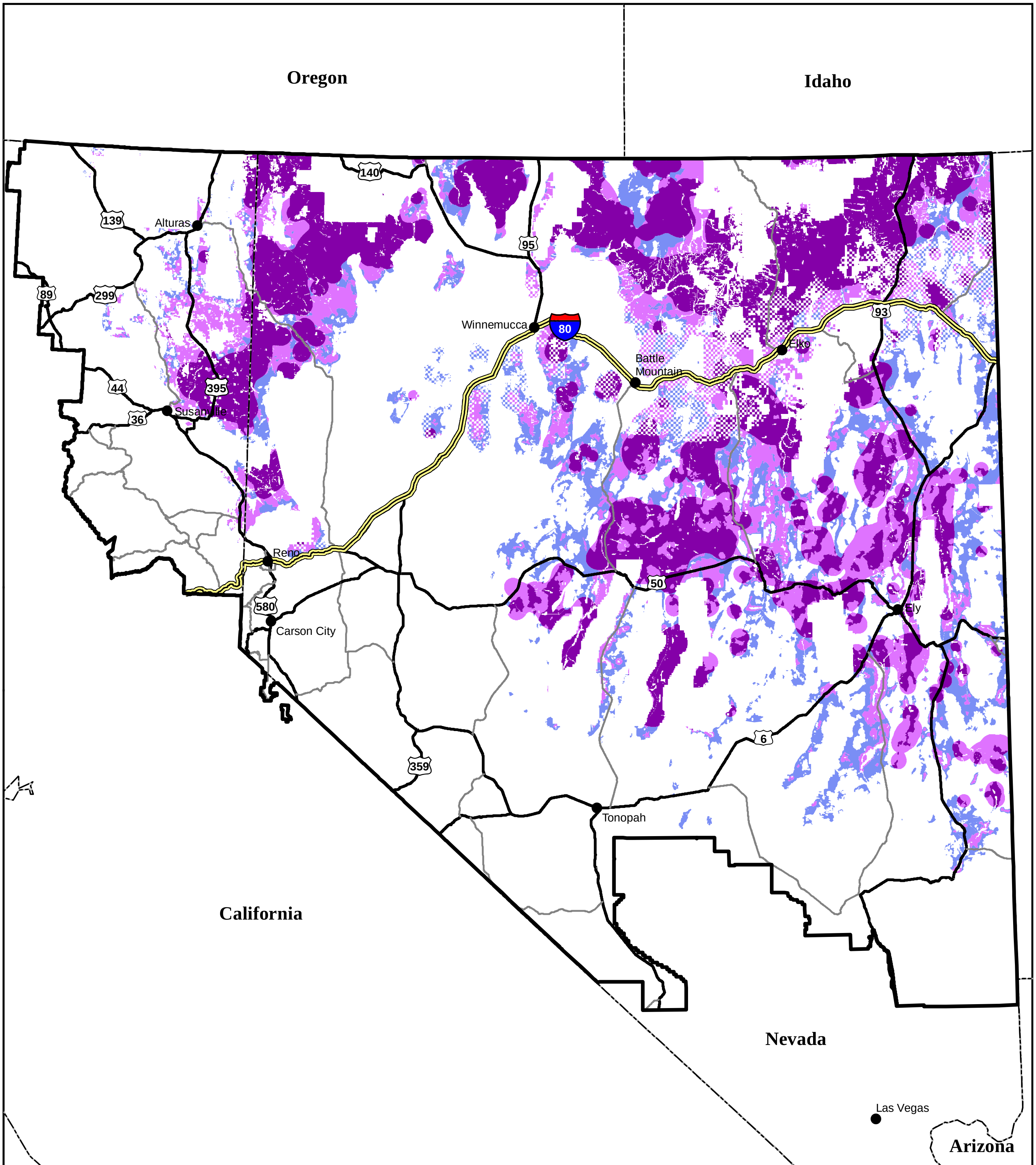


Figure 2-1b: Nevada and Northeastern California Habitat Management Areas on BLM Managed Public Lands (Management Alignment Alternative and Proposed Plan Amendment)

Priority Habitat Management Areas (PHMAs)

General Habitat Management Areas (GHMAs)

Other Habitat Management Areas (OHMAs)

Planning Area Boundary

State Boundary

October 2018

Habitat Management Areas (PHMA, GHMA, and OHMA) were derived from modeling efforts (Coates et al., 2016, as amended by the State of Nevada through the Nevada Sagebrush Ecosystem Council in December 2015) and the model will be updated approximately every 3-5 years following a similar process for which these maps were approved.
No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

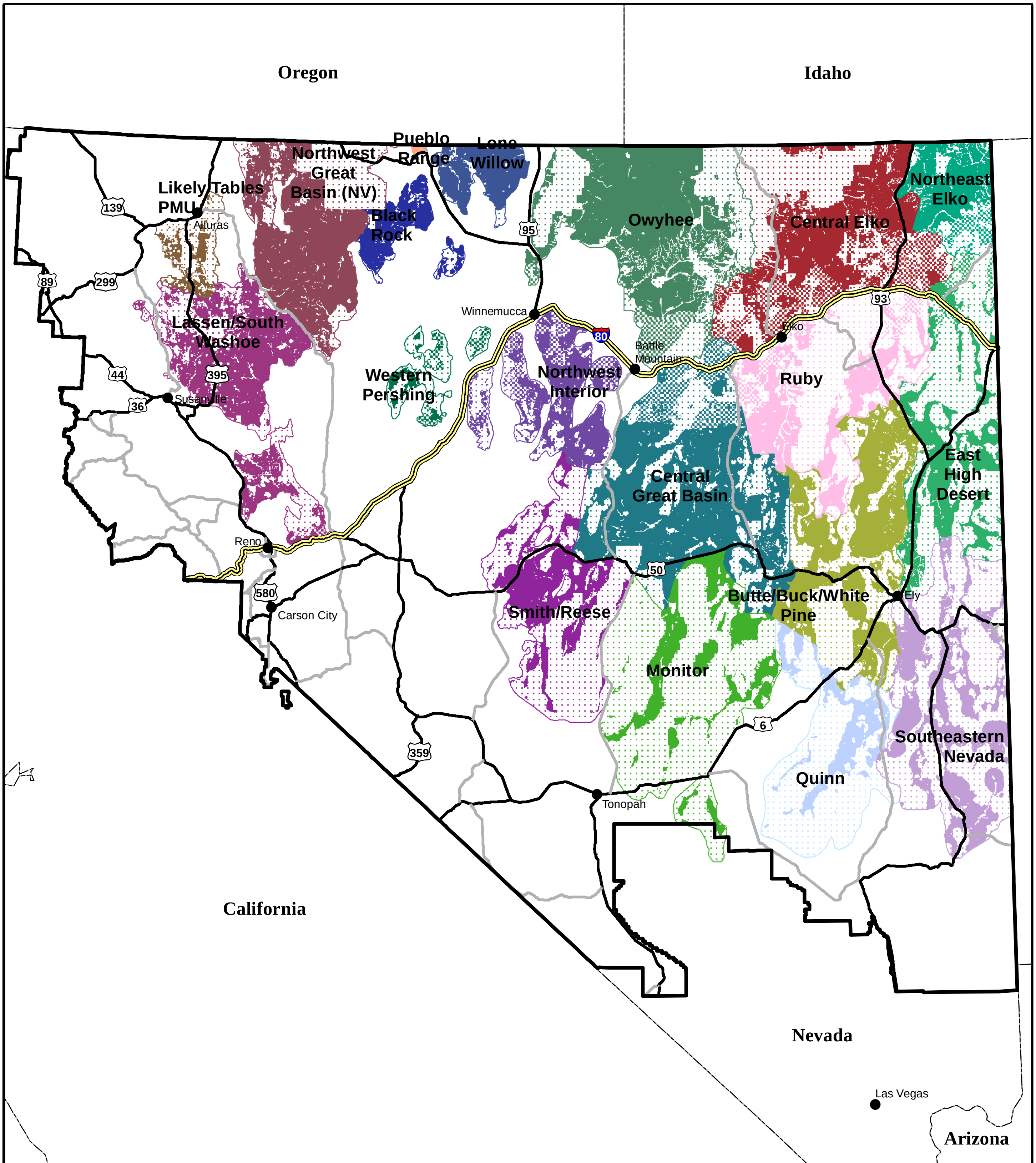


Figure 2-2a: Nevada and Northeastern California Biologically Significant Unit and Lek Clusters (No Action)

Biologically Significant Unit

Black Rock
Butte/Buck/White Pine
Central Elko
Central Great Basin
East High Desert
Lassen/South Washoe
Likely Tables PMU
Lone Willow
Monitor
Northeast Elko
Northwest Great Basin (NV)
Northwest Interior
Owyhee
Pueblo Range
Quinn
Ruby
Smith/Reese
Southeastern Nevada
Western Pershing

HMA Within BSU

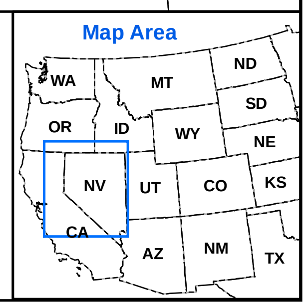
Black Rock
Butte/Buck/White Pine
Central Elko
Central Great Basin
East High Desert
Lassen/South Washoe
Likely Tables PMU
Lone Willow
Monitor
Northeast Elko
Northwest Great Basin (NV)
Northwest Interior
Owyhee
Pueblo Range
Quinn
Ruby
Smith/Reese
Southeastern Nevada
Western Pershing

Planning Area Boundary
States Boundary

N
W E
S

0 30 60 Miles

October 2018



Habitat Management Areas (PHMA, GHMA, and OHMA) were derived from modeling efforts (Coates et al., 2016, as amended by the State of Nevada) and the model will be updated approximately every 3-5 years.
BSU boundaries were delineated by NDOW in the 2015 ARMPA.
No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

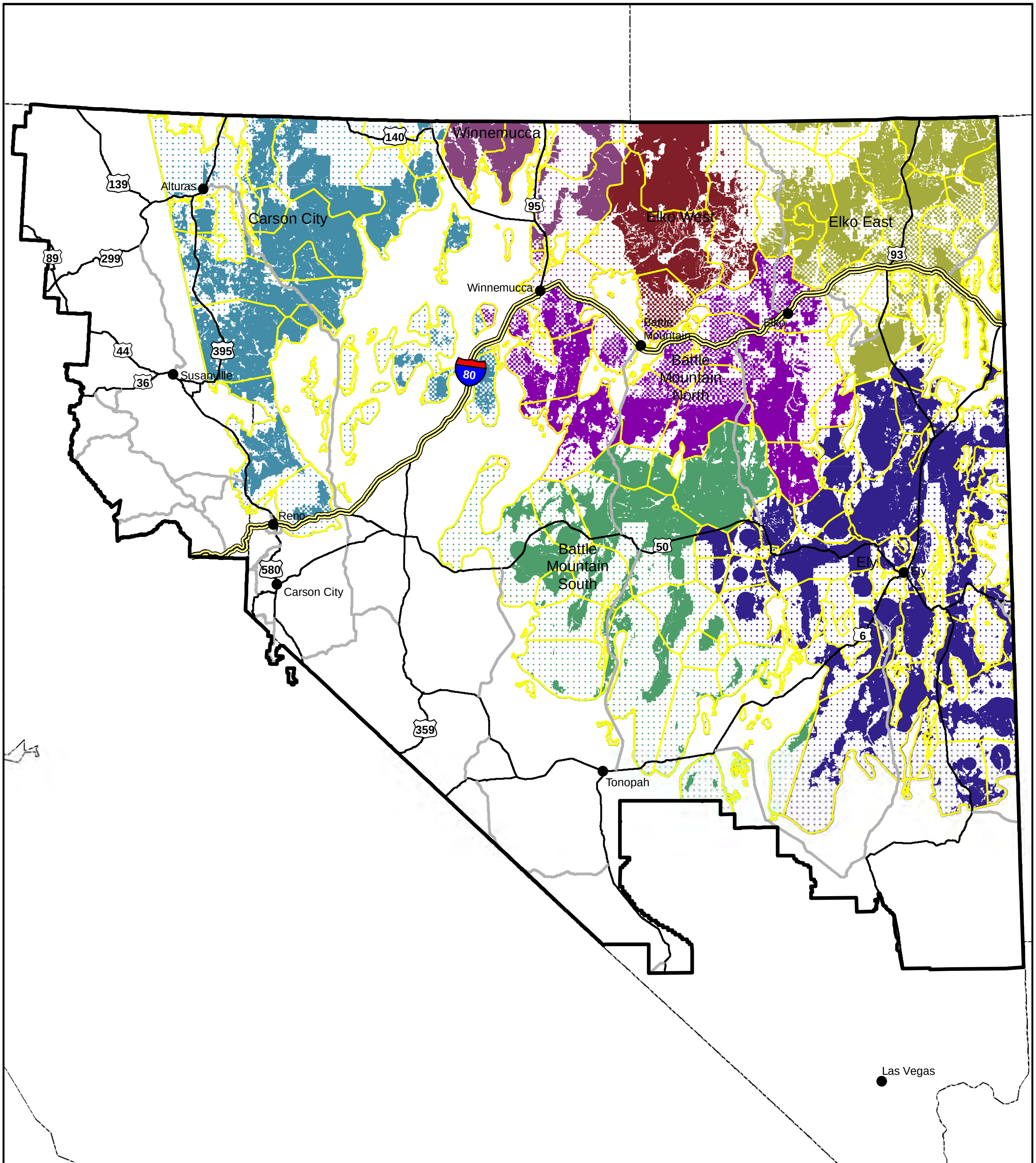


Figure 2-2b: Nevada and Northeastern California Biologically Significant Unit and Lek Clusters (Management Alignment Alternative and Proposed Plan Amendment)

Biologically Significant Unit
- Battle Mountain North
- Battle Mountain South
- Carson City
- Elko East
- Elko West
- Ely
- Winnemucca

HMA Within BSU
- Battle Mountain North
- Battle Mountain South
- Carson City
- Elko East
- Elko West
- Ely
- Winnemucca

- Lek Cluster Boundary
- Planning Area Boundary
- States Boundary

Miles
0 30 60
October 2018

Habitat management areas on this map were derived from modeling efforts (Coates et al., 2016, as amended by the State of Nevada through the Nevada Sagebrush Ecosystem Council in December 2015) and the model will be updated approximately every 3-5 years following a similar process for which these maps were approved. BSU and lek cluster boundaries were derived from Coates et al., 2017.
No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Map Area

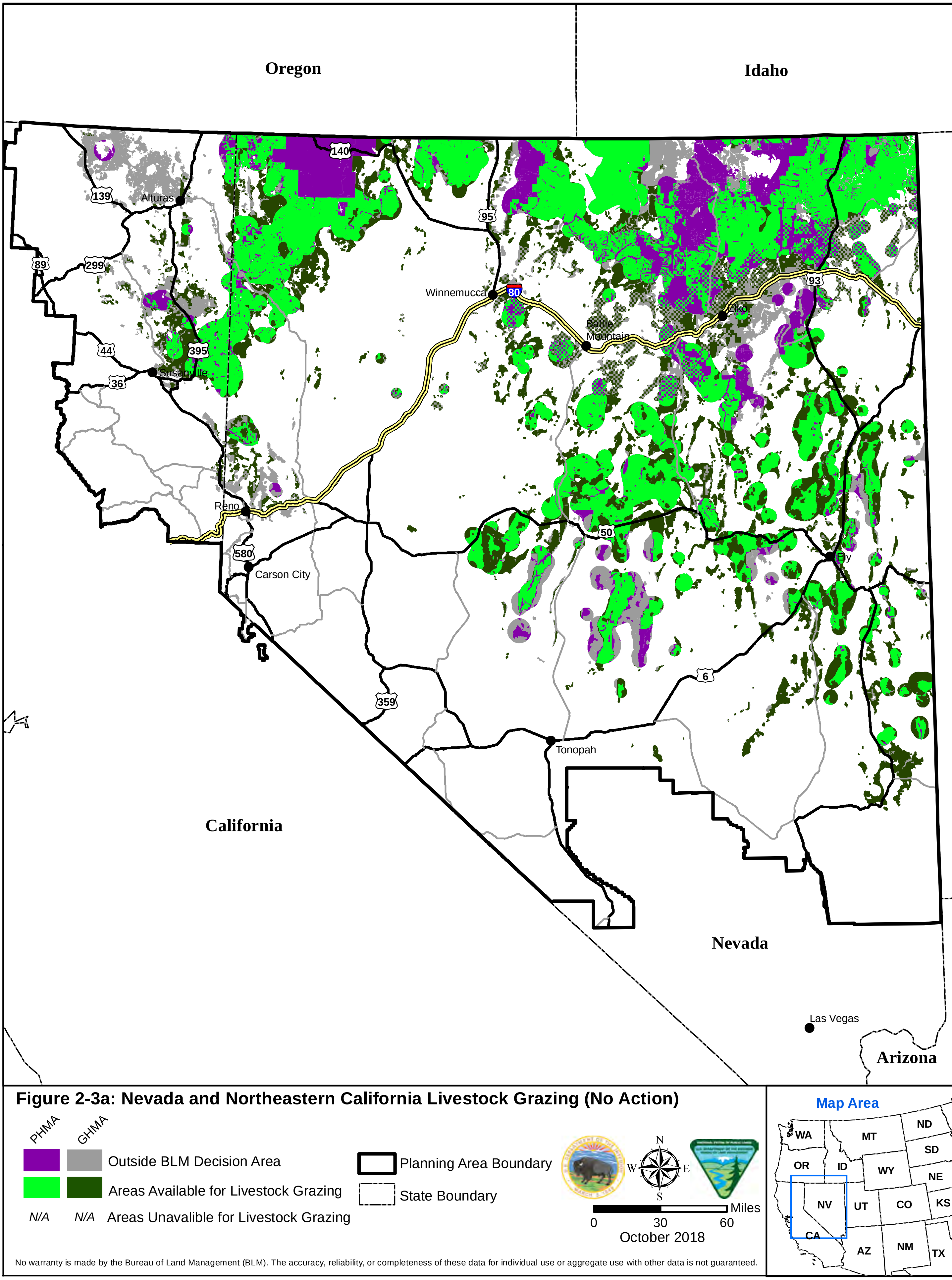


Figure 2-3a: Nevada and Northeastern California Livestock Grazing (No Action)

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

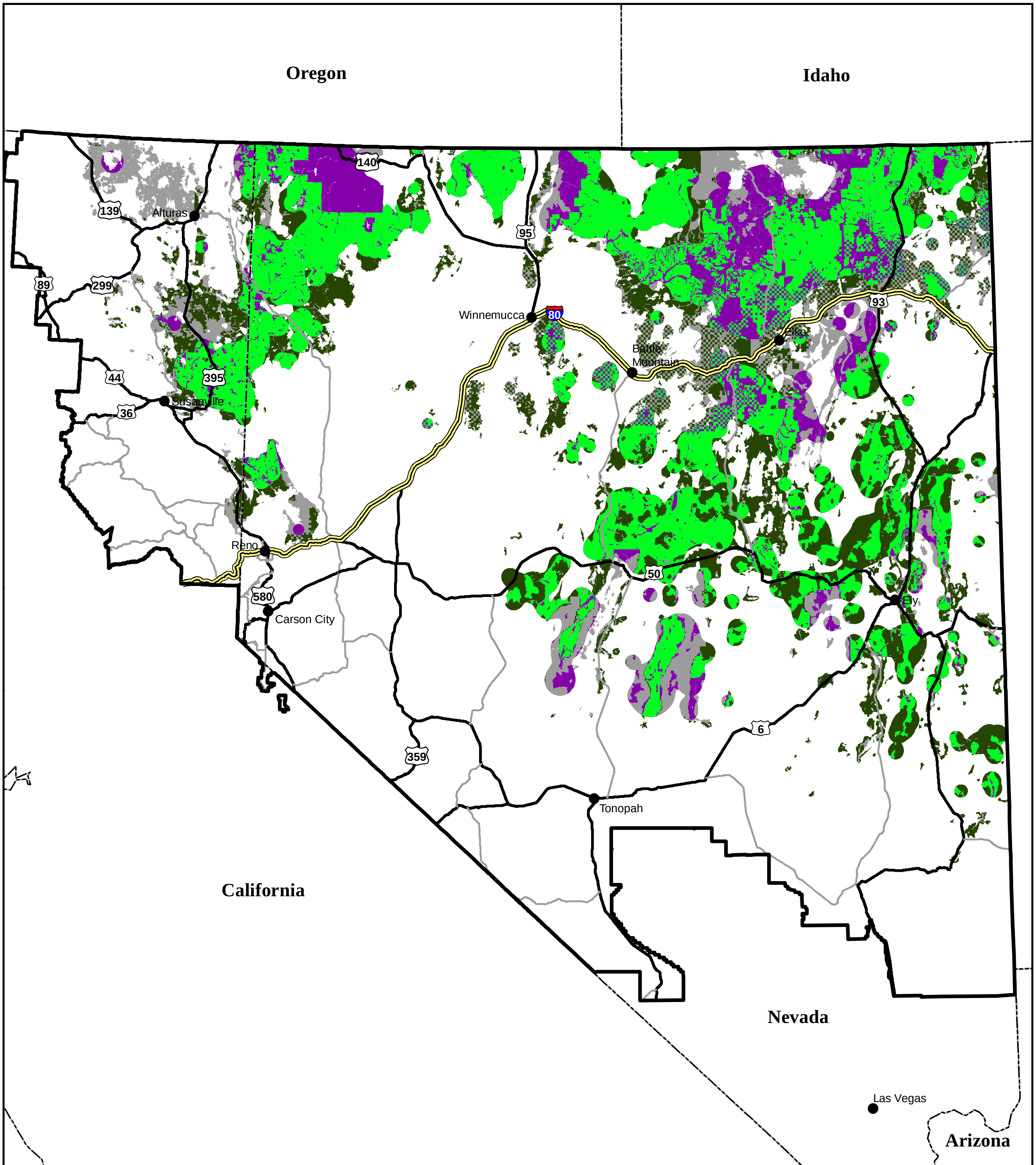


Figure 2-3b: Nevada and Northeastern California Livestock Grazing (Management Alignment Alternative and Proposed Plan Amendment)

PHMA GHMA

Outside BLM Decision Area

Areas Available for Livestock Grazing

N/A N/A Areas Unavalible for Livestock Grazing

Planning Area Boundary

State Boundary

0 30 60 Miles

October 2018

Map Area

WA MT ND SD OR ID WY NE NV UT CO KS CA AZ NM TX

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

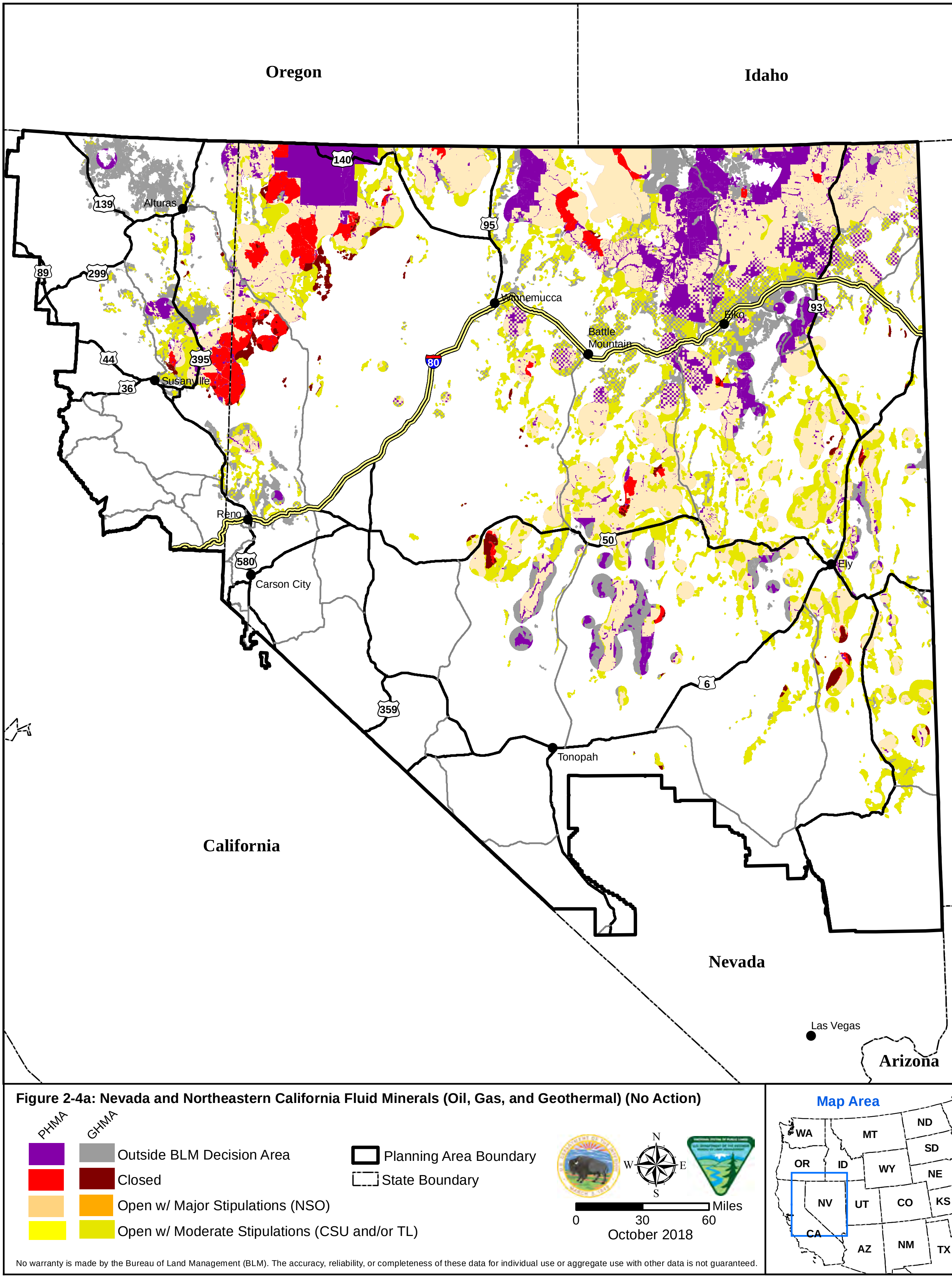


Figure 2-4a: Nevada and Northeastern California Fluid Minerals (Oil, Gas, and Geothermal) (No Action)

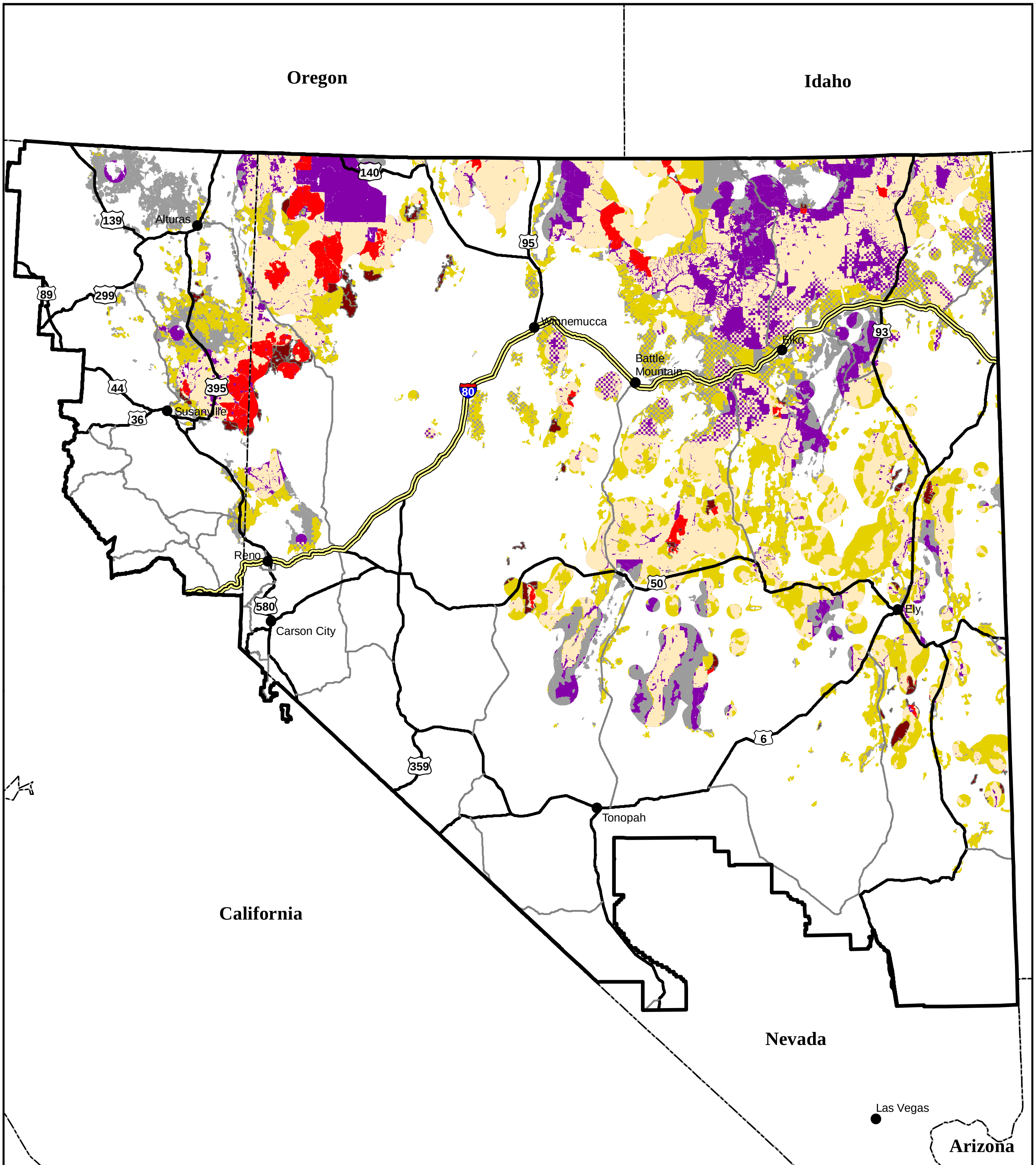


Figure 2-4b: Nevada and Northeastern California Fluid Minerals (Oil, Gas, and Geothermal) (Management Alignment Alternative and Proposed Plan Amendment)

PHMA	GHMA	
		Outside BLM Decision Area
		Closed
	N/A	Open w/ Major Stipulations (NSO)
N/A		Open w/ Moderate Stipulations (CSU and/or TL)

Planning Area Boundary

State Boundary

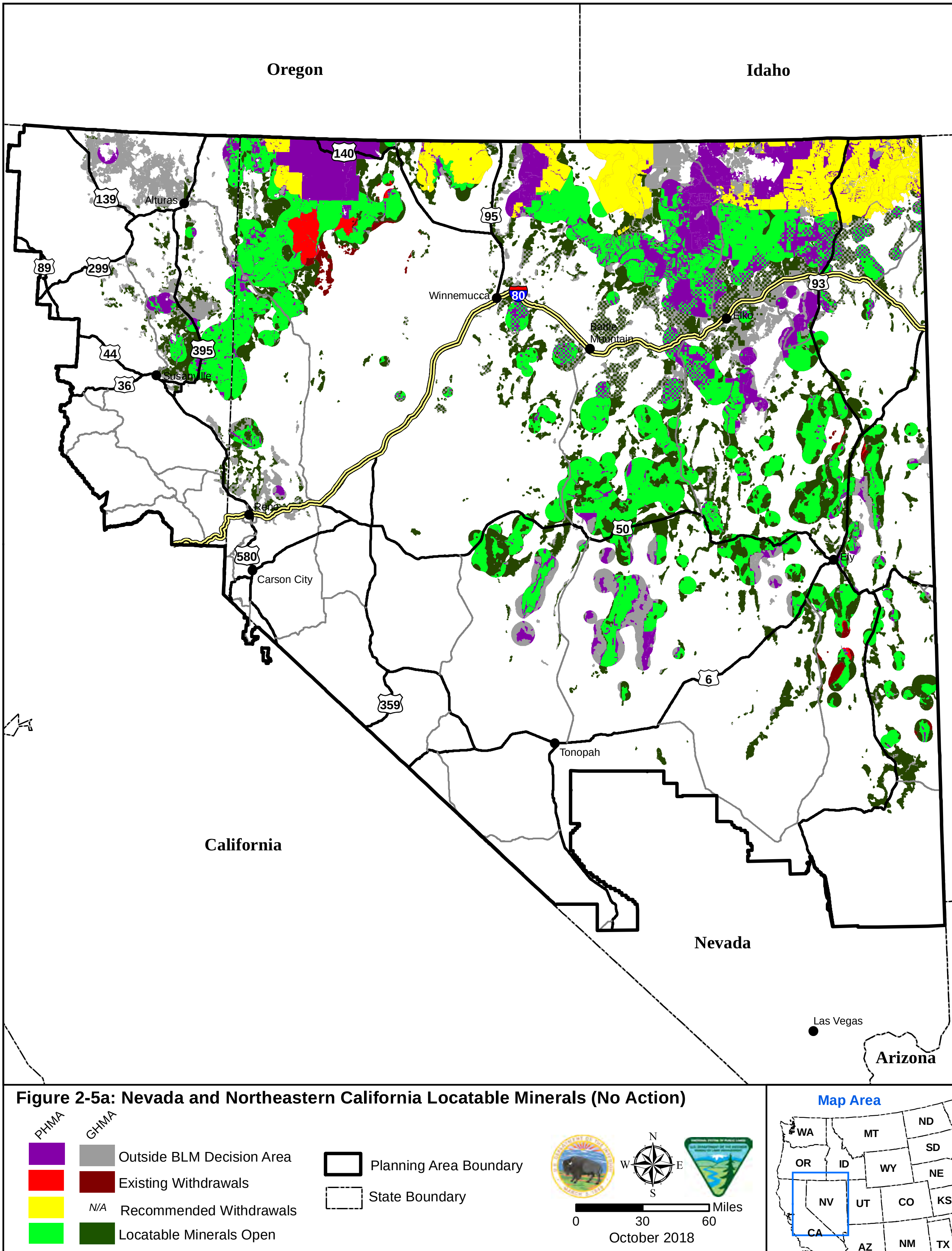


Figure 2-5a: Nevada and Northeastern California Locatable Minerals (No Action)

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

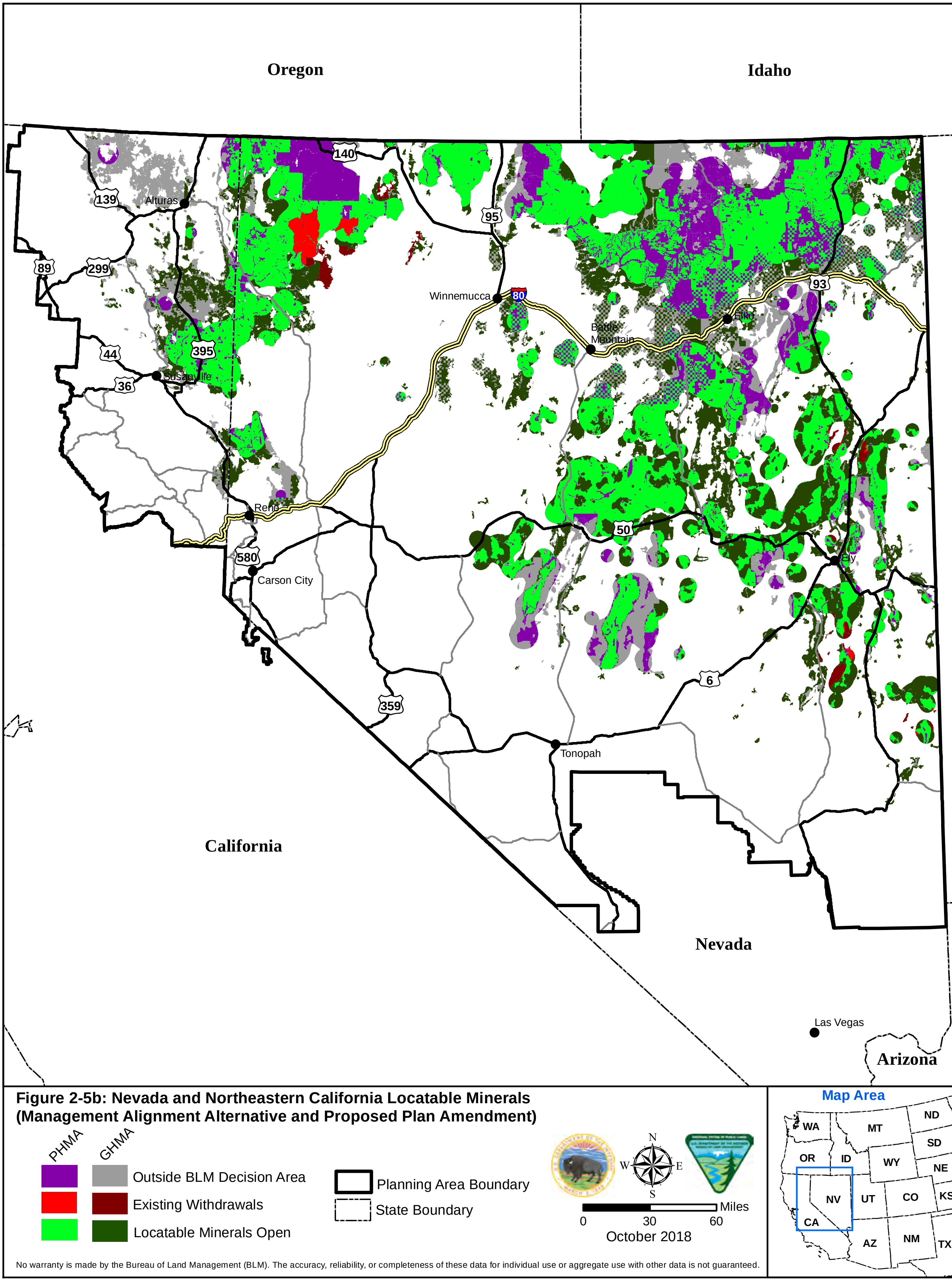


Figure 2-5b: Nevada and Northeastern California Locatable Minerals (Management Alignment Alternative and Proposed Plan Amendment)

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

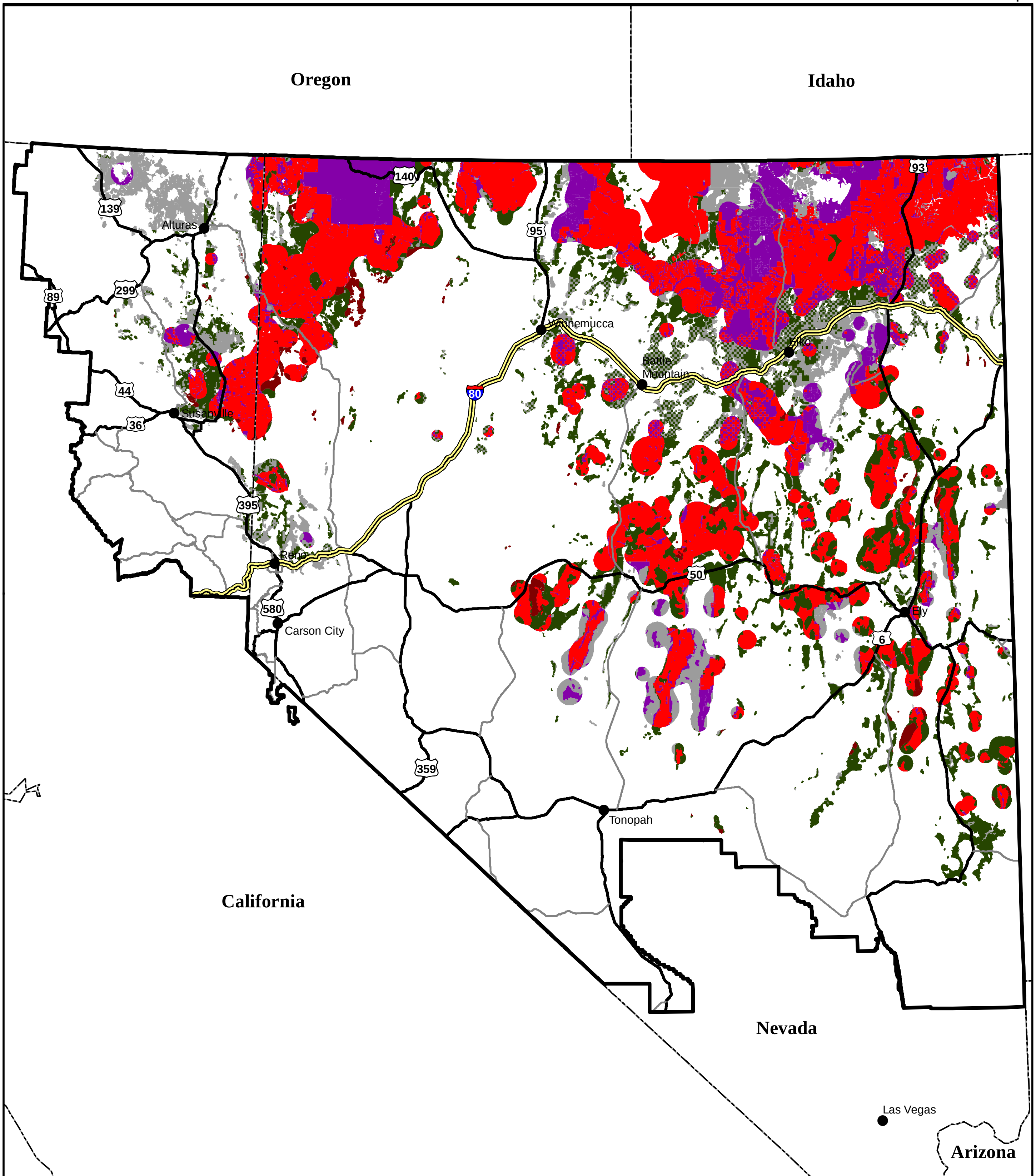


Figure 2-6a: Nevada and Northeastern California Salable Minerals (Mineral Materials) (No Action)

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

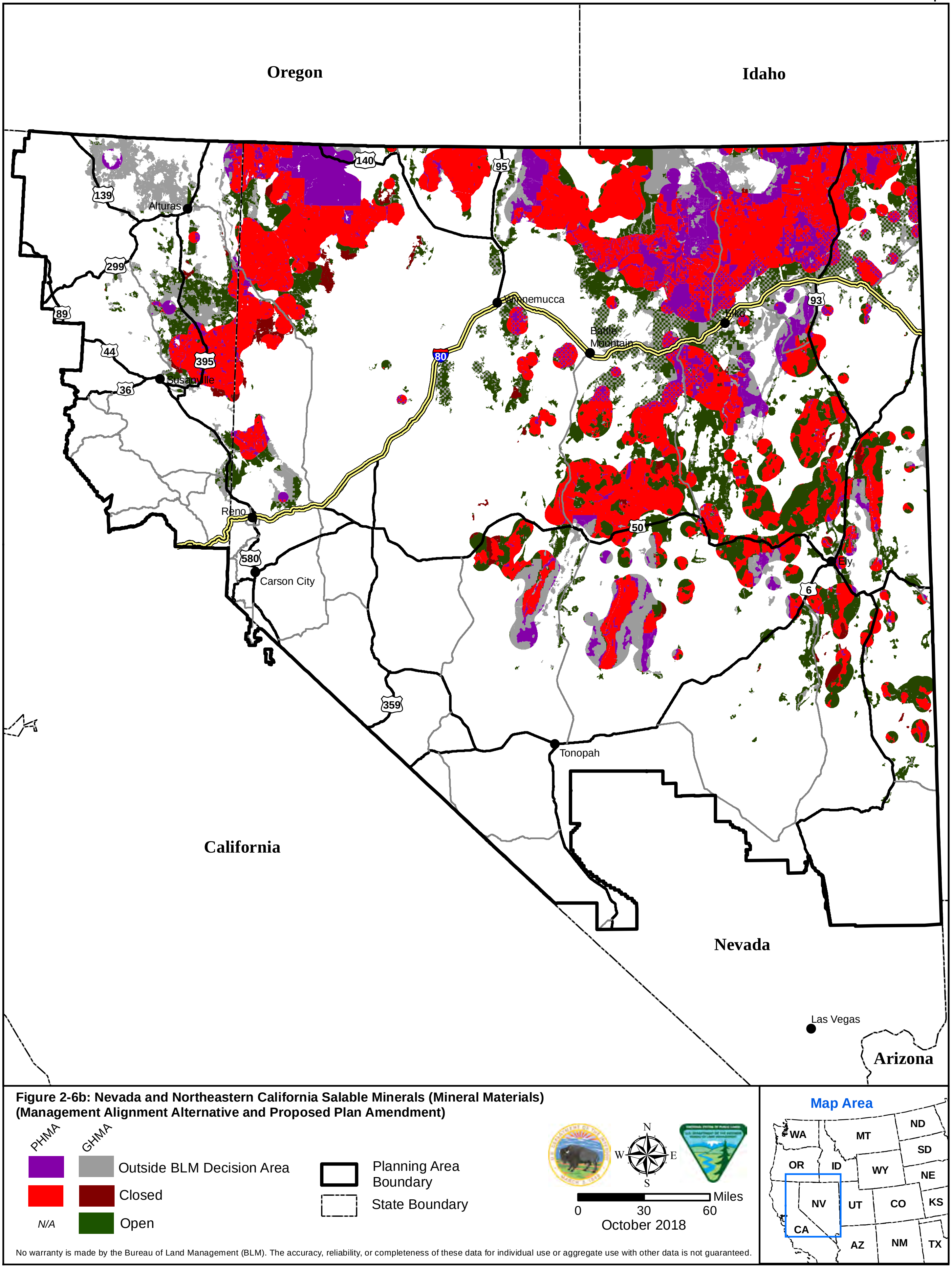


Figure 2-6b: Nevada and Northeastern California Salable Minerals (Mineral Materials) (Management Alignment Alternative and Proposed Plan Amendment)

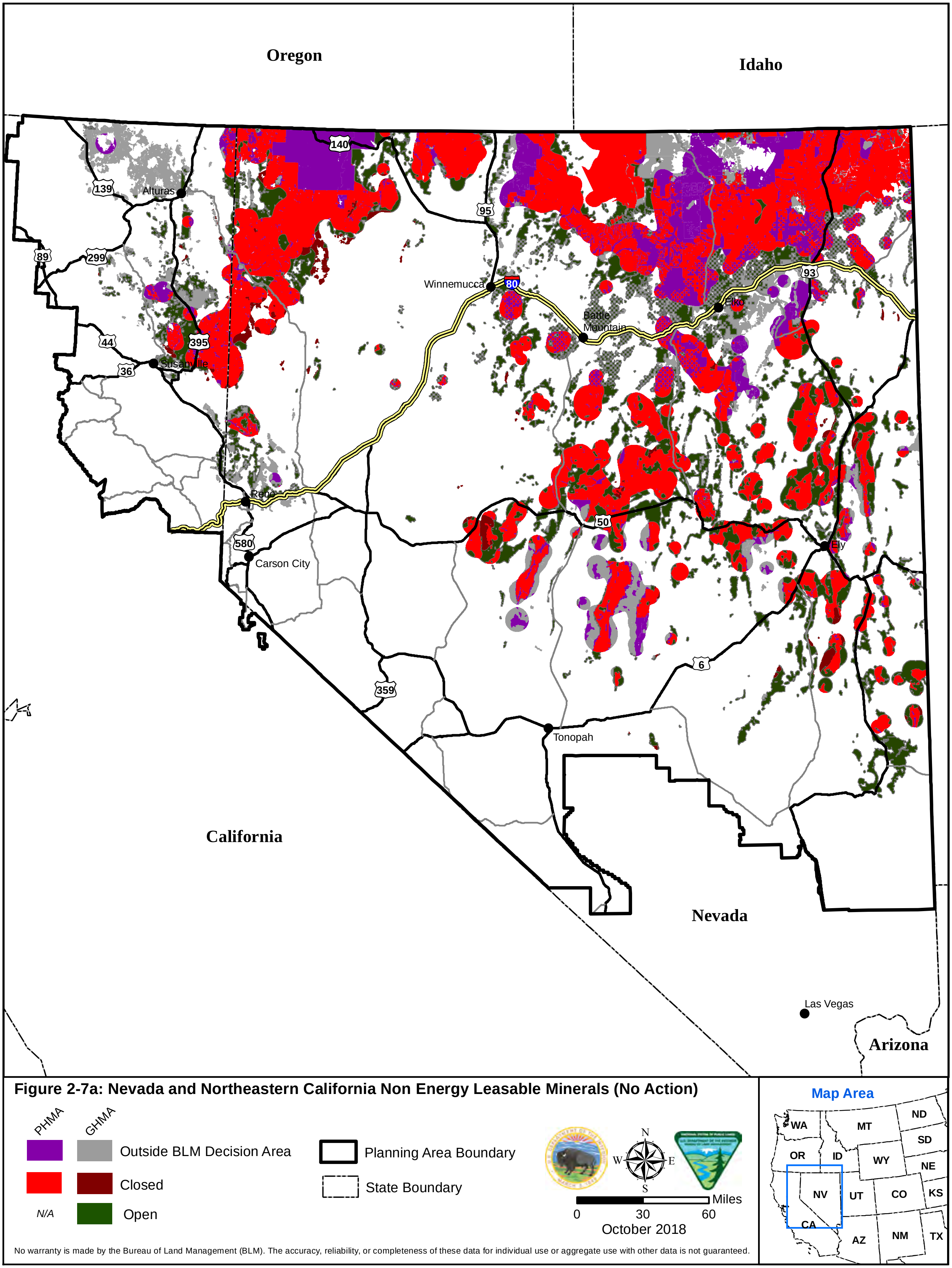


Figure 2-7a: Nevada and Northeastern California Non Energy Leasable Minerals (No Action)

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

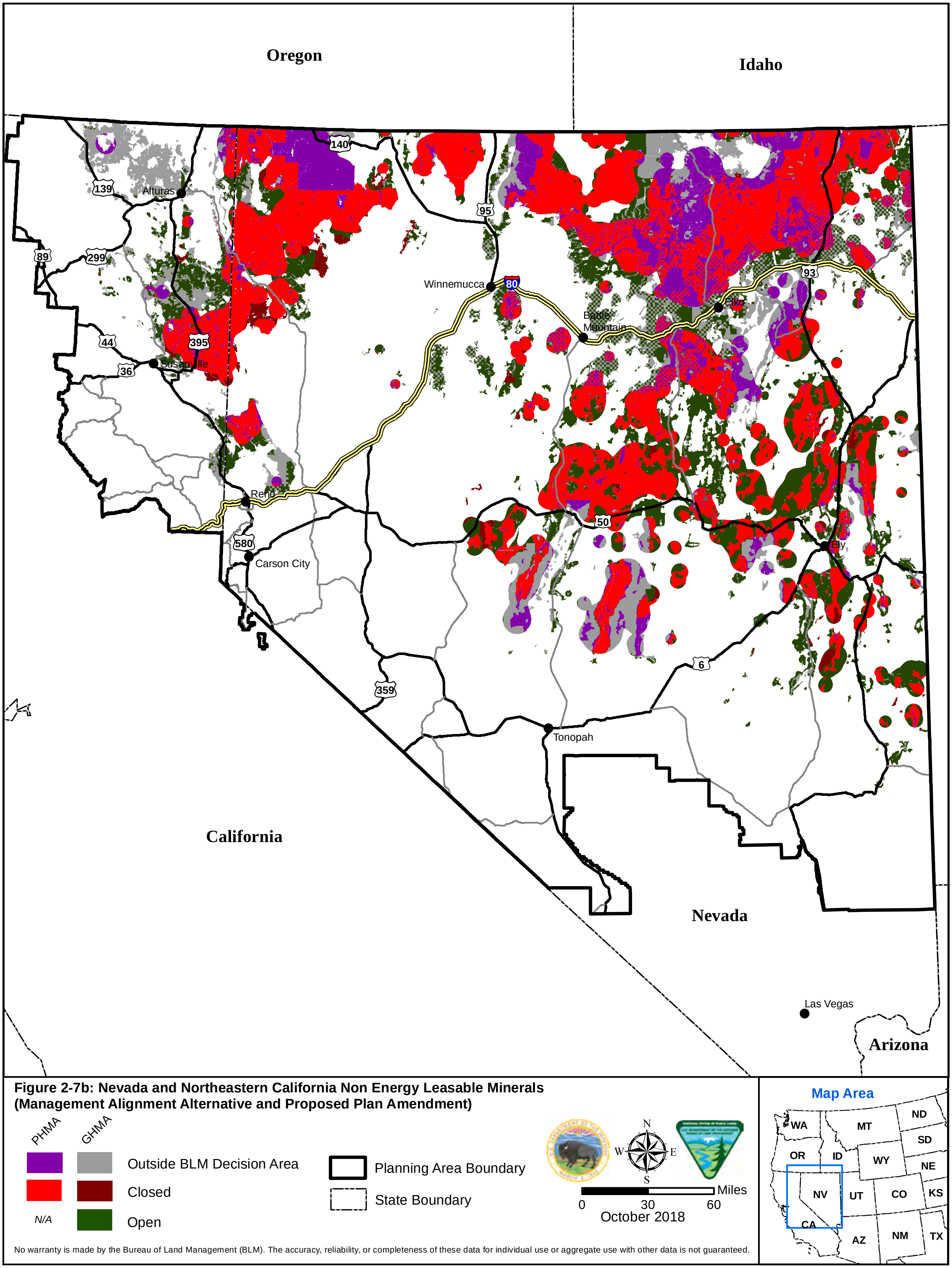


Figure 2-7b: Nevada and Northeastern California Non Energy Leasable Minerals (Management Alignment Alternative and Proposed Plan Amendment)

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

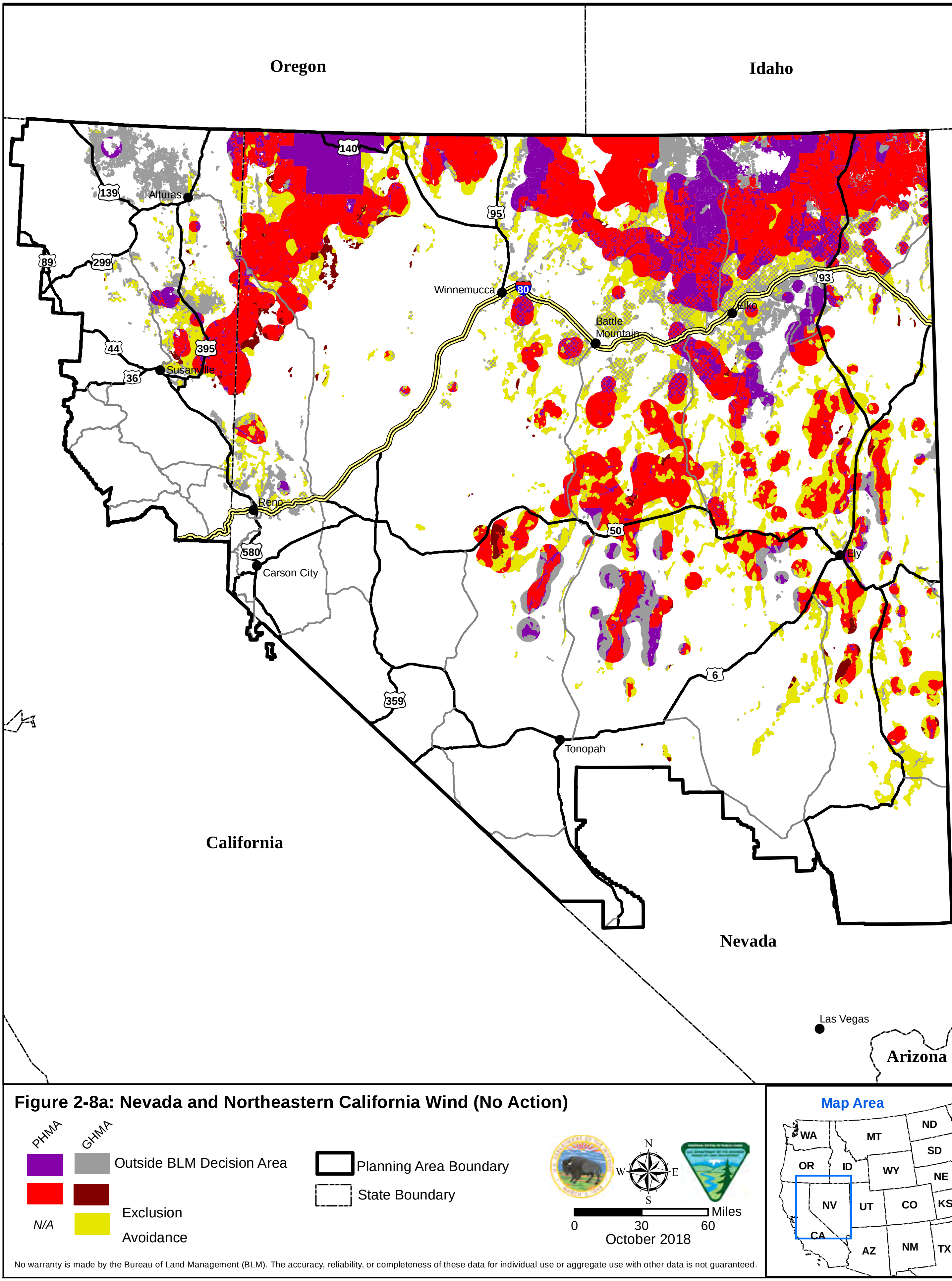


Figure 2-8a: Nevada and Northeastern California Wind (No Action)

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

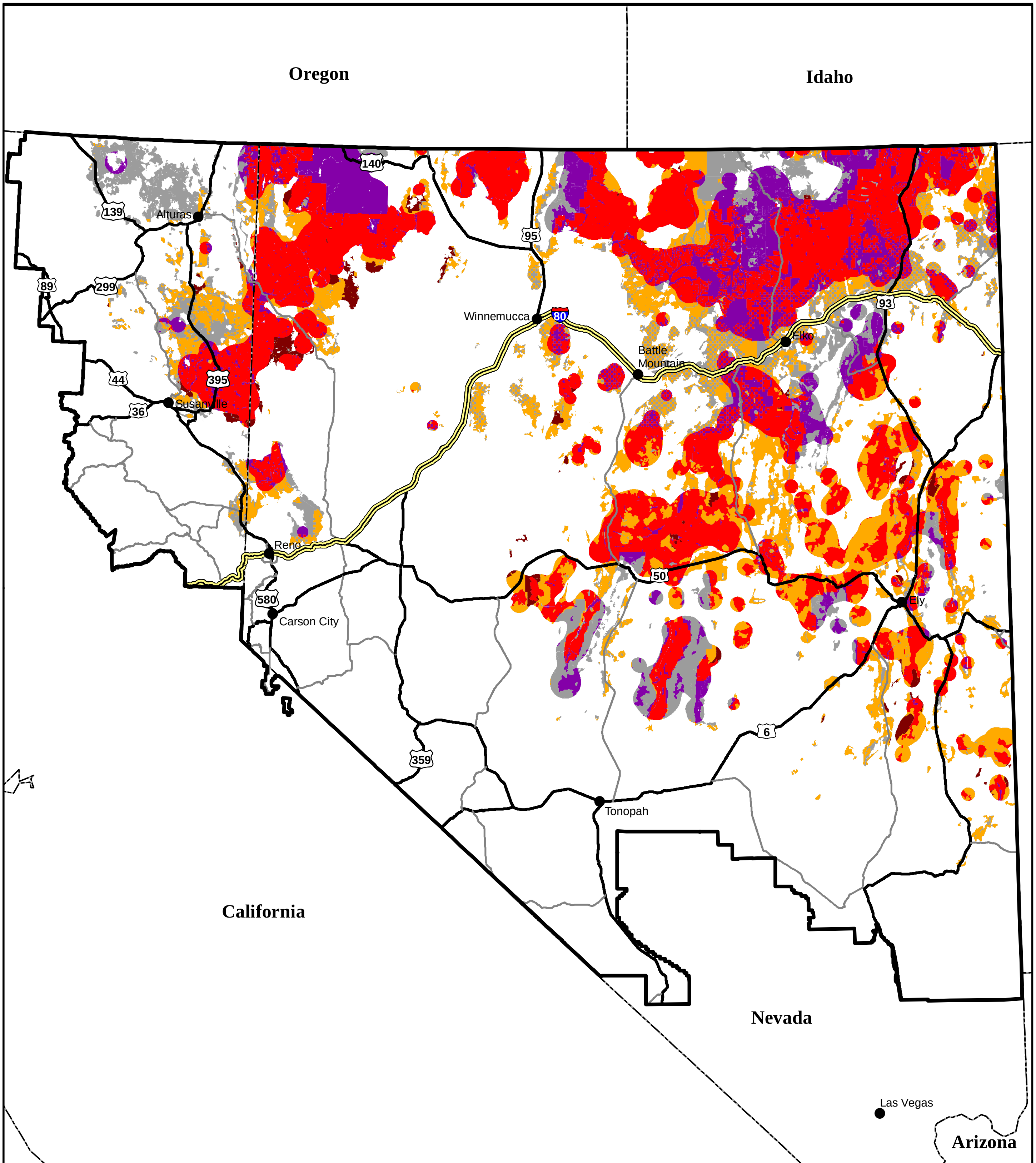


Figure 2-8b: Nevada and Northeastern California Wind (Management Alignment Alternative and Proposed Plan Amendment)

PHMA	GHMA	
		Outside BLM Decision Area
		Exclusion
N/A		Avoidance
N/A	N/A	Open

Planning Area Boundary

State Boundary

October 2018

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

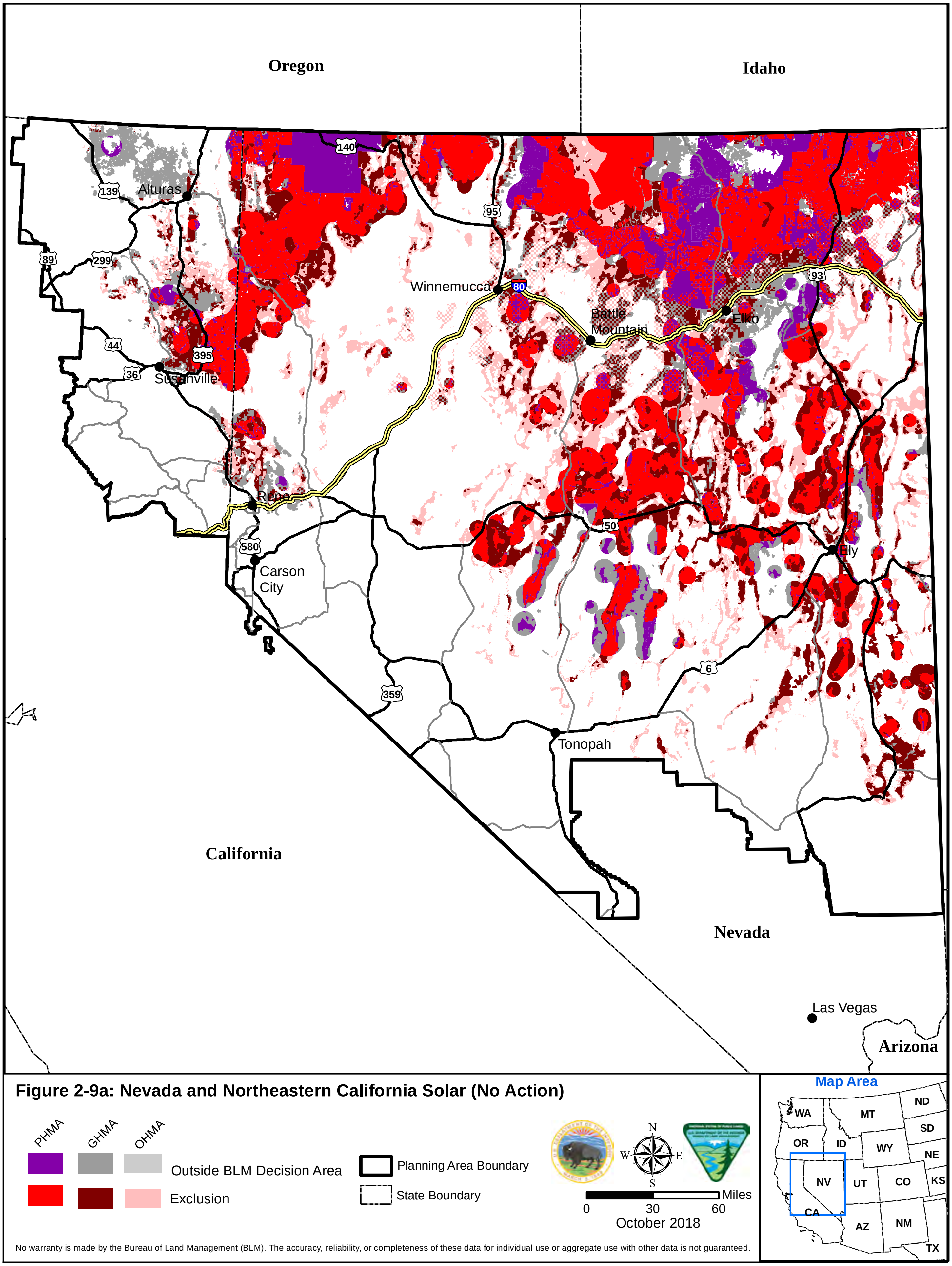


Figure 2-9a: Nevada and Northeastern California Solar (No Action)

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

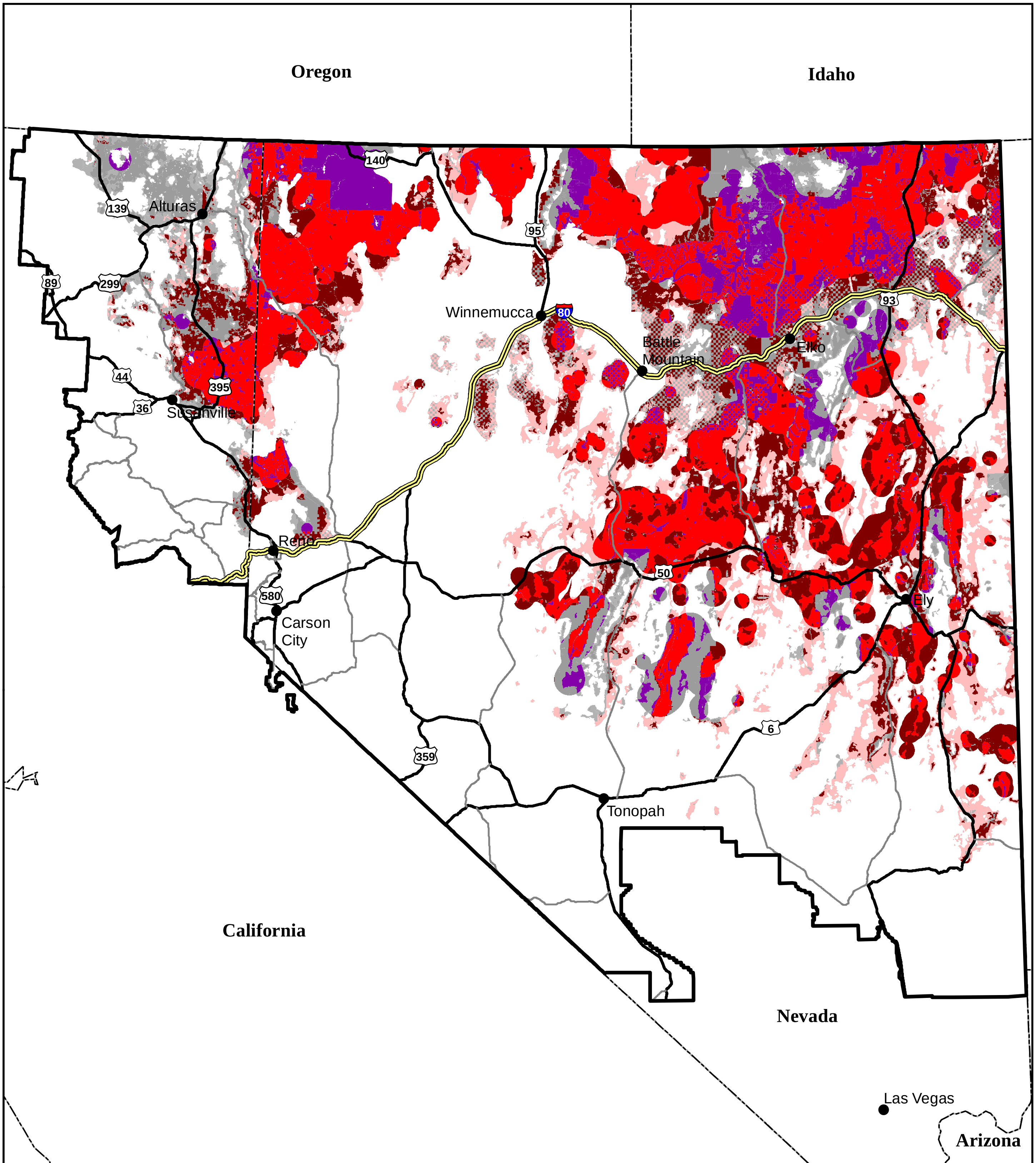


Figure 2-9b: Nevada and Northeastern California Solar (Management Alignment Alternative and Proposed Plan Amendment)

PHMA GHMA OHMA

Outside BLM Decision Area

Exclusion

Planning Area Boundary

State Boundary

Miles 0 30 60

October 2018

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

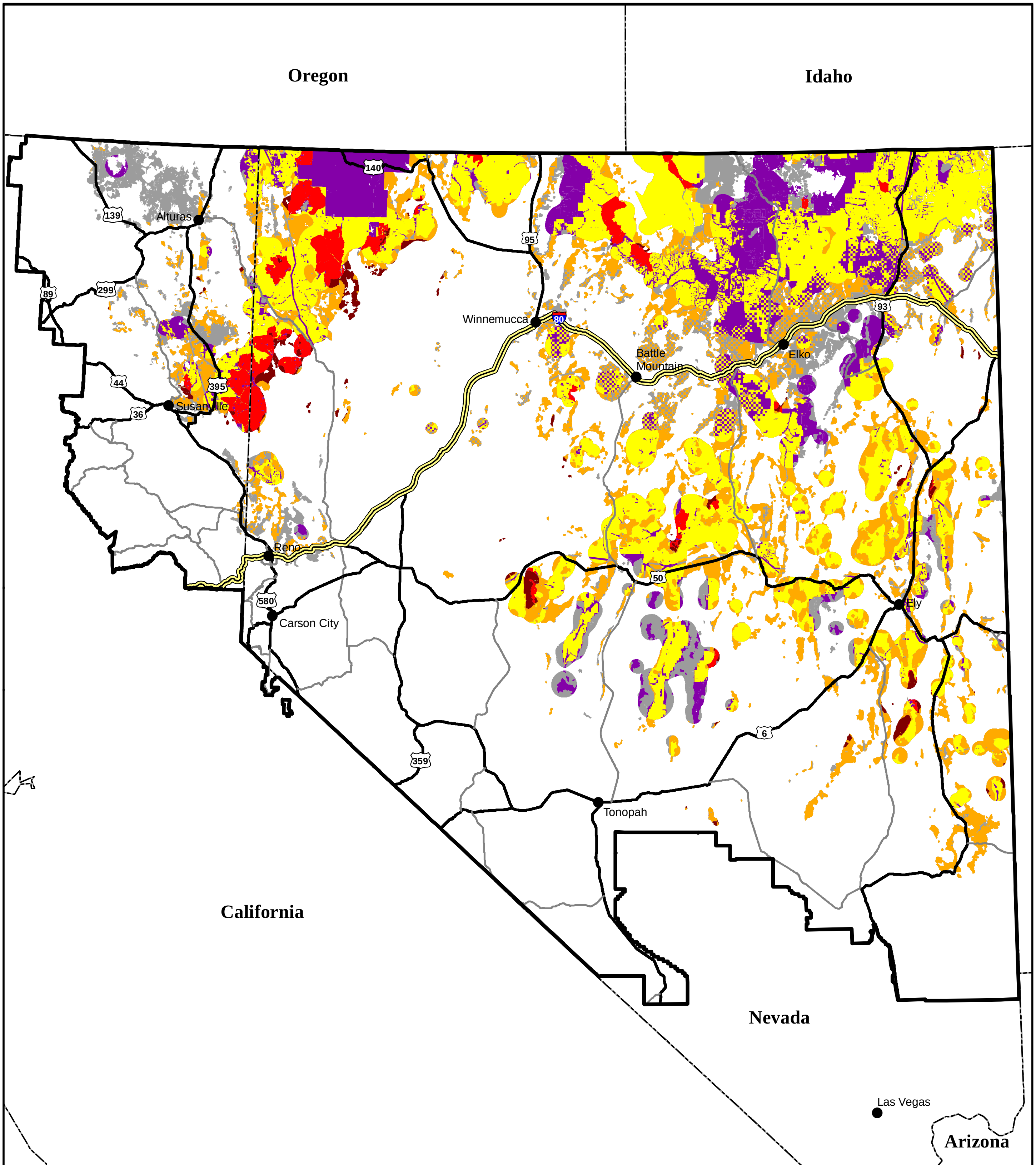


Figure 2-10a: Nevada and Northeastern California Major Rights-of-Way (No Action)

PHMA GHMA
Outside BLM Decision Area
Exclusion
Avoidance

Planning Area Boundary
State Boundary

N W E S

Miles
0 30 60

October 2018

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

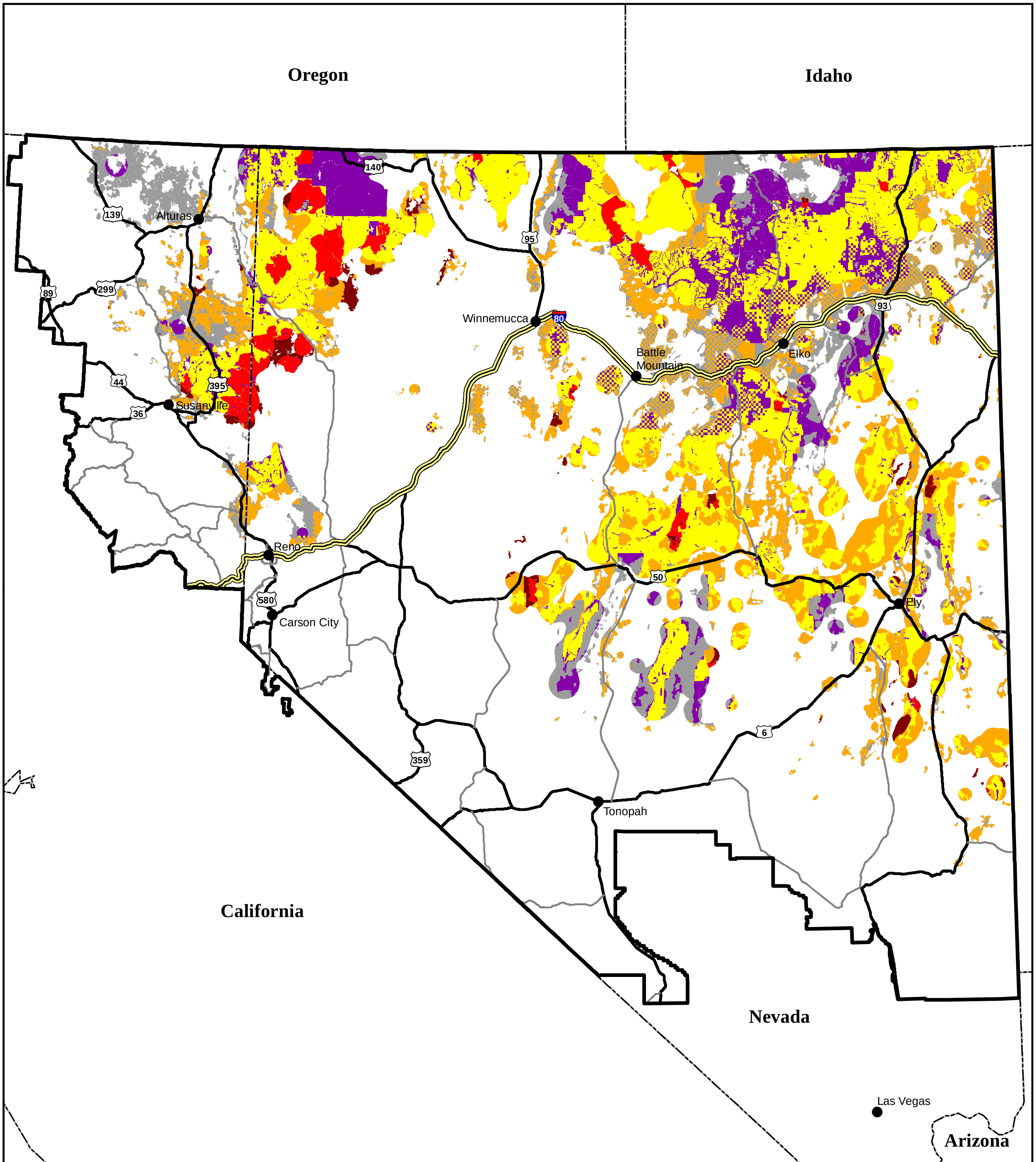


Figure 2-10b: Nevada and Northeastern California Major Rights-of-Way (Management Alignment Alternative and Proposed Plan Amendment)

PHMA GHMA

Outside BLM Decision Area

Exclusion

Avoidance

Planning Area Boundary

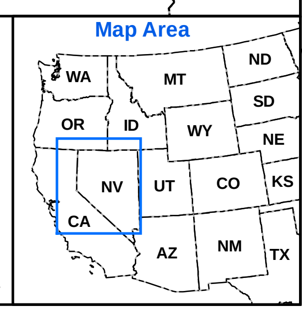
State Boundary

N W E S

Miles

0 30 60

October 2018



No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

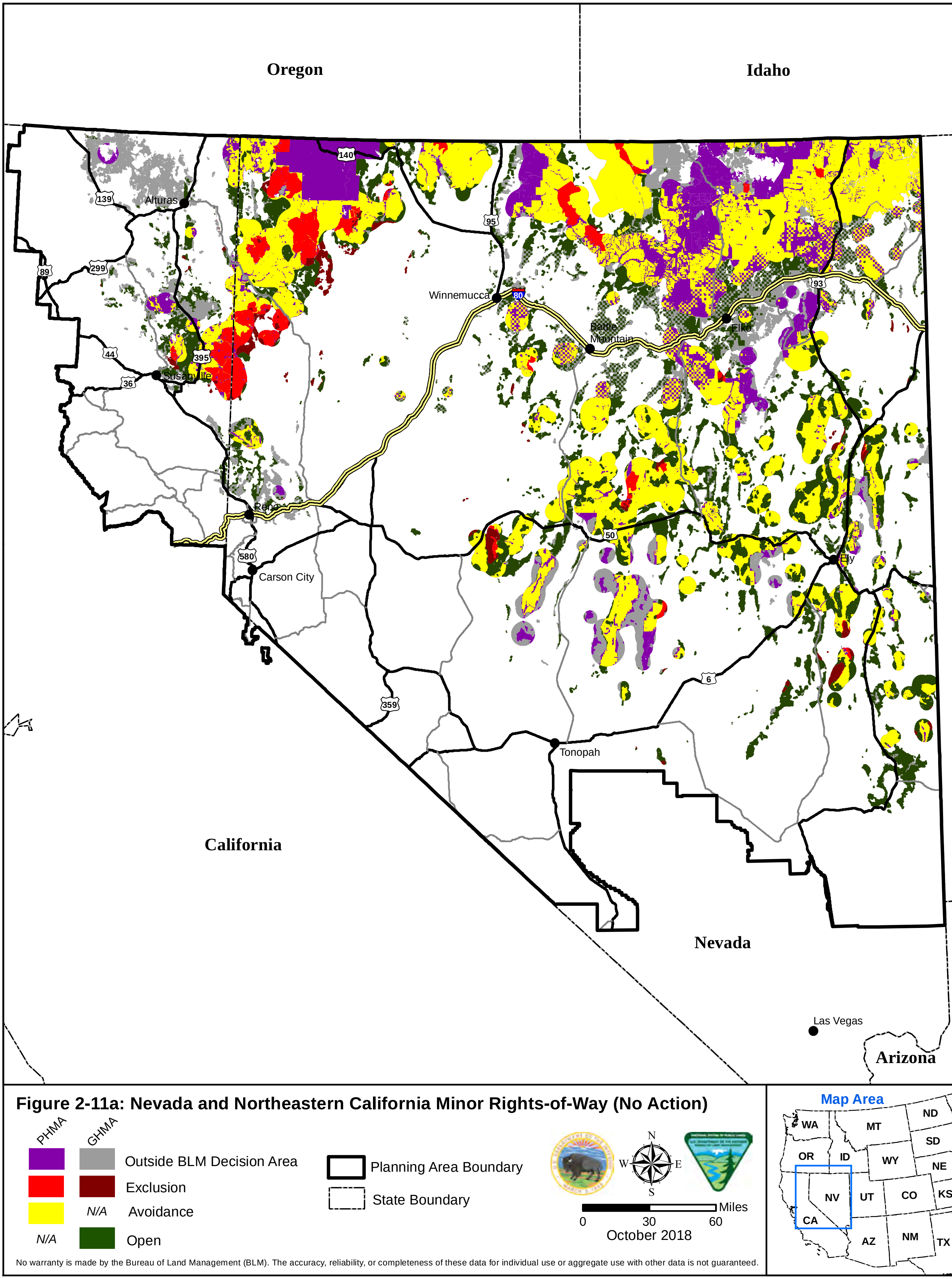


Figure 2-11a: Nevada and Northeastern California Minor Rights-of-Way (No Action)

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

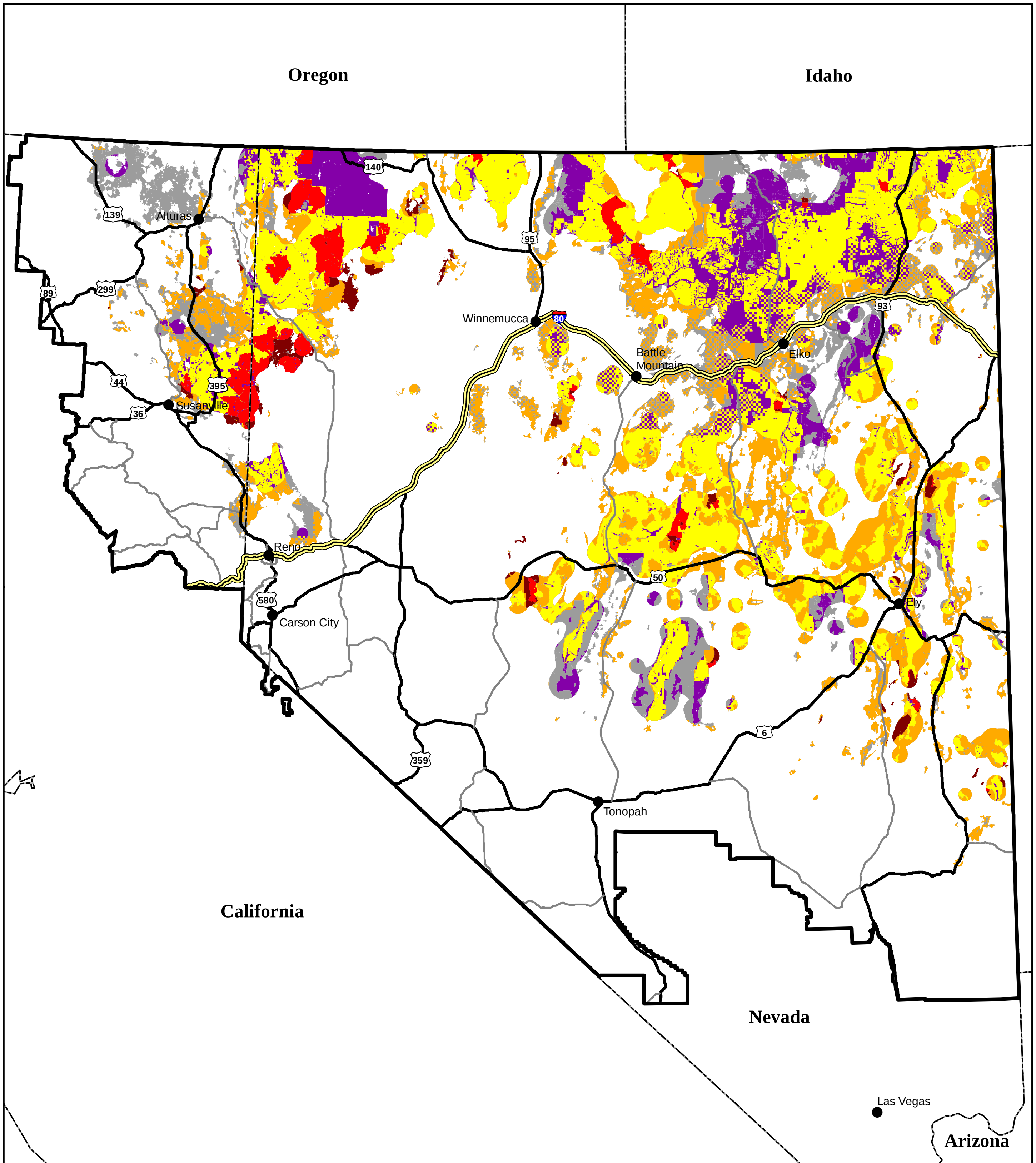
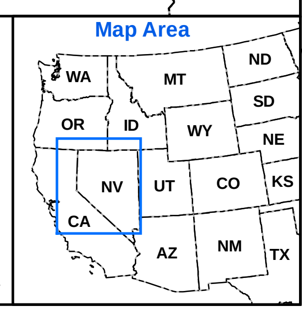


Figure 2-11b: Nevada and Northeastern California Minor Rights-of-Way (Management Alignment Alternative and Proposed Plan Amendment)

PHMA GHMA
Outside BLM Decision Area
Exclusion
Avoidance

Planning Area Boundary
State Boundary

N W E S
0 30 60 Miles
October 2018



No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

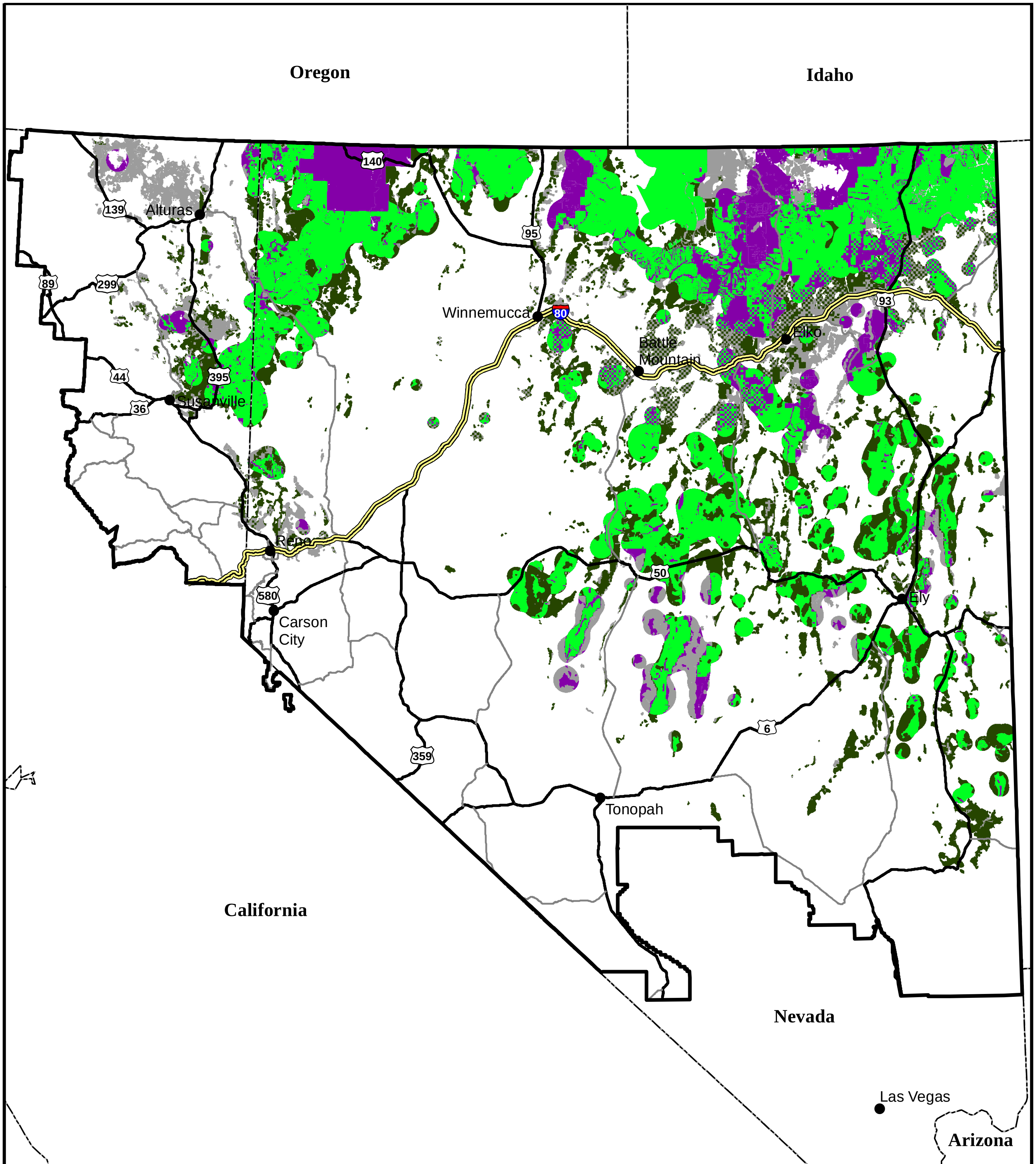


Figure 2-12a: Nevada and Northeastern California Land Tenure (No Action)

PHMA
GHMA
Outside BLM Decision Area
Retention
Planning Area Boundary
State Boundary

0 30 60 Miles

October 2018

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Map Area

WA MT ND MN OR ID SD WY NE NV UT CO KS CA AZ NM TX

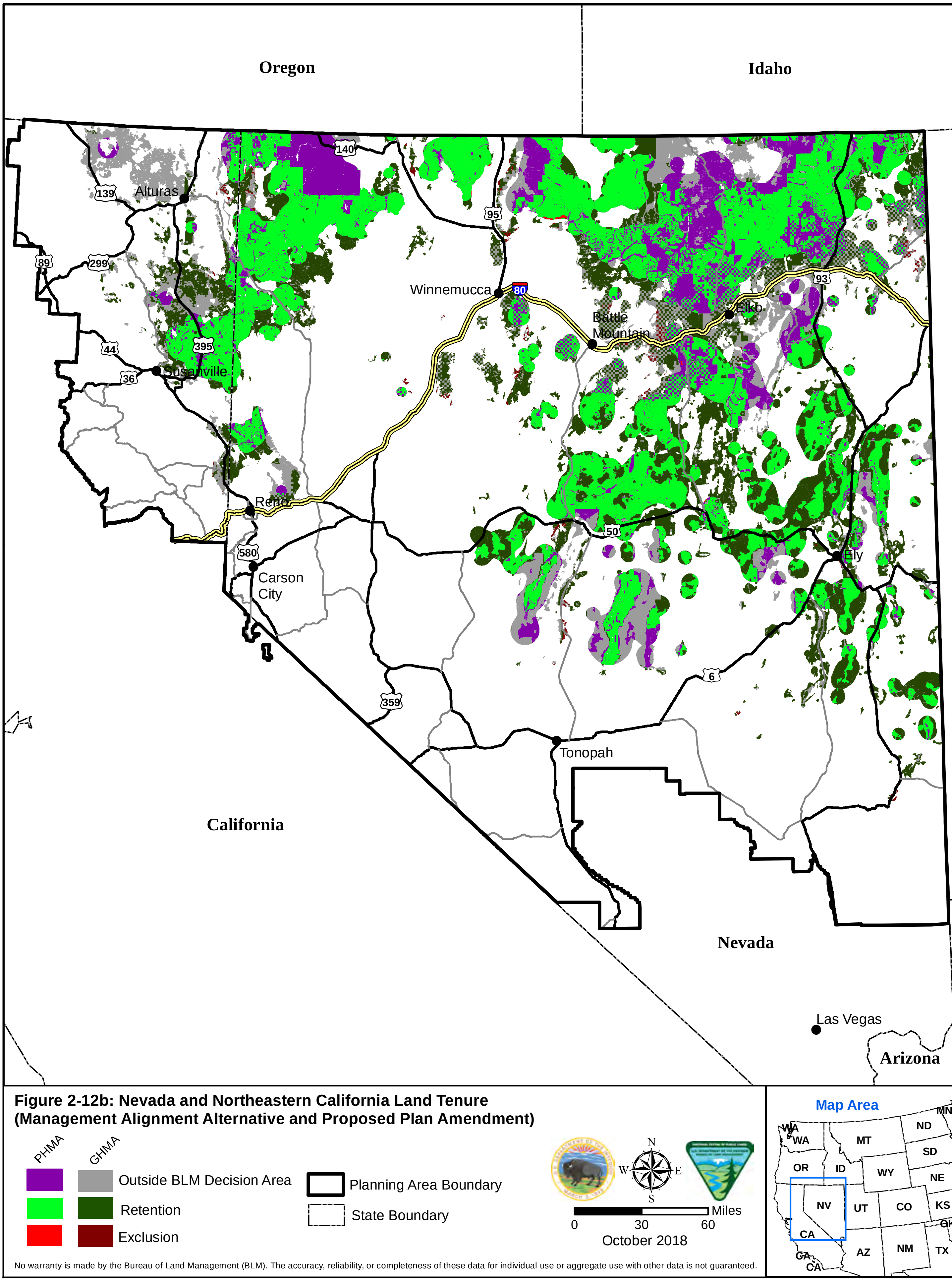


Figure 2-12b: Nevada and Northeastern California Land Tenure (Management Alignment Alternative and Proposed Plan Amendment)

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

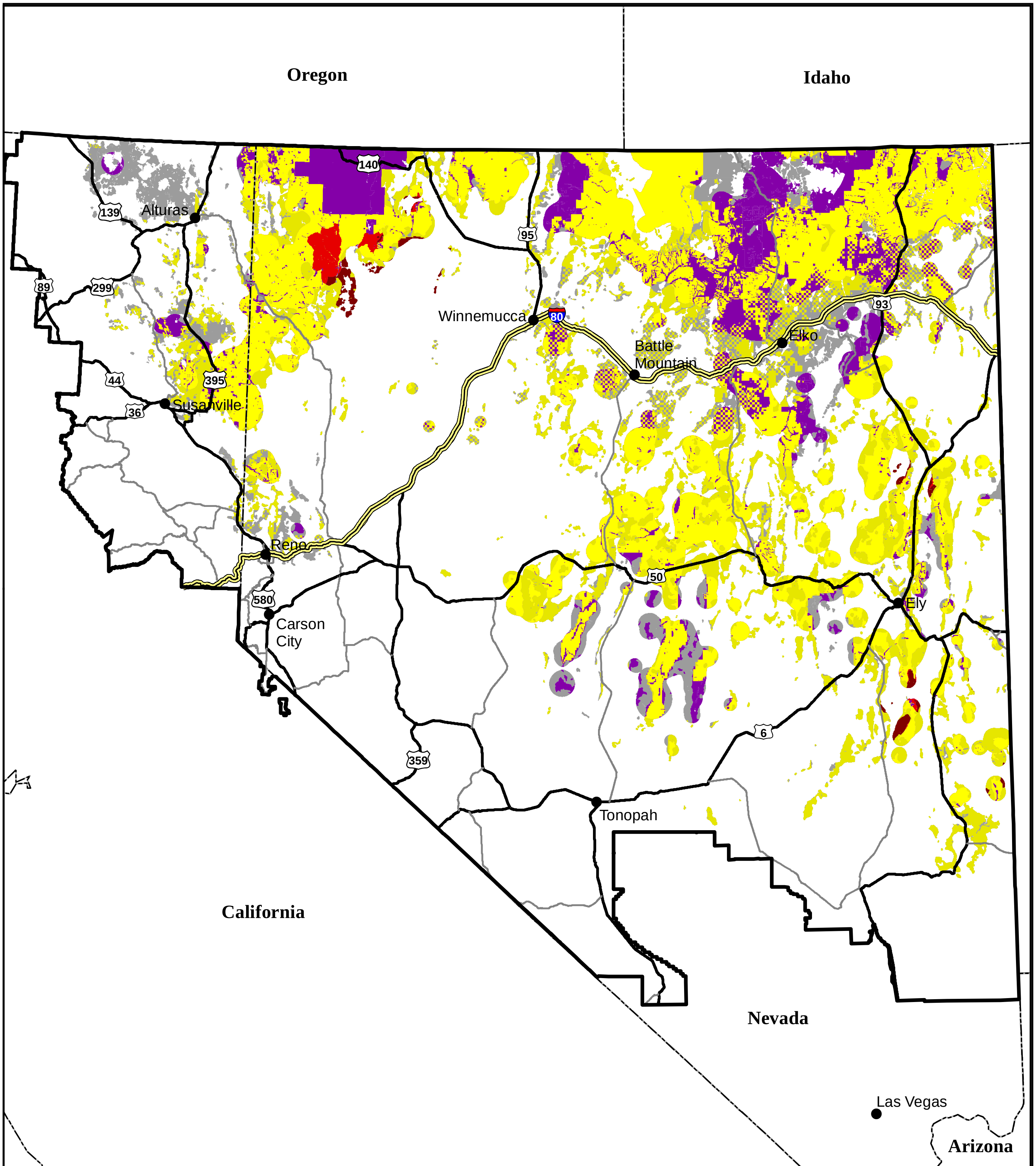


Figure 2-13a: Nevada and Northeastern California Trails and Travel Management (No Action)

PHMA | GHMA
Outside BLM Decision Area
Closed
Limited

Planning Area Boundary
State Boundary

N W E S

0 30 60 Miles
October 2018

Map Area
WA MT ND OR ID WY SD NE NV UT CO KS CA AZ NM TX

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

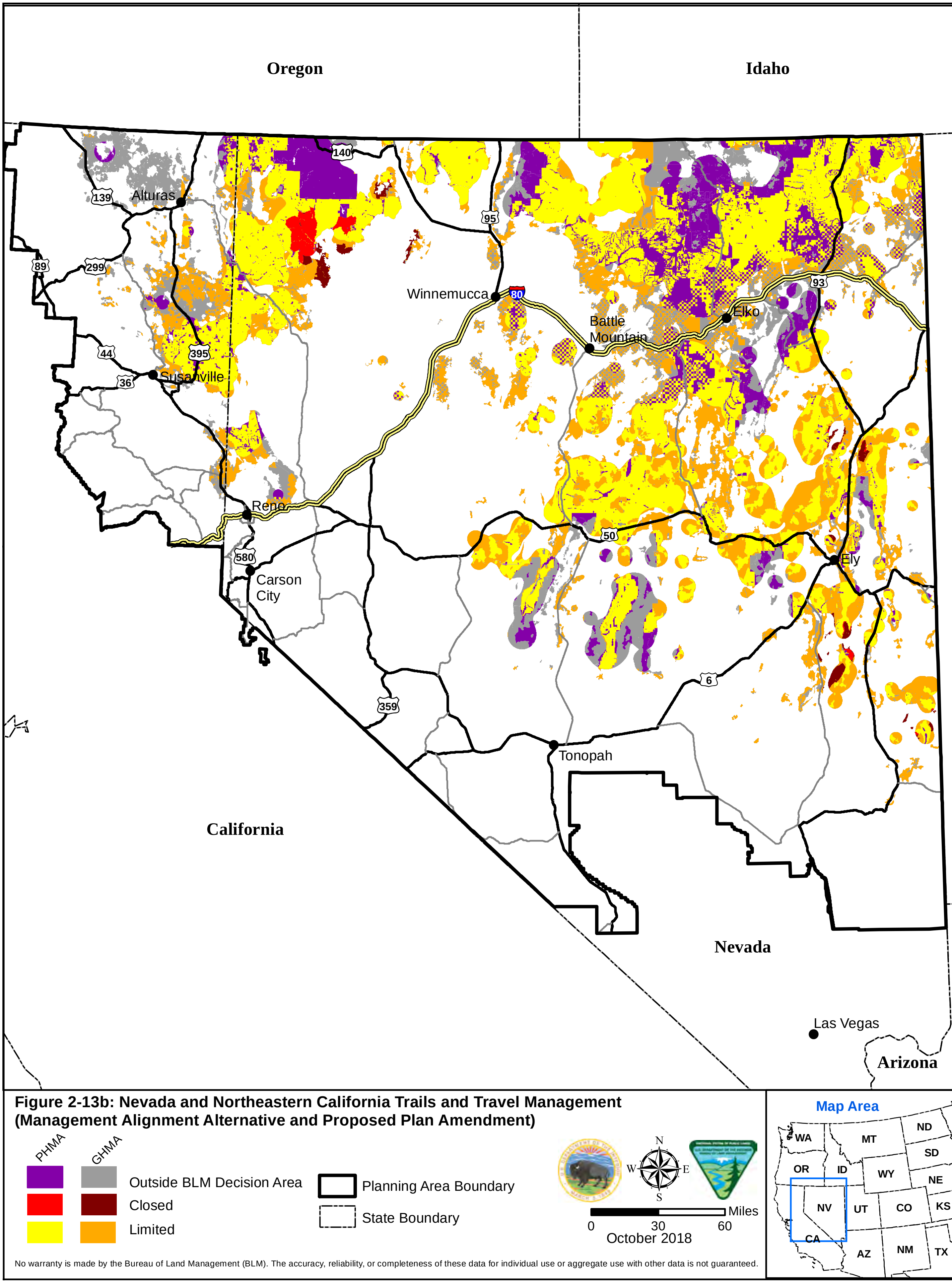


Figure 2-13b: Nevada and Northeastern California Trails and Travel Management (Management Alignment Alternative and Proposed Plan Amendment)

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

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Appendix B

Review of the NTT and COT Report's Relevance to the Planning Process; Incorporation of the NTT, COT, and USGS Summary of Science into the Nevada and California Planning Process

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This appendix outlines how the NTT and COT and reports factored into the planning process for the FEIS, and how NTT, COT, and USGS science was incorporated into the planning process.

B.1 BLM National Technical Team Report (2011)

In 2010, the US Fish and Wildlife Service (USFWS) determined that Greater Sage-Grouse warranted listing under the Endangered Species Act, but was precluded from listing due to other priorities. In response to this determination, the BLM initiated a land use planning process in 2011. To help inform that process the BLM assembled a "National Technical Team" (NTT), comprising state and federal resource specialists and scientists to review the scientific literature available at that time. On December 21, 2011 the NTT finalized a document entitled *A Report on National Greater Sage-Grouse Conservation Measures*, also known as the National Technical Team Report (NTT Report). The report was developed to provide "the latest science and best biological judgement" from the available literature (NTT Report, Introduction, page 5). Though the NTT Report is not itself science, the NTT used the best science available at that time to inform the conservation measures it identified for BLM decision-makers to consider through the land use planning and NEPA process.

On December 27, 2011, the BLM issued policy in Instruction Memorandum 2012-044 requiring BLM offices to "consider all applicable conservation measures when revising or amending its RMPs in Greater Sage-Grouse habitat" (IM-2012-44, Policy/Action). The IM clarified a distinction between "all applicable conservation measures" and those included in the NTT Report by noting in the following sentence that "the conservation measures developed by the NTT…must be considered and analyzed, as appropriate, through the land use planning process" (ibid). Each BLM planning effort complied with this policy by including an alternative based entirely on the conservation measures identified by the NTT. This was Alternative B in the 2013 Draft EIS and 2015 Final EIS, and by extension in the 2018 Draft and Final EISs. Through this alternative and corresponding analysis, the BLM complied with its policy for considering the conservation measures in the NTT Report.

It is critical to clarify that neither the NTT nor the BLM's policy intended that the conservation measures in the NTT Report were to be automatically applied across the range without intervening consideration through detailed land use planning and NEPA analysis. In the same paragraph that directs the BLM to "consider all applicable conservation measures" from the NTT Report, IM-2012-044 also notes that "while these conservation measures are range-wide in scale, it is expected that at the regional and sub-regional planning scales there may be some adjustments of these conservation measures in order to address local ecological site variability." Moreover, the NTT understood that the measures in its report would be evaluated alongside competing land use planning considerations and with follow-up environmental analysis relating to the conservation efficacy of its measures. As the NTT Report described, the conservation measures are not themselves management decisions but rather have been prepared "to assist [the BLM] in making management decisions." (NTT Report, Introduction, page 5.) In other words, "the conservation measures described in [the] report *are not an end point* but, rather, *a starting point* to be used in the BLM's planning processes" (ibid, page 5) (emphasis added).

The principle of local adaptation of scientific results and recommended conservation measures derived from them is present in other documents with Greater Sage-Grouse conservation recommendations. In 2014, three years after the NTT Report, the Department of the Interior requested the US Geological Survey (USGS) prepare a report that compiled and summarized published scientific studies regarding buffer distances around Greater Sage-Grouse habitats. In the report titled *Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review* (Open File Report 2014-1239), USGS scientists note that "responses of individual birds and populations, coupled with variability in land-use patterns and habitat conditions, add variation in research results. This variability presents a challenge for land managers and planners seeking to use research results to guide management and plan for Greater Sage-Grouse conservation measures. Variability between Greater Sage-Grouse populations and their responses to different types of infrastructure can be substantial across the species' range. Logical and scientifically justifiable departures from the 'typical response,' based on local data and other factors, may be warranted when implementing buffer protections or density limits in parts of the species' range" (USGS Open File Report 2014-1239, page 2). A simple statement from the report indicates this variability, where the USGS scientists noted that "there is no single distance that is an appropriate buffer for all populations and habitats across the Greater Sage-Grouse range" (ibid, pg. 2).

Further, the BLM's policy requiring consideration of the conservation measures in the NTT Report allowed for individual planning efforts to make adjustments to the report's conservation measures. IM-2012-044 states that "the NTT-developed conservation measures were derived from goals and objectives developed by the NTT" and that "these goals and objectives are a *guiding philosophy* that should *inform* the goals and objectives developed for individual land use plans. However, *it is anticipated that individual plans may develop goals and objectives that differ and are specific to individual planning areas*" (emphasis added). The anticipation for variability across the range is even more explicit when the IM notes that "while [the NTT Report's] conservation measures are range-wide in scale, *it is expected* that at the regional and sub-regional planning scales there may be some adjustments of these conservation measures in order *to address local ecological site variability*" (emphasis added). With specific consideration of this variability, each BLM planning and NEPA effort developed and analyzed a range of alternative approaches for Greater Sage-Grouse habitat management in each sub-region/state. Through this process, the BLM considered local and regional differences, analyzing the effect of each alternative approach locally and cumulatively.

As the NTT developed its conservation measures, it did not take into consideration other legal and regulatory requirements associated with land use planning and NEPA. For example, the NTT's range-wide conservation measures did not take into account State or local Greater Sage-Grouse conservation efforts. Further, the NTT Report's conservation measure that recommends that priority Greater Sage-Grouse habitat areas be designated as unsuitable for all surface mining of coal entirely overlooks the specific process to determine unsuitability prescribed in 43 Code of Federal Regulations (CFR) 3461. Elsewhere the NTT Report states that "a 4-mile [no surface occupancy (NSO) stipulation] likely would not be practical given most leases are not large enough to accommodate a buffer of this size, and lek spacing within priority habitats is such that lek-based buffers may overlap and preclude all development" (NTT Report, page 21) and therefore presents a conservation measure to close priority Greater Sage-Grouse habitat areas to fluid mineral leasing. This is not consistent with BLM planning guidance directing planning teams that "when applying leasing restrictions, the least restrictive constraint to meet the resource protection objective should be used" (BLM-H-1601 Appendix C page 24); whether or not a lease is large enough to accommodate a large NSO should not be a consideration if NSO provides the necessary protection. In its foundational legislation for the BLM, Congress specifically declared that it neither enlarged nor diminished the authority of the states in managing fish and wildlife. In recognizing this role, as well as local knowledge and expertise, Congress directed the BLM to develop its land use plans to "be consistent with State and local plans to the maximum extent [the BLM] finds consistent with Federal law and the purposes of [FLPMA]" (Federal Land Policy and Management Act {FLPMA}, Section 202 (c)(9)).*

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In recognition of instances where the NTT Report's conservation measures were not consistent with law, regulation, or policy, the BLM's policy direction in IM-2012-044 directs that "when considering the [NTT Report's] conservation measures…BLM offices should ensure that implementation of any of the measures is consistent with applicable statute and regulation. Where inconsistencies arise, BLM offices should consider the conservation measure(s) to the fullest extent consistent with such statute and regulation."

Each BLM planning effort fully considered the broad, range-wide recommendations from the NTT Report through the required NEPA process. This consideration was accomplished, as directed by Congress, using a "systematic interdisciplinary approach to achieve integrated consideration of physical, biological, economic, and other sciences" (FLPMA Section 202(c)(2)). Through careful consideration of the NTT's conservation measures, as well as local expertise, monitoring, partnerships, and other resource and land uses, the BLM developed Greater Sage-Grouse management goals, objectives, and management actions that accounted for the variability of habitat and resources across the range. Through the combination of both the 2015 and 2019 planning processes the BLM complied with the statutory requirement that the BLM resolve, "to the extent practical, inconsistencies between Federal and non-Federal Government plans" (FLPMA Sec. 202(c)(9)). Through these efforts, the BLM has met its statutory and regulatory responsibilities related to its consideration of the conservation measures contained in the NTT Report.

What the NTT Report and its Conservation Measures Are:

- The NTT Report included science-based management considerations for Greater Sage-Grouse to promote sustainable Greater Sage-Grouse populations.
- The conservation measures were to be considered and analyzed through the BLM's land use planning process.
- The conservation measures are range-wide in scale, not accounting for local variability.
- The conservation measures were a starting point to be used in the BLM's planning process.
- The NTT Report was developed by a team of resource specialists and scientists familiar with Greater Sage-Grouse literature and BLM programs.

What the NTT Report and its Conservation Measures Are Not:

- Unlike FLPMA's requirement that the BLM develop and modify Land Use Plans in coordination with state and local plans and policies, the NTT Report was not developed with input from or consideration of plans, policies, or programs of State, Tribal, or local government agencies.
- The conservation measures were not developed using a systematic interdisciplinary approach, as required by FLPMA for land use plans.
- The NTT Report presented conservation measures that would provide food and habitat for one species of wildlife, but did not consider other FLPMA requirements for BLM to manage for other species and resources while also recognizing the need for sources of minerals, food, timber and fiber from public lands.
- The NTT Report is not a land use plan, or an amendment or revision to a land use plan.
- The conservation measures were based on best available science at the time and do not provide for future updates in scientific knowledge or technological advancements.
- When preparing the NTT Report, the NTT did not complete a NEPA analysis on its conservation measures. Instead, the BLM completed NEPA and land use planning processes in 2015 and 2019 to assess the environmental consequences of the NTT Report's conservation measures, as well as alternatives to those measures—and to account for competing land management considerations.

B.2 US Fish and Wildlife Conservation Objectives Team Report (2013)

In 2012 the director of the USFWS convened a Conservation Objectives Team (COT) of state and USFWS representatives. The team developed a peer-reviewed report (COT Report) that delineated objectives based on the "best scientific and commercial data available at the time of its release" (COT Report, page ii). The COT Report, released in March 2013, identifies conservation objectives, measures, and options for each of the Greater Sage-Grouse threats assessed. The COT Report also identified Priority Areas for Conservation (PACs) which were identified as "the most important areas needed for maintaining Greater Sage-Grouse representation, redundancy, and resilience across the landscape" (ibid, page 13). Unique compared to the NTT Report, the COT Report identified threats to each PAC, recognizing that threats vary across the range, and therefore corresponding management should vary to address those threats. The preface to the report is clear that the COT report "is guidance only" and that the "identification of conservation objectives and measures does not create a legal obligation beyond existing legal requirements" (ibid, page ii). Further, the preface notes that the objectives "are subject to modification as dictated by new findings, changes in species' status, and the completion of conservation actions" (ibid, page ii).

The COT Report clearly identifies the necessity to adapt Greater Sage-Grouse conservation goals, objectives, and measures due to variability across the range. The COT noted that "due to the variability in ecological conditions and the nature of the threats across the range of the Greater Sage-Grouse, *developing detailed, prescriptive species or habitat actions is not possible at the range-wide scale*" (emphasis added) (COT Report, Section 5- Conservation Objectives, page 31). The COT Report summarizes the relationship between its range-wide conservation goals, objectives, and measures and the state-specific planning efforts, noting that "specific strategies or actions necessary to achieve the following conservation objectives must be developed and implemented at the state or local level, with the involvement of all stakeholders" (ibid).

The BLM received the COT Report when developing its 2013 Draft EIS and fully considered it prior to Draft EIS publication, providing for public review of the BLM's evaluation. Upon receipt of the Report the BLM evaluated the range of alternatives and determined that the threats addressed by the COT Report were all addressed in the range of alternatives; this was presented to the public in Appendix C in the 2013 Draft EIS. The BLM also evaluated the impacts to Greater Sage-Grouse from the alternatives and determined that the COT Report objectives were all addressed within the range of alternatives; this was presented to the public in the 2013 Draft EIS Chapter 2 Table 2.4 (Comparison of Alleviated Threats to GRSG in the Utah Sub-Region).

Following public comments and development of the 2015 Proposed Plan, Section 2.5 of the Final EIS updated the crosswalk between the USFWS threats and the BLM program areas, showing that all the threats for which the BLM has discretion were addressed. Section 2.11.7 notes that all conservation measures and objectives identified in the COT report were considered within the 2015 Final EIS range of alternatives. Finally, a table was added to the 2015 Final EIS Executive Summary that showed the management actions from the 2015 Proposed Plan that addressed the COT Report threats.

On October 2, 2015, the USFWS determined that "listing the Greater Sage-Grouse as a threatened or endangered species is not warranted…" (Federal Register Vol. 80, No. 191, 59936). One of the rationales for this determination was that "the new Federal land-management paradigm is established in 98 amended Federal Plans that reduce and minimize threats to the species in the most important habitat for the species" (ibid). Through this language, it is clear that the 2015 planning efforts incorporated the recommendations from the COT Report to a degree that met the report's goal of "long-term conservation of Greater Sage-Grouse and healthy sagebrush shrub and native perennial grass and forb communities by maintaining viable, connected, and well-distributed populations and habitats across their range, through threat amelioration, conservation of key habitats, and restoration activities" (COT Report, page 13).

What the COT Report and its Objectives, Measures and Options Are:

- The COT Report is a compilation of reasonable objectives, based upon the best scientific and commercial data available at the time of its release, for the conservation and survival of Greater Sage-Grouse.
- The COT Report is guidance to federal land management agencies, state Greater Sage-Grouse teams, and others developing efforts to achieve conservation for Greater Sage-Grouse.
- The COT Report was clear that its objectives were subject to modification based on new findings, changes in species' status, and the completion of conservation actions.
- The COT Report was developed by a team of state and USFWS representatives selected by their respective state or agency.

What the COT Report and its Objectives, Measures and Options Are Not:

- The COT Report is not a recovery plan, conservation strategy, or conservation agreement.
- The COT Report did not include input from BLM biologists or BLM field staff familiar with local habitat conditions and threats.

- The COT Report was not developed with input from the BLM, its managers, planners, wildlife program leads, or field biologists and as such includes objectives, measures and options that do not consider the BLM's statutory, regulatory, or policy requirements.
- When preparing the COT Report, the USFWS did not complete a NEPA analysis on its conservation objectives, measures, and options. Instead, the BLM completed NEPA and land use planning processes in 2015 and 2019 to assess the environmental consequences of the COT Report conservation objectives, measures, and options, as well as alternatives to those objectives, measures, options—as they applied to the development of affected BLM land use planning decisions—while accounting for competing land management considerations.

B.3 Excerpts from the Nevada and California FEIS November 2018

- **Executive Summary**
  - **p. ES-5.** *Plan Maintenance* - Management Decisions SSS 2(D) and SSS 3(C) from the 2015 ARMPA/ROD have been clarified to resolve conflicting statements regarding how the BLM would "apply" lek buffers contained in the USGS "*Conservation Buffer Distance Estimates for Greater Sage-Grouse–A Review", Open File Report 2014-1239* (Mainer et al. 2014).
  - **p. ES-9.** The BLM continues to build upon the 2015 planning effort as envisioned in Secretarial Order (SO) 3353 by collaborating with states and stakeholders to improve compatibility between federal management plans and state plans and programs at the state level, while ensuring consistency with the BLM's multiple use mission and obligation to protect Greater Sage-Grouse habitat. This enhanced cooperation between the BLM and the states would lead to improved management and coordination with states across the range of Greater Sage-Grouse. These modifications include updating and making adjustments to HMAs and including language that would allow the BLM to update them through plan maintenance, when appropriate, based on the best available current science; removing SFA designations; incorporating new science into the adaptive management strategy and replacing predetermined hard trigger responses with a clear causal factor analysis process to determine the appropriate management responses and to address the decline in Greater Sage-Grouse populations and/or habitat; revising and simplifying an allocation exception process to allow for the consideration of projects within Greater Sage-Grouse HMAs provided they meet prescribed criteria; solidifying the BLM's commitment to use the most current version and future updated versions of the State of Nevada's Habitat Quantification Tool (HQT) to quantify disturbance calculations; and identifying that seasonal timing restrictions and modifying habitat objectives would be addressed in coordination with the US Geological Service (USGS), Nevada Division of Wildlife (NDOW), CDFW, and others.

- <u>**Chapter 1:**</u> **Purpose of and Need for Action**
  - **p. 1-2.** On March 29, 2017, the Secretary of the Interior (Secretary) issued Secretarial Order (SO) 3349, American Energy Independence, ordering DOI agencies to reexamine practices "to better balance conservation strategies and policies with the equally legitimate need of creating jobs for hard-working American families." On June 7, 2017, the Secretary issued SO 3353 with a purpose of enhancing cooperation among 11 western states and the BLM in managing and conserving Greater Sage-Grouse. SO 3353

directed an Interior Review Team, consisting of the BLM, USFWS, and US Geological Survey (USGS), to coordinate with the Sage-Grouse Task Force Team and review the 2015 Greater Sage-Grouse plans and associated policies to identify provisions that may require modification to make the plans more consistent with the individual state plans and better balance the BLM's multiple-use mission as directed by SO 3349. On August 4, 2017, the Interior Review Team submitted its "Report in Response to SO 3353." This report made recommendations for modifying the Greater Sage-Grouse plans and associated policies to better align with the individual state plans. On August 4, 2017, the Secretary issued a memo to the Deputy Secretary directing the BLM to implement the recommendations found in the report.

- **p. 1-6.** This RMPA/EIS would incorporate, as appropriate, information in a USGS report that identified and annotated Greater Sage-Grouse science published since January 2015 (Carter et al. 2018) and a report that synthesized and outlined the potential management implications of this new science (Hanser et al. 2018), and other best available science.
- **p. 1-10 - 11.** *Plan Maintenance* - Management Decisions SSS 2(D) and SSS 3(C) from the 2015 ARMPA/ROD have been clarified to resolve conflicting statements regarding how the BLM would "apply" lek buffers contained in the USGS Report *Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review, Open File Report 2014-1239* (Mainer et al. 2014). Management Decisions SSS 2(D) and SSS 3(C) have been revised to read as follows:

  In undertaking BLM management actions [in PHMA and GHMA], and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM would utilize the lower end of the interpreted range of lek buffer-distances and guidance identified in Mainer et al. (2014) to establish the evaluation area around leks that would be used to analyze impacts during project-specific NEPA, including scientifically justifiable departures based on local data, topography, and other factors, in accordance with Appendix B.

  Appendix B has also been revised to reflect this clarified decision language.

- <u>**Chapter 2:**</u> **Alternatives**
  - **Section 2.2.1 Varying Constraints on Land Uses and Development Activities. p. 2-2.** Alternative B was based on the conservation measures developed by the National Technical Team planning effort in the Washington Office Instruction Memorandum (IM) 2012-044. As directed in the IM, the conservation measures developed by the National Technical Team must be considered and analyzed, as appropriate, through the land use planning process and NEPA by all BLM state and field offices that contain occupied Greater Sage-Grouse habitat. Most management actions included in Alternative B would have been applied to PHMA.
  - **Section 2.2.1 Varying Constraints on Land Uses and Development Activities. p. 2-2 - 3.** The Proposed LUPA incorporated guidance from specific State Conservation strategies, as well as additional management based on the National Technical Team recommendations. This alternative emphasized management of Greater Sage-Grouse seasonal habitats and maintaining habitat connectivity to support population objectives.

- **Section 2.2.1 Varying Constraints on Land Uses and Development Activities. p. 2-3.** Further, additional constraints on land uses or development without a documented need would not meet the purpose of SO 3353. The BLM did not discover new information that would indicate that it should increase the level of conservation, management, and protection to achieve its land use plan objective. As part of the consideration of whether to amend the 2015 ARMPA/ROD, the BLM partnered with the USGS to review the best available information published since January 2015, develop an annotated bibliography of that Greater Sage-Grouse science (Carter et al. 2018; see Section 3.1), and incorporate the information into this EIS. In addition, SO 3353 directs the BLM to promote habitat conservation, while contributing to economic growth and energy independence. As analyzed in the 2015 Final EIS, all of the previously analyzed alternatives, including one proposing constraints stricter than the current management plan, were predicted to result in a loss of development opportunities on public lands.
- **Section 2.4 Comparative Summary of Alternatives. p. 2-5.** Table 2-1 below provides a comparison between acres designated as PHMA, GHMA, and Other Habitat Management Areas (OHMA) (managed by the BLM) between the No-Action Alternative and Management Alignment Alternative. The change in acres between these two alternatives is based on the BLM's consideration in the Management Alignment Alternative of new PHMA, GHMA, and OHMA boundaries, from the composite management categories contained within the USGS's Spatially Explicit Modeling of Annual and Seasonal Habitat for Greater Sage-Grouse (*Centrocercus urophasianus*) in Nevada and Northeastern California—an updated decision-support tool for management (Coates et al. 2016) and as adopted and modified by the State of Nevada on December 11, 2015
- **Table 2-2 Comparison of Alternatives. p. 2-7 – 25.** USGS appears.

- <u>**Chapter 3:**</u> **Affected Environment**
  - **Section 3-1 Introduction. p. 3-1.** The BLM analyzed the management situation in full compliance with its regulations and policies. The BLM evaluated inventory and other data and information, partnering with USGS and coordinating extensively with States, to help provide a basis for formulating reasonable alternatives. The BLM described this process in its Report to the Secretary in response to SO 3353 (Aug. 4, 2017). Among other things, the Report describes how the BLM coordinated "with each State to gather information related to the [Secretary's] Order, including State-specific issues and potential options for actions with respect to the 2015 GRSG Plans and Instruction Memorandums (IMs) to identify opportunities to promote consistency with State plans." (Report to the Secretary at 3.) This process overlapped to some degree with the BLM's scoping process, which also assisted the BLM in identifying the scope of issues to be addressed and significant issues, and with coordination with the States occurring after the Report.
  - **Section 3.1.1 Greater Sage-Grouse Literature, 2015-2018. p. 3-2.** As part of the consideration of whether to amend some, all, or none of the 2015 Greater Sage-Grouse land use plans, the BLM requested the USGS to inform the effort through the development of an annotated bibliography of Greater Sage-Grouse science published

since January 2015 (Carter et al. 2018)[1] and a report that synthesized and outlined the potential management implications of this new science (Hanser et al. 2018).

Following the 2015 Final EIS, the scientific community has continued to improve the knowledge available to inform implementation of management actions and an overall understanding of Greater Sage-Grouse populations, their habitat requirements, and their response to human activity. The report discussed the science related to six major topics identified by USGS and BLM (summarized below), as follows:

- Multiscale habitat suitability (habitat objectives) and mapping tools
- Discrete human activities
- Diffuse activities
- Fire and invasive species
- Restoration effectiveness
- Population estimation and genetics

– **Section 3.1.1 Greater Sage-Grouse Literature, 2015-2018. p. 3-3.** Advances in modeling and mapping techniques at the range-wide scale can help inform broad-scale habitat assessment, allocations, and targeting of land management resources to benefit Greater Sage-Grouse conservation. The 2015 Final EIS included the 2014 version of the "Spatially explicit modeling of Greater Sage-Grouse (*Centrocercus urophasianus*) habitat in Nevada and northeastern California—A decision-support tool for management"-USGS Open-File Report 2014-1163 (Coates et al. 2014) to delineate Greater Sage-Grouse HMAs within the planning area.

In 2016, the USGS updated the 2014 decision support tool, as follows:

- Adding radio and global positioning system (GPS) telemetry locations from Greater Sage-Grouse monitored at multiple sites during 2014 to the original location dataset beginning in 1998
- Integrating high resolution maps of sagebrush and pinyon and/or juniper cover
- Modifying the spatial extent of the analyses to match newly available vegetation layers
- Accounting for differences in habitat availability between mesic sagebrush steppe communities in the northern part of the study area and drier Great Basin sagebrush in southerly regions
- Deriving updated land management categories and an updated index of Greater Sage-Grouse abundance and space-use
- Masking urban footprints and major roadways out of the final map products

Based on continued efforts to refine and improve Greater Sage-Grouse habitat mapping and incorporate the best available science, the BLM is considering adopting the updated 2016 spatially explicit model -USGS Open-File Report 2016-1080 (Coates et al. 2016), which was adopted by the State of Nevada and recommended for adoption by the State of California. Adoption of Coates et al. 2016 would allow the BLM to update delineations for Greater Sage-Grouse HMAs (PHMA, GHMA, and OHMA).

  - **Section 3.3 Greater Sage-Grouse and its Habitat. p. 3-6.** Since 2015, the BLM and Forest Service have been implementing the Greater Sage-Grouse conservation measures outlined in the 2015 Final EIS. In addition to working with partners, such as NDOW, CDFW, and USGS, to monitor the status of Greater Sage-Grouse populations in the planning area, the BLM has also been tracking human disturbance, wildland fire, and reclamation/restoration efforts in Greater Sage-Grouse HMAs.
  - **Section 3.3.1 Greater Sage-Grouse Population Status. p. 3-7 – 8.** In a recent publication by USGS (Coates et al. 2017b), data from monitored Greater Sage-Grouse lek sites across Nevada and Northeastern California from 2000 to 2016 were used to estimate annual rates of change in Greater Sage-Grouse populations. As of 2016, populations across Nevada and northeastern California have declined at an average rate of 3.86 percent annually over the last 17 years. This estimated rate of population decline corresponds to other estimates documented for Greater Sage-Grouse in the Great Basin (Garton et al. 2011; Coates et al. 2016a).

- **<u>Chapter 4:</u> Environmental Consequences**
  - **Section 4.13.2 Why Use the WAFWA Management Zone? p. 4-26.** The cumulative effects analysis area for Greater Sage-Grouse extends beyond a state, political, or planning area boundary to reflect the WAFWA MZs because they encompass areas with similar issues, threats, and vegetative conditions important Greater Sage-Grouse habitat management. Each suite of threats to specific Greater Sage-Grouse populations have been identified in the USFWS's 2013 Conservation Objectives Team (COT) Report, the 2015 Regional RODs (BLM 2015c), and the USFWS' 2010 Listing Decision. The 2015 Regional RODs (BLM 2015c) identify how planning level allocation decisions address the identified threats to populations, which are aggregated in this analysis by MZs. The threats vary geographically and may have more or less impact on Greater Sage-Grouse and its habitat in some parts of the MZs, depending on such factors as climate, land use patterns, and topography.
  - **Section 4.4 Incomplete or Unavailable Information. p. 4-10.** The best available information pertinent to the decisions to be made was used in developing the 2015 Final EIS as well as this Proposed RMPA/Final EIS. The BLM made a considerable effort to acquire and convert resource data into digital format from the BLM and outside sources (e.g., NDOW, USGS, etc.).
  - **Section 4.5.2 Management Alignment Alternative. p. 4-11.** The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. This would ensure that current and future renditions of HMA boundaries accurately reflect Greater Sage-Grouse habitat on the ground and guide management actions appropriately. As the boundaries are updated, the land use plan allocations associated with each HMA (see Table 2-1) would be adjusted to match the newest USGS map model (Coates et al. 2016). This would help to conserve the species by ensuring allocations and any of their associated restrictions are applied in the appropriate areas, while allowing infrastructure and economic development to occur in areas that would not affect the species.

- **Section 4.6.2 Management Alignment Alternative. p. 4-15.** The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. The allocations associated with each HMA (Table 2-2) would be adjusted based on updates to the USGS map model (Coates et al. 2016). The allocation exception process would be updated and standardized, as described in Table 2-2, to allow for the consideration of projects within HMAs, provided they meet prescribed criteria.
- **Section 4.7.2 Management Alignment Alternative. p. 4-16 - 17.** The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. The land use plan allocations associated with each HMA (Table 2-2) would be adjusted to align with the USGS map model, as updated (Coates et al. 2016). The allocation exception process would be updated and standardized, as described in Table 2-2, to allow for the consideration of projects within HMAs, provided they meet the prescribed criteria.
- **Section 4.8.2 Management Alignment Alternative. p. 4-17 – 18.** The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. The land use plan allocations associated with each HMA (Table 2-2) would be adjusted to align with USGS map model as updated (Coates et al. 2016). The allocation exception process would be updated and standardized, as described in Table 2-2, to allow for the consideration of projects within HMAs, provided they meet prescribed criteria.
- **Section 4.9.2 Management Alignment Alternative. p. 4-19.** The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. The land use plan allocations associated with each HMA (Table 2-2) would be adjusted to align with USGS map model as updated (Coates et al. 2016). The allocation exception process would be updated and standardized, as described in Table 2-2, to allow for the consideration of projects within HMAs, provided they meet prescribed criteria.
- **Section 4.10.2 Management Alignment Alternative. p. 4-20.** The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. The land use plan allocations associated with each habitat management area (Table 2-2) would be adjusted to align with USGS map model as updated (Coates et al. 2016). The allocation exception process would be updated and standardized, as described in Table 2-2, to allow for the consideration of projects within Greater Sage-Grouse HMA, provided they meet prescribed criteria.
- **Section 4.11.2 Management Alignment Alternative. p. 4-21.** The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically

revising these boundaries in the future, as new data becomes available. The land use plan allocations associated with each HMA (Table 2-2) would be adjusted to align with the USGS map model as updated (Coates et al. 2016). The allocation exception process would be updated and standardized, as described in Table 2-2, to allow for the consideration of projects within HMAs, provided they meet prescribed criteria.

- **Section 4.12.2 Management Alignment Alternative. p. 4-22.** The Management Alignment Alternative proposes to update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. The land use plan allocations associated with each habitat management area (Table 2-2) would be adjusted to align with the USGS map model as updated (Coates et al. 2016). The allocation exception process would be updated and standardized, as described in Table 2-2, to allow for the consideration of projects within HMAs, provided they meet the prescribed criteria.
- **Section 4-13 Cumulative Effects Analysis. p. 4-23.** This Proposed RMPA/Final EIS incorporates by reference the analysis in the 2015 Final EIS and the 2016 SFA Draft EIS, which comprehensively analyzed the cumulative impacts associated with these planning decisions under consideration in that process. The 2015 Final EIS, and to some degree the 2016 SFA Draft EIS evaluated the cumulative impacts associated with the No-Action Alternative in this Proposed RMPA/Final EIS. The Management Alignment Alternative's and Proposed Plan Amendment's impacts are effectively within the range of effects analyzed by the 2015 Final and 2016 SFA Draft EISs. The 2015 Final EIS is quite recent, and the BLM has determined that conditions in the Nevada and Northeastern California Sub-region have not changed significantly based, in part, on the USGS science review (see Chapter 3), as well the BLM's review of additional past, present, and reasonably foreseeable actions in 2018. Conditions on public land have changed little since the 2015 Final EIS, and to the extent that there have been new actions or developments, the impacts associated with those actions or developments are in line with the projections in the 2015 Final EIS regarding reasonably foreseeable future actions and effects. Additionally, changes that have occurred on a smaller scale, like wildfires, received prompt responses. Since the nature and context of the cumulative effects scenario has not appreciably changed since 2015, and the 2015 analysis covered the entire range of the Greater Sage-Grouse, the BLM's consideration of cumulative effects in the 2015 Final EIS adequately addresses most, if not all, of the planning decisions to be made through this planning effort.
- **Section 4.13.1 Range-wide Cumulative Effects Analysis – Greater Sage-Grouse. p. 4-25.** The BLM's assessment that conditions and cumulative impacts have not changed significantly is based, in part, on the USGS science review (see Chapter 3) and the BLM's review of additional past, present, and reasonably foreseeable actions in 2018. Since the nature and context of the cumulative effects scenario have not appreciably changed since 2015, and the 2015 plans included analysis by WAFWA MZ across the entire range of the Greater Sage-Grouse, the cumulative effects analysis in the 2015 Final EIS applies to this planning effort and provides a foundation for the BLM to identify any additional cumulative impacts.

B.4 Excerpts from Chapter 2 NVCA FEIS June 2015 for NTT and COT:

Page	NTT	COT	USGS
2-1	–	–	**Changes to Chapter 2 between draft and final EIS:** • Developed separate BLM and Forest Service Proposed Plan Amendments • Added additional references to support the management decisions • Updated maps and habitat category acreages based on USGS-*A Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California: A Decision Support Tool for Management (Coates et al. 2014) (see Appendix A)* • Updated Alternative E based on the State of Nevada's revised Greater Sage-Grouse Plan submitted during the public comment period • Updated Alternative language, as appropriate, based on public comments received on the Draft LUPA/EIS. • Chapter 2 has been reorganized for consistency between all sub-regional GRSG LUPAs/EISs. • The GRSG habitat objectives table has been updated. • See additional changes in Section 2.1
2-1	–	–	Changes made to the Proposed LUPA/Final EIS from the preferred alternative (Alternative D) in Draft LUPA/EIS are the following: • Revised GRSG map—Updated PHMA and GHMA delineations based on best available science, i.e., USGS Open File Report 2014-1163; delineated unmapped areas identified in the DEIS based on the USGS report. With the adoption of the USGS habitat suitability map (2014), the unmapped habitat is now mapped and identified in the Proposed LUPA/Final EIS as OHMA. A description of the mapping change was analyzed in the Draft LUPA/EIS and an explanation can be found in Appendix A (Habitat Mapping Process).

Page	NTT	COT	USGS
2-3	–	–	As noted in the DEIS, one of the goals/objectives of this planning effort is to protect both the habitat and the species. (see, for example, the LUPA/DEIS Goal B-SSS 1, Goal D-SSS 1, Goal E-SSS 1, Goal F-SSS 1, and Objective D-SSS 4. Further, as noted by the USGS Report/Coates which supports the delineation of habitat mapping for this planning effort, the potential presence of bird in these areas of the SFAs is acknowledged (see USGS Open File Report 2014-1163; page page28, habitat definitions).
2-3 - 4	–	–	USGS Buffer Study—Included a management action to incorporate the lek buffer-distances identified in the USGS report titled Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review: USGS Open File Report 2014-1239 (Manier et al. 2014) during NEPA analysis at the implementation stage. Although the buffer report was not available at the time of the DEIS release, applying these buffers was addressed in the DEIS and is qualitatively within the spectrum of alternatives analyzed. Specifically, (Alternatives C and F) identified and analyzed allocation restrictions such as closure to fluid minerals, recommendation for withdrawal, elimination of grazing. For example, Alternative C proposed closure to fluid, salable, and non-energy leasable minerals in all GRSG habitat. It also included elimination of grazing in all habitat. In Alternative C, all GRSG habitat was excluded for ROW development. Alternative D proposed exclusion for solar and wind development in PHMA and GHMA and proposed closures for salable and non-energy leasable minerals. Alternative F proposed closure to fluid and salable minerals in PHMA and GHMA. Alternative F also proposed exclusion areas in PHMA and GHMA for solar, wind and all ROWs.

Page	NTT	COT	USGS
2-6	–	The BLM and Forest Service developed this LUPA/EIS to provide management direction for over 55 million acres of land that they administer in the Great Basin. This Proposed LUPA/ Final EIS analyzes alternatives that address threats to GRSG habitat identified in the USFWS listing decision and COT report (USFWS 2010 and 2013a).	–
2-10	Developed a No Action Alternative (Alternative A) and two preliminary action alternatives. The first, Alternative B, is based on A Report on National Greater Sage-Grouse Conservation Measures (NTT 2011), and the second, Alternative C, is based on a proposed alternative submitted by conservation groups.	–	–
2-10	Customized the goals, objectives, and actions from the NTT-based Alternative B to develop a third action alternative, Alternative D, for balance among competing interests.	–	–
2-11	–	–	The habitat nomenclature between the Draft LUPA/EIS and the Proposed LUPA/Final EIS has changed. The draft LUPA/EIS used the terms preliminary priority habitat (PPH) and preliminary general habitat (PGH) to describe GRSG habitat and as a basis for proposed management in the action alternatives. The Proposed LUPA/Final EIS uses the terms priority habitat management areas (PHMAs), general habitat management areas (GHMAs) and other management areas (OHMA). These areas are based on USGS (2014) habitat mapping, as described in Section 1.1.2, Nevada and Northeastern California Sub-regional Strategy, subsection- Habitat Delineation.

Page	NTT	COT	USGS
2-11 *(cont'd)*	–	–	Also, in the proposed plan, there is GRSG habitat mapped as other habitat management areas (OHMAs). This habitat was referenced in the Draft LUPA/EIS as unmapped habitat outside of PHMAs and GHMAs but in the planning area. With the adoption of the USGS habitat suitability map (2014), the unmapped habitat is now mapped and identified in the Proposed LUPA/Final EIS as OHMA.
2-12	–	Managing GRSG habitat in this document is focused on responding to the threats identified by the USFWS in its 2010 "warranted but precluded" finding on listing the GRSG, as well as its COT report (USFWS 2010 and 2013a). The USFWS threats do not necessarily align with BLM and Forest Service resource program areas, and they are often integrated into several different agency resource program areas. Table 2-1 provides a crosswalk between each of the 2010 warranted but precluded findings and COT-identified threats; the table compares these to the BLM and the Forest Service program areas addressing these threats, with references to the specific sections of the LUPA/Proposed Plan.	–
2-16	–	–	The BLM and Forest Service Proposed Plan Amendment considers documents related to the conservation of GRSG that have been released since the publication of the Draft LUPA/EIS. For example, this Proposed Plan Amendment considers the USFWS's October 27, 2014, memorandum, Greater Sage-Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes, and the USGSs' November 21, 2014, report, Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review (USGS 2014). Based on these documents, the BLM is proposing to designate SFAs to further protect highly valuable habitat. It is also proposing to include lek buffer-distances when authorizing activities near leks. The

Page	NTT	COT	USGS
2-16 *(cont'd)*	–	–	BLM and Forest Service also updated the Proposed Plan Amendment to reflect new GRSG state conservation strategies, including recent state executive orders.
2-18 - 19	–	–	Table 2-2 Proposed Habitat Objectives for GRSG. USGS appears.
2-22	–	–	In management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS report, Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review Open File-Report 2014-1239 (Manier et al. 2014), in accordance with Appendix B.
2-24	–	–	In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS report, Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review Open File Report 2014-1239 (Manier et.al 2014]), in accordance with Appendix B.
2-35	–	Action WFM-HFM 5: 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 option • How GRSG goals and objectives would be met by its use • How the COT report objectives would be addressed and met • A risk assessment to address how potential threats to GRSG habitat would be minimized.	–

Page	NTT	COT	USGS
2-76	–	–	The BLM and Forest Service cooperated with the Nevada SETT, NDOW, CDFW, and USFWS, along with GRSG research scientists from the USGS and the University of Nevada Reno in developing the adaptive management triggers, definitions, and methods of calculating population and habitat trends.
2-76	–	–	*Adaptive Management Application Scale and Reporting Units* The scale used to monitor for application of the adaptive management triggers are the Biological Significant Units (BSUs; **Map 2-1**) developed in collaboration with the Nevada SETT, NDOW, CDFW, and USGS. These areas represent local GRSG population use areas in the sub-region. The monitoring data on population and habitat can be aggregated up to the population, WAFWA management zone, or other reporting units, such as priority areas for conservation (PACs). Likewise, finer-scale management adjustments can be applied at the lek cluster-scale using population responses and triggers. The boundaries of the BSUs, lek clusters, and other reporting units may be adjusted over time, based on the understanding of local population interactions, genetic sampling and climate variation. Population monitoring methods may be updated based on new science and advances in technology (e.g., integrated population models).

Page	NTT	COT	USGS
2-79	–	–	***Population Trends for Triggers*** Counts of male GRSGs attending breeding leks provide reliable data for analyzing population growth trends (Fedy and Aldridge 2011). Lek counts can inform statistical estimation of population growth rates (see below) at each scale. "Trend leks" have been identified by NDOW, USGS and CDFW within each BSU. Trend leks are monitored consistently each year and have more available data than adjacent leks within the BSU. These trend leks will be used to estimate the population trends/averages within each BSU. Triggers for changes in population growth will be evaluated at three scales: individual lek (smallest scale), lek cluster, and BSU (largest scale).
2-82	–	–	The rate of GRSG population decline and the time frame over which populations are evaluated would be monitored and adjusted as understanding of GRSG population thresholds emerge. The BLM, Forest Service, NDOW, USGS, and CDFW would pursue a program to collect and incorporate additional demographic data into the GRSG space-use model.
2-89	–	In all GRSG habitat, in undertaking BLM/USFS management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Actions which result in habitat loss and degradation include those identified as threats which contribute to GRSG disturbance as identified by the US Fish and Wildlife Service in its 2010 listing decision (75 FR 13910), COT report (USFWS 2013a) and shown in Table 2 in the attached Monitoring Framework (Appendix E).	–

Page	NTT	COT	USGS
2-94 - 95	GRSG conservation measures in A Report on National Greater Sage-Grouse Conservation Measures (NTT 2011) were used to form BLM and Forest Service management direction under Alternative B. Management actions by the BLM and Forest Service in concert with other federal, state, and local agencies, tribes, and private landowners play a critical role in the future trends of GRSG populations. To ensure BLM and Forest Service management actions are effective and based on the best available science, the BLM's National Policy Team created the National Technical Team in August 2011. The BLM's objective for chartering this planning strategy was to develop new or revised regulatory mechanisms, through LUPs, to conserve and restore GRSG and its habitat on BLM-administered and National Forest System lands on a range-wide basis over the long term. Conservation measures in the report are applied to GRSG PHMAs and to a lesser extent to GHMAs. The alternative includes all mapped PPH and PGH (Section 1.1.2) in PHMAs and GHMAs, with no adjustments. PHMAs have the highest conservation value to maintaining or increasing GRSG populations. The complete NTT report can be reviewed online at: https://www.blm.gov/sites/blm.gov/files/uploads/IM%202012-044%20Att%201.pdf. The BMPs proposed in the NTT report are included as RDFs (consistent with applicable law), as part of Alternative B and are listed in Appendix D of this document. Management actions from the NTT report	–	–

Page	NTT	COT	USGS
2-94 – 95 *(cont'd)*	concerning coal are not applicable to the Nevada and Northeastern California Sub-region since there are no reasonably developable coal resources in the planning area. Accordingly, the part of the NTT report that addresses coal leasing was not carried forward as part of Alternative B.	–	–
2-101	–	–	The desired conditions in Table 2-13 should not be reviewed, measured, or managed for, independently. GRSG habitat suitability should be determined by the relationship among several indicator values including ecological site descriptions (including current state and potential) along with the relative abundance of habitat types across the landscape. These conditions apply to an area being used by GRSG for the appropriate life stage (microsites) and not across the entire site or landscape. The desired conditions for each seasonal habitat should only be assessed during the appropriate season of use (dates can vary annually based on climatic conditions) and in areas spatially mapped as the relevant seasonal habitat (expected from USGS in May 2015).
2-102 - 103	–	–	Table 2-13 Desired Habitat Conditions for Greater Sage-Grouse. USGS appears.
2-104	–	–	These desired habitat conditions were developed by a team consisting of representatives from the USFWS, NDOW, USFS, USGS, and BLM. The team reviewed the Connelly et al. (2000) guidelines adding considerable detail and making adjustments based on regionally and locally derived data and analysis by the USGS. The State of Nevada's Science Work Group provided input on the science behind the desired habitat conditions in Table 2-13.
2-182 – 456	–	–	Table 2-16 Description of Action Alternatives. NTT appears.

Page	NTT	COT	USGS
2-203	–	–	Action E-SSS-ACDM 2: Determination of GRSG habitat will be based on the USGS Habitat Suitability Map. At the onset of a proposed project, habitat evaluations or "ground-truthing" of the project site and its surrounding areas shall be conducted by a qualified biologist with GRSG experience using methods as defined in Stiver et al (2010) to confirm habitat type. Evaluations can be conducted by the SETT or NDOW at the request of the project proponent.
2-461 – 488	–	–	Table 2-17 Summary of Environmental Consequences. NTT appears.

- End of tables of excerpts from the NVCA Greater Sage-Grouse 2015 FEIS and 2018 FEIS

B.5 COT, NTT AND USGS 2018 GENERAL INFORMATION

Outline:

1) COT and NTT Reports
    a) Introduction
    b) Description of each document
    c) How the reports were considered in 2015 and 2019 LUP decision
    d) How/which parts were implemented
2) USGS 2018 Annotated Bibliography: Research on Greater Sage-Grouse since 2015
    a) Description
    b) How it was considered in 2018

1.a. Introduction to COT and NTT reports:

Upon review of the best available science and commercial information, the USFWS concluded in 2010 that the Greater Sage-Grouse warranted protection under the ESA. Two factors leading to the decision to list the species as "warranted but precluded" were threats to habitat and the inadequacy of existing regulatory mechanisms.

1.b.i. Sage-Grouse National Technical Team (NTT). A Report on National Greater Sage-Grouse Conservation Measures. December 2011. https://eplanning.blm.gov/epl-front-office/projects/lup/9153/39961/41912/WySG_Tech-Team-Report-Conservation-Measure_2011.pdf

In 2011, in response to the USFWS 2010 warranted but precluded finding, the BLM initiated a land use planning process and assembled a National Technical Team (NTT) made up of state and federal Greater Sage-Grouse experts to review all of the best available science on Greater Sage-Grouse and habitat impacts and make recommendations for conservation measures that should apply inside Priority Habitats. The report describes the scientific basis for the conservation measures proposed within each BLM program area.

Among the key recommendations of the National Technical Team's final report (NTT 2011) were recommendations to: (1) close Priority Habitats to future mining claims and leasing for oil, gas, and coal; (2) apply four-mile NSO buffers around Greater Sage-Grouse leks for existing oil and gas leases; and (3) cap cumulative habitat disturbance at 3% of the landscape and one industrial site per square-mile.

1.b.ii. Conservation Objectives Team (COT). Greater Sage-Grouse Final Report. February 2013. https://www.fws.gov/greatersagegrouse/documents/COT-Report-with-Dear-Interested-Reader-Letter.pdf

In 2012, at the request of the Sage-Grouse Task Force, a group of state and federal representatives (Conservation Objectives Team (COT)) produced a report that identified the most significant areas for Greater Sage-Grouse conservation (Priority Areas for Conservation (PACs)), the principal threats within those areas, and the degree to which such threats need to be reduced or ameliorated to conserve the Greater Sage-Grouse so that it would not be in danger of extinction or likely to become so in the foreseeable future.

1.c. How COT and NTT were considered in 2015 and 2019 LUP decisions:

2015: As directed in the BLM Washington Office IM 2012-044, the conservation measures developed by the National Technical Team were to be considered and analyzed, as appropriate, through the land use planning and NEPA processes by all BLM state and field offices that contain occupied Greater Sage-Grouse habitat. IM 2012-144 https://www.blm.gov/policy/im-2012-044 also directed the BLM to refine the Preliminary Priority Habitat and Preliminary General Habitat data through the land use planning process. The 2013 Draft Greater Sage-Grouse RMP amendments and revisions/Draft EISs contained one alternative based on the conservation measures developed by the National Technical Team and evaluated through the 2012-2015 planning process.

2019: The BLM considered the entire range of alternatives from the 2015 Final EIS to identify issues meriting reconsideration, given the BLM's goal of enhancing alignment with state plans. In this manner, the BLM will continue to appropriately manage Greater Sage-Grouse and its habitat through this planning effort in tandem with the 2015 ROD/ARMPA.

1.d. How/which parts of NTT were implemented:
The 2015 Proposed LUPA incorporated management based on the National Technical Team recommendations.

2 USGS 2018 Annotated Bibliography: Research on Greater Sage-Grouse since 2015
2.a. Description:
In June 2017, Secretarial Order 3353 Greater Sage-Grouse Conservation and Cooperation with Western States established a team to review the federal land management agencies' Greater Sage-Grouse Plan Amendments or Revisions completed on or before September 2015.
https://www.doi.gov/sites/doi.gov/files/uploads/so_3353.pdf

In 2018, additional constraints on land uses or development without a documented need would not meet the purpose of SO 3353. The BLM did not discover new information that would indicate the agency should increase the level of conservation, management, and protection to achieve its land use plan objective. As part of the consideration of whether to amend the 2015 Greater Sage-Grouse RMPs, the BLM requested the USGS to develop an annotated bibliography of Greater Sage-Grouse science published since January 2015 (Carter et al. 2018; see Section 3.1). In addition, SO 3353 directs the BLM to promote habitat conservation, while contributing to economic growth and energy independence. As analyzed in the 2015 Final EIS, all the previously analyzed alternatives, including one proposing constraints stricter than the current management plan, were predicted to result in a loss of development opportunities on public lands.

2.b. How USGS Bibliography was considered in 2018
As part of the consideration of whether to amend some, all, or none of the 2015 Greater Sage-Grouse land use plans, the BLM requested the USGS to develop an annotated bibliography of Greater Sage-Grouse science published since January 2015 (Carter et al. 2018)1 and a report that synthesizes and outlines the potential management implications of this new science (Hanser et al. 2018).

B.6 How the 2019 ARMPA Changes Affect Alignment with USFWS Conservation Objectives Team Objectives

This appendix includes a description of the 2013 USFWS Conservation Objectives Team (COT) Report (USFWS 2013), including how the 2013 Draft EIS and 2015 Final EIS included sections that documented how the report's objectives were addressed in the range of alternatives. The October 2, 2015 USFWS determination that listing Greater Sage-Grouse as threatened or endangered was partially based on the 2015 ARMPAs incorporating management that reduced or minimized threats. This section summarizes how the 2019 ARMPA affects alignment of the BLM Nevada and Northeastern California's plan with the COT Report objectives and the COT Report's goal of "long-term conservation of Greater Sage-Grouse and healthy sagebrush shrub and native perennial grass and forb communities by maintaining viable, connected, and well-distributed populations and habitats across their range, through threat amelioration, conservation of key habitats, and restoration activities" (USFWS 2013; page 13).

B.6.1 Issue: Habitat Management Area Designations

The COT Report anticipated updating boundaries with the objective that "PAC boundaries should be adjusted based on new information regarding habitat suitability and refined mapping techniques, new genetic connectivity information, and new or updated information on seasonal range delineation" (USFWS 2013, page 37). Language was already in the 2015 ROD/ARMPA addressing such adjustments. The 2019 ROD/ARMPA added additional detail to clarify HMA boundary adjustments through the process of collecting and incorporating new information and adopting USGS' updated "Spatially Explicit Modeling of Annual and Seasonal Habitat for Greater Sage-Grouse (*Centrocercus urophasianus*) in Nevada and Northeastern California—an updated decision-support tool for management" (Coates et al. 2016). Additional detail on this is included in the 2018 Final EIS, Section 2.3. These additions in the 2019 ROD/ARMPA are consistent with the COT objectives.

B.6.2 Issue: Removal of Sagebrush Focal Areas

Removal of the SFAs does not affect meeting the COT objectives. SFAs were not identified as required to meet any specific COT objective and are not mentioned in the COT Report. The 2019 ROD/ARMPA continues to manage all SFAs according to their underlying Habitat Management Area (HMA) designation with the associated goals, objectives, and protective management. Removing the SFA recommendation for withdrawal from locatable mineral entry does not change impacts to HMAs, as there is low potential for such development, and therefore no threat to Greater Sage-Grouse or its habitat from mining in the SFAs (see 2016 Draft EIS). Further, prioritizing grazing permit renewals and vegetation treatments within SFAs over all other HMAs could have re-directed limited staff time and funding to areas that already provide functioning Greater Sage-Grouse habitat characteristics and away from areas that may have substantial resource concerns, potentially resulting in decreased habitat quality and quantity.

B.6.3 Issue: Allocation Exception Process

The 2015 ROD/ARMPA identified a unique allocation exception process for each of the following resources: Geothermal, Oil and Gas, Wind Energy, Recreation, Saleable Minerals and Land Tenure. The 2019 ROD/ARMPA revised these allocation exception processes by developing one consolidated process applicable to all of the resources listed above. The 2019 ROD/ARMPA provided consistency to the various exception allocation processes identified in the 2015 ROD/ARMPA, allows for verification of landscape-scale mapping of priority habitat management area (PHMA), general habitat management area (GHMA), and other habitat management areas (OHMA) in regards to the application of allocations and stipulations, addresses restrictions on actions related to public health and safety, existing infrastructure, and administrative functions and addresses inconsistencies with existing federal legislation that includes land tenure adjustments.

The COT objective for energy development states that it "should be designed to ensure that it will not impinge upon stable or increasing Greater Sage-Grouse population trends" (USFWS 2013, page 43). It goes on to note that "addressing energy development and any subsequent successful restoration activities in sagebrush ecosystems *will require consideration of local ecological conditions*, which cannot be prescribed on a range-wide level."

For recreation development the COT object states: "In areas subjected to recreational activities, maintain healthy native sagebrush communities based on local ecological conditions and with consideration of drought conditions, and manage direct and indirect human disturbance (including noise) to avoid interruption of normal sage-grouse behavior."

The 2019 ROD/ARMPA defines specific criteria that must be met in order for an exception or modification to be considered (see MD SSS 5), including the following:

In PHMA, GHMA, and OHMA, the State Director may grant an exception to the allocations and stipulations described in Table 2-1 (Comparative Summary of Alternatives) if one of the following applies (in coordination with NDOW, SETT, and/or CDFW):

i. The location of the proposed activity is determined to be unsuitable (by a biologist with Greater Sage-Grouse experience using methods such as Stiver et al. 2015) and lacks the ecological potential to become marginal or suitable habitat; and will not result in direct, indirect, or cumulative impacts on Greater Sage-Grouse and its habitat. Management allocation decisions will not apply to those areas determined to be unsuitable if the area has passed a threshold and lacks the ecological potential to become marginal or suitable habitat.

ii. The proposed activities impacts will be offset to result in no adverse impacts on Greater Sage-Grouse or its habitat, through use of the mitigation hierarchy and the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). In cases where exceptions may be granted for projects with a residual impact, voluntary compensatory mitigation consistent with the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law) will be one mechanism by which a proponent achieves the Approved RMPA goals, objectives, and exception criteria. When a proponent volunteers compensatory mitigation as their chosen approach to address residual impacts, the BLM will incorporate those actions into the rationale used to grant an exception. The final decision to grant a waiver, exception, or modification will be based, in part, on criteria consistent with the State's Greater Sage-Grouse management plans and policies.

iii. The proposed activity will be authorized to address public health and safety concerns, specifically as they relate to federal, state, local government and national priorities.

iv. Renewals or re-authorizations of existing infrastructure in previously disturbed sites or expansions of existing infrastructure that do not result in direct, indirect, or cumulative impacts on Greater Sage-Grouse and its habitat.

v. The proposed activity is determined to be a routine administrative function conducted by federal, state or local governments, including prior existing uses, authorized uses, valid existing rights and existing infrastructure (i.e., rights-of-way for roads) that serve a public purpose and will have no adverse impacts on Greater Sage-Grouse and its habitat, consistent with the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law).

Exceptions to non-disposal or exchange of lands that are identified for retention in Appendix A, Figure 2-12 could be considered if (a) they are identified for disposal through previous planning efforts or address a Congressional Act (e.g., the respective Lincoln and White Pine County Conservation, Recreation, and Development Acts), (b) the agency can demonstrate that the disposal, including land exchanges, will have no adverse direct, indirect or cumulative impacts on Greater Sage-Grouse and its habitat, or (c) adverse impacts on Greater Sage-Grouse or its habitat will be offset, through use of voluntary compensatory mitigation, consistent with the States' mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law).

The Allocation Exception Process makes all exceptions to stipulations and land use plan allocations tied to PHMA, GHMA, and OHMA consistent and based on a set of six criteria and all exception need to be approved by the BLM State Directors.

B.6.4 Issue: Seasonal Timing Restrictions

Seasonal Timing Restrictions were not identified as required to meet any of the COT objectives and are not mentioned in the COT Report. The 2015 ROD/ARMPA included criteria for modifications and/or waivers to seasonal timing restrictions. The 2019 ROD/ARMPA revised the 2015 criteria to allow for beneficial Greater Sage-Grouse projects to be implemented to protect and enhance their habitat while avoiding negative impacts to Greater Sage-Grouse and its habitat.

The 2019 ROD/ARMPA includes the following criteria for applying modifications and waivers to seasonal timing restrictions:

The seasonal dates could be modified or waived (in coordination with NDOW and/or CDFW) based on site-specific information that indicates:

i. A project proposal's NEPA document and/or project record, and correspondence from NDOW and/or CDFW demonstrates that any modification (shortening/extending seasonal timeframes or waiving the seasonal timing restrictions altogether) is justified on the basis that it serves to better protect or enhance Greater Sage-Grouse and its habitat than if the seasonal timing restrictions are implemented. Under this scenario modifications can occur if:
    a. A proposed activity will have beneficial or neutral impacts on Greater Sage-Grouse.
    b. Topography or other factors eliminate direct and indirect impacts from visibility and audibility to Greater Sage-Grouse and its habitat.
    c. There are documented local variations (e.g., higher/lower elevations) and/or annual climatic fluctuations (e.g., early/late spring, long/heavy winter) that indicate the seasonal Life cycle periods are different than presented, or that Greater Sage-Grouse are not using the area during a given seasonal life cycle period.

ii. Modifications are needed to address an immediate public health and safety concern in a timely manner (e.g., maintaining a road impacted by flooding).

iii. The proposed action is determined to be a routine administrative function conducted by federal, state or local governments, including prior existing uses, authorized uses, valid existing rights and existing infrastructure (i.e., rights-of-way for roads) that serve a public purpose and will have no adverse impacts on Greater Sage-Grouse or its habitat.

Add a final paragraph stating since it was not in the COT it is in compliance and avoids impact to Greater Sage-Grouse and benefits Greater Sage-Grouse.

B.6.5 Issue: Adaptive Management

The COT Report recommends developing and implementing a monitoring plan to track the success of conservation plans. It notes that "without this information… there is no capacity to adapt if current management actions are determined to be ineffective" (COT Report; pg. 35). The COT Report suggested development and implementation of adaptive management actions "if the monitoring determines that current management actions are ineffective" (COT Report; page 35). However, the COT Report did not identify any specific criteria to monitor or recommend any management responses.

Consistent with COT recommendations, the 2015 ARMPA included an adaptive management approach complete with specific triggers and responses (see 2015 ROD/ARMPA; GRSG-AM-ST-011 and GRSG-AM-ST-012 and Appendix J). The 2019 ARMPA carried this strategy forward with several adjustments based on lessons-learned from implementing the 2015 strategy.

From the 2015 Plan:

A biologically significant unit (BSU) (see Appendix A; Figure 2-2) that has hit a soft trigger due to vegetation disturbance will be a priority for restoration treatments consistent with Fire and Invasives Assessment Tool (FIAT) (Appendix J).

If a soft trigger is reached, the BLM will identify the causal factor and apply additional project-level adaptive management and/or mitigation measures contained in the authorization (and for future similar authorizations), to alleviate the specific or presumptive causes in the decline of Greater Sage-Grouse populations or its habitats and include the following: The adjustment in management would be based on the causal factor and would affect only the area being impacted in the lek cluster or other appropriate scale (e.g., BSU)

- Greater Sage-Grouse populations and habitat would continue to be monitored annually.
- If the causal factor were not readily discernible, then an interdisciplinary team, including the BLM, Forest Service (as applicable), and state wildlife agency representatives, would identify the appropriate mitigation or adjusted management actions in a timely manner.

Once a hard trigger has been reached, all responses in Table J-1 and Table J-2 in Appendix J will be implemented. This includes where soft triggers have been reached for both population and habitat.

When a hard trigger is hit in a PAC that has multiple BSUs, including those that cross state lines, the WAFWA Management Zone Greater Sage-Grouse Conservation Team will convene to determine the cause, will put project level responses in place, as appropriate, and will discuss further appropriate actions to be applied. The team will also investigate the status of the hard triggers in other BSUs in the PAC and will invoke the appropriate plan response. Adopting any further actions at the plan level may require initiating a plan amendment process.

The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.

From the 2019 Plan:

The BLM will implement the Adaptive Management Strategy as described in Appendix D. The revised soft and hard population triggers, warnings, and new BSU and lek cluster boundaries were derived from USGS's *Hierarchical Population Monitoring of Greater Sage-Grouse (Centrocercus urophasianus) in Nevada and California— Identifying Populations for Management at the Appropriate Spatial Scale: US Geological Survey Open-File Report 2017– 1089* (Coates et al. 2017). These triggers, warnings, BSU boundaries, and lek cluster boundaries can be found in Appendix D. Soft and hard trigger responses will be removed when the criteria for recovery have been met (see Appendix D, Longevity of Responses). Removal of the soft and hard trigger responses returns management direction in the affected lek cluster and/or BSU to the management directions that were in place prior to reaching a trigger.

The 2015 ARMPA required a knee-jerk response, broadly applying suggested management changes before determining if those changes even related to the cause of the declines. The 2019 ARMPA provides for a more responsive approach, as suggested by the COT Report language. It revises the Adaptive Management Strategy to include the best available science and to better align with the State of Nevada's Adaptive Management Strategy (2018) which includes:

- Updates biologically significant units (BSU), lek cluster boundaries, as well as the state-space model to determine Greater Sage-Grouse population triggers (Coates et. Al 2017)
- Incorporated language regarding the longevity of soft and hard trigger responses.
- Removes all predetermined hard trigger responses which are replaced with a clear causal factor analysis process in collaboration with other Federal, state, and local partners.

Triggers are not specific to any particular project, but identify Greater Sage-Grouse population and habitat thresholds outside of natural fluctuations or variations (with the exception of wildfires) and are based on the two key metrics that are being monitored; population status and habitat loss. Reaching a trigger would initiate a local-state-federal interagency dialogue in collaboration with affected authorized land users to evaluate causal factor(s) and recommend adjustments to implementation-level activities to reverse the trend. BLM would strive to use a collaborative process with stakeholders, appropriate state and local agencies, and affected authorized land users when developing and implementing management responses when a trigger has been identified. This approach is consistent with the COT Report's language that recommends monitoring data be gathered to help guide management changes.

These changes in the 2019 ARMPA are consistent with the COT Report's language of adjusting management in direct response to collection and evaluation of monitoring data.

B.6.6 Issue: Compensatory Mitigation

The COT Report recommends the pursuit of a "no net loss" goal for sage-grouse habitat, noting that "when avoidance is not possible, meaningful minimization and mitigation of the impacts should be implemented" (page 31). It also recommends that "efforts should be made to restore the components lost within the PAC (e.g., redundancy or representation) in other areas such that there is no net loss of sage-grouse or their habitats" (page 37). The 2019 ARMPA implements this recommendation by adopting a goal and objective to "undertake planning decisions, actions and authorizations 'to minimize or eliminate threats affecting the status of [GRSG] or to improve the condition of [GRSG] habitat'" (2019 ARMPA; pg 1-5).

The COT Report does not specify how to achieve its objective of "no net loss" of sage-grouse habitat. The approach taken by the BLM in the 2019 ARMPA, which includes the goal and objective described above (Objective SSS-4, see also MD-SSS-2). while relying on avoidance and minimization, implementation of state mitigation requirements and standards, and voluntary mitigation undertaken by project proponents, as well as additional BLM and State investments to protect and restore sage-grouse habitat, is fully consistent with the COT report's recommendation to pursue a "no net loss" objective for sage-grouse habitat.

Appendix C

Lek Buffer-Distances (Evaluating Impacts to Leks)

Appendix C. Lek Buffer-Distances (Evaluating Impacts to Leks)

In addition to any other relevant information determined to be appropriate (e.g., state wildlife agency plans, local agency plans, and local information), the BLM, through project specific NEPA analysis, would assess and address impacts from the following activities using the lower end of the interpreted range of lek buffer-distances and guidance identified in the USGS Report, *"Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review",* Open File Report 2014-1239 (Mainer et al. 2014). Project specific analysis should use the lower end of the interpreted range in the report as a guideline for effects determination unless justifiable departures are determined to be appropriate (see below). The lower end of the interpreted range of the lek[1] buffer-distances is as follows:

- linear features (roads) 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) within 1.2 miles of leks in flat or rolling terrain;
- surface disturbance (continuing human activities that alter or remove the natural vegetation, excluding livestock grazing) within 3.1 miles of leks; and
- 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 from the lek where impacts are anticipated, based on local information and data, best available science, landscape features (i.e., topography), and other existing protections (e.g., land use allocations, state regulations), or factors reducing visibility and audibility may be appropriate. 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, "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 departures from the lek buffer-distances identified above for impact assessments would require appropriate analysis and disclosure as part of the NEPA.

The BLM would use the most recent active and/or pending lek data available from the state wildlife agency to assess project specific impacts.

[1] Applicable to Active and Pending leks as defined by NDOW and CDFW

C.1 For Actions in GHMA

The BLM, through the NEPA analysis, should avoid or minimize actions in GHMA that are within the applicable lek buffer distance identified above. If it is not possible to avoid or minimize impacts by relocating the project outside of the identified lek buffer-distance(s), the BLM may approve the project if:

- Based on best available science, landscape features, and other existing protections, (e.g., land use allocations, state regulations), the BLM determines that a lek buffer-distance, other than the applicable distance identified above, offers the same or a greater level of protection to Greater Sage-Grouse and/or its habitat, including conservation of seasonal habitat outside of the analyzed buffer area;
- The BLM determines that impacts to Greater Sage-Grouse and/or its habitat are minimized such that the project would cause minor or no new disturbance (e.g., co-location with existing authorizations);
- If range improvements do not impact Greater Sage-Grouse, or, range improvements which provide a conservation benefit to Greater Sage-Grouse such as fences for protecting important seasonal habitats;
- Mitigation (consistent with IM 2018-018: Compensatory Mitigation) has been developed and implemented which have the ability (alone or in concert with others) to protect the seasonal habitats within the buffer area and any residual impacts within the lek buffer-distances have been addressed.

C.2 For Actions in PHMA

The BLM, through NEPA analysis, should avoid actions in PHMA that are within the applicable lek buffer distance identified above. If it is not possible to avoid impacts by relocating the project outside of the identified lek buffer-distance(s), the BLM may approve the project, if in accordance with actions identified above for GHMA, and with input from the state fish and wildlife agency (and local agencies when appropriate).

The BLM would explain its justification for the analysis of buffer distances in its project decision record.

Appendix D
Required Design Features Worksheet

The worksheet below includes a list of design features that would be implemented for all authorized/permitted activities, consistent with applicable law (and consistent with the 2015 BLM Nevada and Northeastern California's Approved Resource Management Plan Amendment, MD SSS 2(C), SSS 3(B), and SSS 4. At the site-specific scale, BLM will document when an RDF is or is not applied to a particular project. If an RDF is not applied, this worksheet provides the BLM an opportunity to consistently document its rationale as to why that RDF if not applicable. This document will be placed in the project record and/or referenced in the project's NEPA analysis.

Project Name: **NEPA #:**

General RDFs		Applied	If RDF not applied, select reason:
RDF Gen 1:	Locate new roads outside of GRSG habitat to the extent practical.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	
RDF Gen 2:	Avoid constructing roads within riparian areas and ephemeral drainages. Construct low water crossings at right angles to ephemeral drainages and stream crossings (note that such construction may require permitting under Sections 401 and 404 of the Clean Water Act).	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	
RDF Gen 3:	Limit construction of new roads where roads are already in existence and could be used or upgraded to meet the needs of the project or operation. Design roads to an appropriate standard, no higher than necessary, to accommodate intended purpose and level of use.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	
RDF Gen 4:	Coordinate road construction and use with ROW holders to minimize disturbance to the extent possible.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	
RDF Gen 5:	During project construction and operation, establish and post speed limits in GRSG habitat to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	

Project Name: **NEPA #:**

RDF Gen 6:	Newly constructed project roads that access valid existing rights would not be managed as public access roads. Proponents will restrict access by employing traffic control devices such as signage, gates, and fencing.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat. **Rationale if RDF is not applied:**
RDF Gen 7:	Require dust abatement practices when authorizing use on roads.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat. **Rationale if RDF is not applied:**
NO RDF 8 Identified			
RDF Gen 9:	Upon project completion, reclaim roads developed for project access on public lands unless, based on site-specific analysis, the route provides specific benefits for public access and does not contribute to resource conflicts.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat. **Rationale if RDF is not applied:**
RDF Gen 10:	Design or site permanent structures that create movement (e.g., pump jack/ windmill) to minimize impacts on GRSG habitat.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat. **Rationale if RDF is not applied:**
RDF Gen 11:	Equip temporary and permanent aboveground facilities with structures or devices that discourage nesting and perching of raptors, corvids, and other predators.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat. **Rationale if RDF is not applied:**

Project Name: | **NEPA #:**

RDF Gen 12:	Control the spread and effects of nonnative, invasive plant species (e.g., by washing vehicles and equipment, minimize unnecessary surface disturbance; Evangelista et al. 2011). All projects would be required to have a noxious weed management plan in place prior to construction and operations.	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Gen 13:	Implement project site-cleaning practices to preclude the accumulation of debris, solid waste, putrescible wastes, and other potential anthropogenic subsidies for predators of GRSG.	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Gen 14:	Locate project related temporary housing sites outside of GRSG habitat.	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Gen 15:	When interim reclamation is required, irrigate site, in accordance with state laws, to establish seedlings more quickly if the site requires it.	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Gen 16:	Utilize mulching or other soil amendment techniques to expedite reclamation and to protect soils if the site requires it.	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		

Project Name: | **NEPA #:**

RDF Gen 17:	Restore disturbed areas at final reclamation to the pre-disturbance landforms and desired plant community.	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF# __________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Gen 18:	When authorizing ground-disturbing activities, require the use of vegetation and soil reclamation standards suitable for the site type prior to construction.	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF# __________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Gen 19:	Instruct all construction employees to avoid harassment and disturbance of wildlife, especially during the GRSG breeding (e.g., courtship and nesting) season. In addition, pets shall not be permitted on site during construction (BLM 2005b).	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF# __________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Gen 20:	To reduce predator perching in GRSG habitat, limit the construction of vertical facilities and fences to the minimum number and amount needed and install anti-perch devices where applicable.	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF# __________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Gen 21:	Outfit all reservoirs, pits, tanks, troughs or similar features with appropriate type and number of wildlife escape ramps (BLM 1990; Taylor and Tuttle 2007).	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF# __________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		

Project Name: **NEPA #:**

RDF Gen 22:	Load and unload all equipment on existing roads, pull outs, or disturbed areas to minimize disturbance to vegetation and soil.	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		

In addition to the General RDFs, apply Lands and Realty RDFs to PHMA, GHMA, and OHMA as appropriate and consistent with applicable law:

Project Name: ____________ **NEPA #:** ____________

Lands and Realty RDFs*		Applied	If RDF not applied, select reason:
RDF LR-LUA 1:	Where new ROWs associated with valid existing rights are required, co-locate new ROWs within existing ROWs or where it best minimizes impacts in GRSG habitat. Use existing roads or realignments of existing roads to access valid existing rights that are not yet developed.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	
RDF LR-LUA 2:	Do not issue ROWs to counties on newly constructed energy/mining development roads, unless for a temporary use consistent with all other terms and conditions included in this document.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	
RDF GEN (LR-LUA) 3:	Where necessary, fit transmission towers with anti-perch devices (Lammers and Collopy 2007) in GRSG habitat.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	

***These RDFs also apply to other land use authorizations such as leases and permits**

In addition to the General RDFs, apply Fuels and Fire Management RDFs to PHMA, GHMA, and OHMA as appropriate and consistent with applicable law:

Project Name: **NEPA #:**

Fuels and Fire Management RDFs		Applied	If RDF not applied, select reason:
RDF WFM 1:	Power-wash all firefighting vehicles, including engines, water tenders, personnel vehicles, and all-terrain vehicles (ATVs), prior to deploying in or near GRSG habitat to minimize the introduction and spread of undesirable and invasive plant species. (This is not applicable to initial attack vehicles.)	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	
RDF WFM 2:	Protect wildland areas from wildfire originating on private lands, infrastructure corridors, and recreational areas.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	
RDF WFM 3:	Reduce the risk of vehicle or human-caused wildfires and the spread of invasive species by planting and maintaining perennial vegetation (e.g., greenstrips) paralleling road rights-of-way.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	

In addition to the General RDFs, apply Fluid Minerals RDFs to PHMA, GHMA, and OHMA as appropriate and consistent with applicable law:

Project Name: **NEPA #:**

	Fluid Minerals RDFs	Applied		If RDF not applied, select reason:
RDF Lease FM 1:	Co-locate power lines, flow lines, and small pipelines under or immediately adjacent to existing roads (Bui et al. 2010) in order to minimize or avoid disturbance.	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Lease FM 2:	Cover, create barriers, or implement other effective deterrents (e.g., netting, fencing, birdballs, and sound cannons) for all ponds and tanks containing potentially toxic materials to reduce GRSG mortality.	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Lease FM 3:	Require installation of noise shields to comply with noise restrictions (see Action SSS 7) when drilling during the breeding, nesting, brood-rearing, and/or wintering season. Require applicable GRSG seasonal timing restrictions when noise restrictions cannot be met (see Action SSS 6).	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Lease FM 4:	Ensure habitat restoration meets GRSG habitat objectives (Table 2-2) for reclamation and restoration practices/sites (Pyke 2011).	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		

RDF Lease FM 5:	Maximize the area of interim reclamation on long-term access roads and well pads, including reshaping, topsoil management, and revegetating cut-and-fill slopes.	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Lease FM 6:	Restore disturbed areas at final reclamation to the pre-disturbance landforms and meets the GRSG habitat objectives (Table 2-2).	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Lease FM 7:	Use only closed-loop systems for drilling operations and no reserve pits within GRSG habitat.	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Lease FM 8:	Place liquid gathering facilities outside of GRSG habitat. Have no tanks at well locations within GRSG habitat to minimize vehicle traffic and perching and nesting sites for aerial predators of GRSG.	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Lease FM 9:	In GRSG habitat, use remote monitoring techniques for production facilities and develop a plan to reduce vehicular traffic frequency of vehicle use (Lyon and Anderson 2003).	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		

RDF Lease FM 10: Use dust abatement practices on well pads.	☐ Yes	☐	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.
	☐ No	☐	An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________
		☐	A specific RDF will provide no additional protection to GRSG or its habitat.
	Rationale if RDF is not applied:		
RDF Lease FM 11: Cluster disturbances associated with operations and facilities as close as possible, unless site-specific conditions indicate that disturbances to GRSG habitat would be reduced if operations and facilities locations would best fit a unique special arrangement.	☐ Yes	☐	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.
	☐ No	☐	An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________
		☐	A specific RDF will provide no additional protection to GRSG or its habitat.
	Rationale if RDF is not applied:		
RDF Lease FM 12: Apply a phased development approach with concurrent reclamation.	☐ Yes	☐	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.
	☐ No	☐	An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________
		☐	A specific RDF will provide no additional protection to GRSG or its habitat.
	Rationale if RDF is not applied:		
RDF Lease FM 13: Restrict pit and impoundment construction to reduce or eliminate augmenting threats from West Nile virus (Dougherty 2007).	☐ Yes	☐	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.
	☐ No	☐	An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________
		☐	A specific RDF will provide no additional protection to GRSG or its habitat.
	Rationale if RDF is not applied:		

Project Name: **NEPA #:**

RDF Lease FM 14:	In GRSG habitat, remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus. If surface disposal of produced water continues, use the following steps for reservoir design to limit favorable mosquito habitat (Doherty 2007): • Overbuild size of ponds for muddy and non-vegetated shorelines • Build steep shorelines to decrease vegetation and increase wave actions • Avoid flooding terrestrial vegetation in flat terrain or low lying areas • Construct dams or impoundments that restrict down slope seepage or overflow • Line the channel where discharge water flows into the pond with crushed rock • Construct spillway with steep sides and line it with crushed rock. • Treat waters with larvicides to reduce mosquito production where water occurs on the surface	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		
RDF Lease FM 15:	Consider using oak (or other material) mats for drilling activities to reduce vegetation disturbance and for roads between closely spaced wells to reduce soil compaction and maintain soil structure to increase likelihood of vegetation reestablishment following drilling.	☐ Yes ☐ No	☐	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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________
			☐	A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:		

In addition to the General RDFs, apply Locatable Minerals RDFs to PHMA, GHMA, and OHMA as appropriate and consistent with applicable law:

Project Name: **NEPA #:**

	Locatable Minerals RDFs	Applied	If RDF not applied, select reason:
RDF LOC 1:	Install noise shields to comply with noise restrictions (see Action SSS 7) when drilling during the breeding, nesting, brood-rearing, and/or wintering season. Apply GRSG seasonal timing restrictions when noise restrictions cannot be met (see Action SSS 6).	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	
RDF LOC 2:	Cluster disturbances associated with operations and facilities as close as possible, unless site-specific conditions indicate that disturbances to GRSG habitat would be reduced if operations and facilities locations would best fit a unique special arrangement.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	
RDF LOC 3:	Restrict pit and impoundment construction to reduce or eliminate augmenting threats from West Nile virus (Dougherty 2007).	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	

Project Name: **NEPA #:**

RDF LOC 4:	Remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus. If surface disposal of produced water continues, use the following steps for reservoir design to limit favorable mosquito habitat (Doherty 2007): • Overbuild size of ponds for muddy and non-vegetated shorelines • Build steep shorelines to decrease vegetation and increase wave actions • Avoid flooding terrestrial vegetation in flat terrain or low lying areas • Construct dams or impoundments that restrict down slope seepage or overflow • Line the channel where discharge water flows into the pond with crushed rock • Construct spillway with steep sides and line it with crushed rock. • Treat waters with larvicides to reduce mosquito production where water occurs on the surface	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.	**Rationale if RDF is not applied:**
RDF LOC 5:	Address post reclamation management in reclamation plan such that goals and objectives are to protect and improve sage-grouse habitat needs.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.	**Rationale if RDF is not applied:**
RDF LOC 6:	Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, topsoiling, and revegetating cut and fill slopes.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.	**Rationale if RDF is not applied:**
RDF LOC 7:	Cover (e.g., fine mesh netting or use other effective techniques) all pits and tanks regardless of size to reduce sage-grouse mortality.	☐ Yes ☐ No	☐ 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 is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # ___________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.	**Rationale if RDF is not applied:**

In addition to the General RDFs, apply Comprehensive Travel and Transportation Management RDFs to PHMA, GHMA, and OHMA as appropriate and consistent with applicable law:

Project Name: ____________ **NEPA #:** ____________

Comprehensive Travel and Transportation Management RDFs		Applied	If RDF not applied, select reason:
RDF CTTM 1:	Rehabilitate roads, primitive roads, and trails not designated in approved travel management plans.	☐ Yes ☐ No	☐ 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 alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	
RDF CTTM 2:	Reclaim closed duplicate roads by restoring original landform and establishing desired vegetation in GRSG habitat in accordance with GRSG habitat objectives (Table 2-2) as identified in travel management planning.	☐ Yes ☐ No	☐ 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 alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # __________ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale if RDF is not applied:	

Appendix E

Adaptive Management Plan

APPENDIX E
ADAPTIVE MANAGEMENT PLAN

INTRODUCTION

Adaptive management is a decision process that promotes flexible resource management decision-making. These decisions can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Carefully monitoring these outcomes both advances scientific understanding and helps with adjusting resource management directions as part of an iterative learning process.

On February 1, 2008, the Department of the Interior published its Adaptive Management Implementation Policy (522 DM 1). The adaptive management strategy presented in this Approved RMP Amendment complies with this policy and direction, as well as the Department of the Interior's Adaptive Management Technical Guide (DOI 2009).

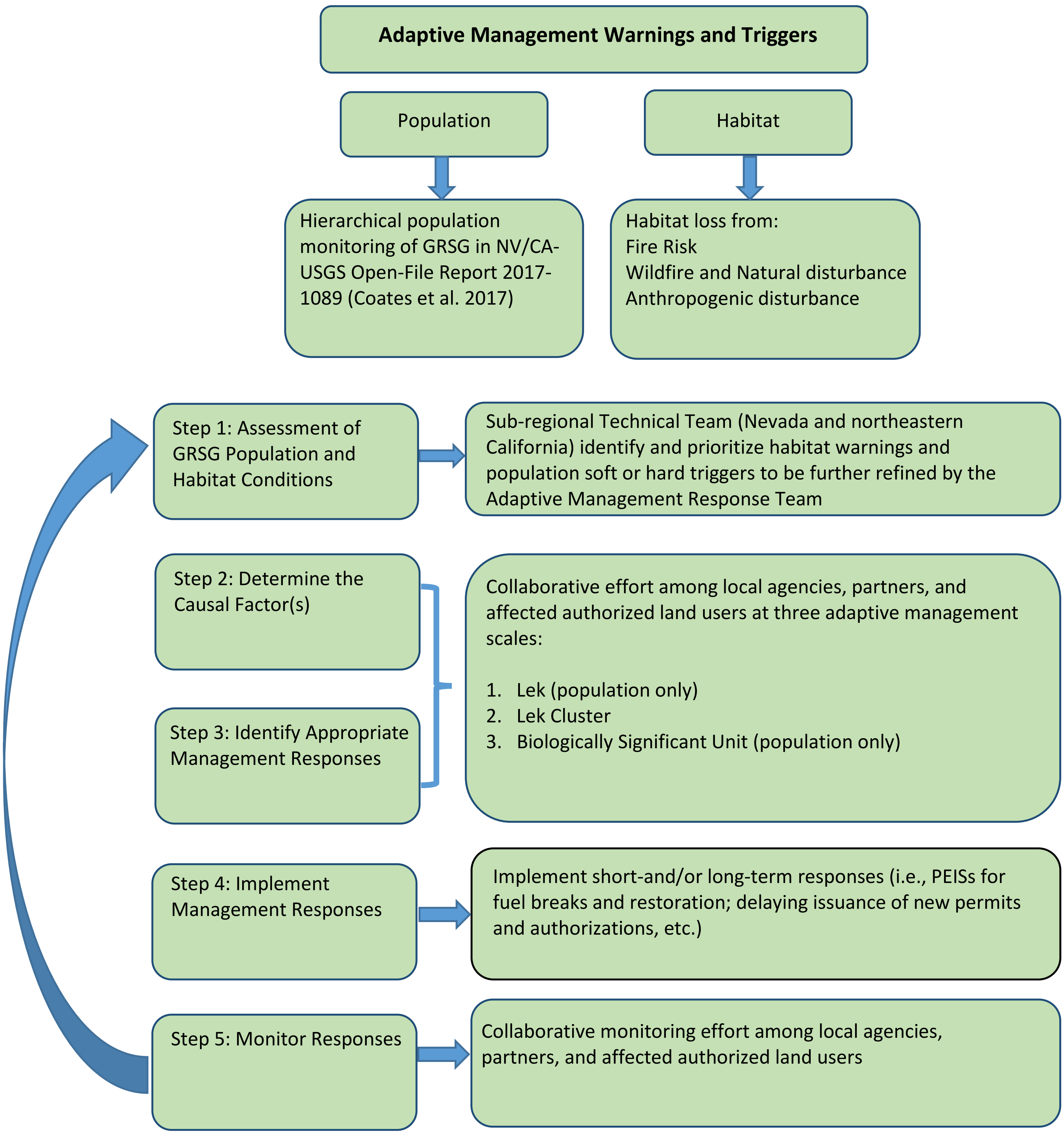
Adaptive management would help identify if Greater Sage-Grouse (GRSG) conservation measures presented in this Approved RMP Amendment contain the needed level of certainty for effectiveness. Principles of adaptive management are incorporated into the conservation measures in the Approved RMP Amendment to lessen threats to GRSG and its habitat, thereby increasing the likelihood that the conservation measures and plan would be effective in reducing threats to them.

The following provides the BLM's adaptive management strategy for the Nevada and Northeastern California Greater Sage-Grouse Sub-region Approved RMP Amendment.

This adaptive management strategy includes warnings, soft and hard triggers and responses. Triggers are not specific to any particular project, but identify GRSG population and habitat thresholds outside of natural fluctuations or variations (with the exception of wildfires). Triggers are based on the two key metrics that are being monitored; population status and habitat loss. Adaptive management, with specific triggers, provides additional certainty that the management actions included in this Approved RMP Amendment are robust and able to respond to a variety of conditions and circumstances quickly and effectively to conserve the GRSG and its habitat. Reaching a trigger would initiate a local-state-federal interagency dialogue in collaboration with affected authorized land users to evaluate causal factor(s) and recommend adjustments to implementation-level activities to reverse the trend. BLM would strive to use a collaborative process with stakeholders, appropriate state and local agencies, and affected authorized land users when developing and implementing management responses when a trigger has been identified.

A sub-regional (Nevada and northeastern California) technical team, consisting of BLM, Forest Service, USFWS, NDOW, CDFW, SETT, USGS, University of Nevada-Reno, and other appropriate federal, state, and local agencies would coordinate, prioritize, and implement specific habitat restoration efforts targeted at multiple spatial scales. This adaptive management strategy calls for a collaborative effort that would result in individual plans for the recovery of declining GRSG populations. These plans would be focused based on discussion of how threats impact GRSG and its habitat, and the relative importance of various conservation measures. The outcomes would be used to assist local efforts in identifying and prioritizing areas to enable efficiencies and pool resources. This would increase the likelihood that GRSG population and habitat declines can be addressed effectively through collaboration, stewardship, and conservation. The principles of adaptive management would be incorporated into the conservation measures that lessen threats to GRSG and its habitat.

Figure E-1. Adaptive Management Process



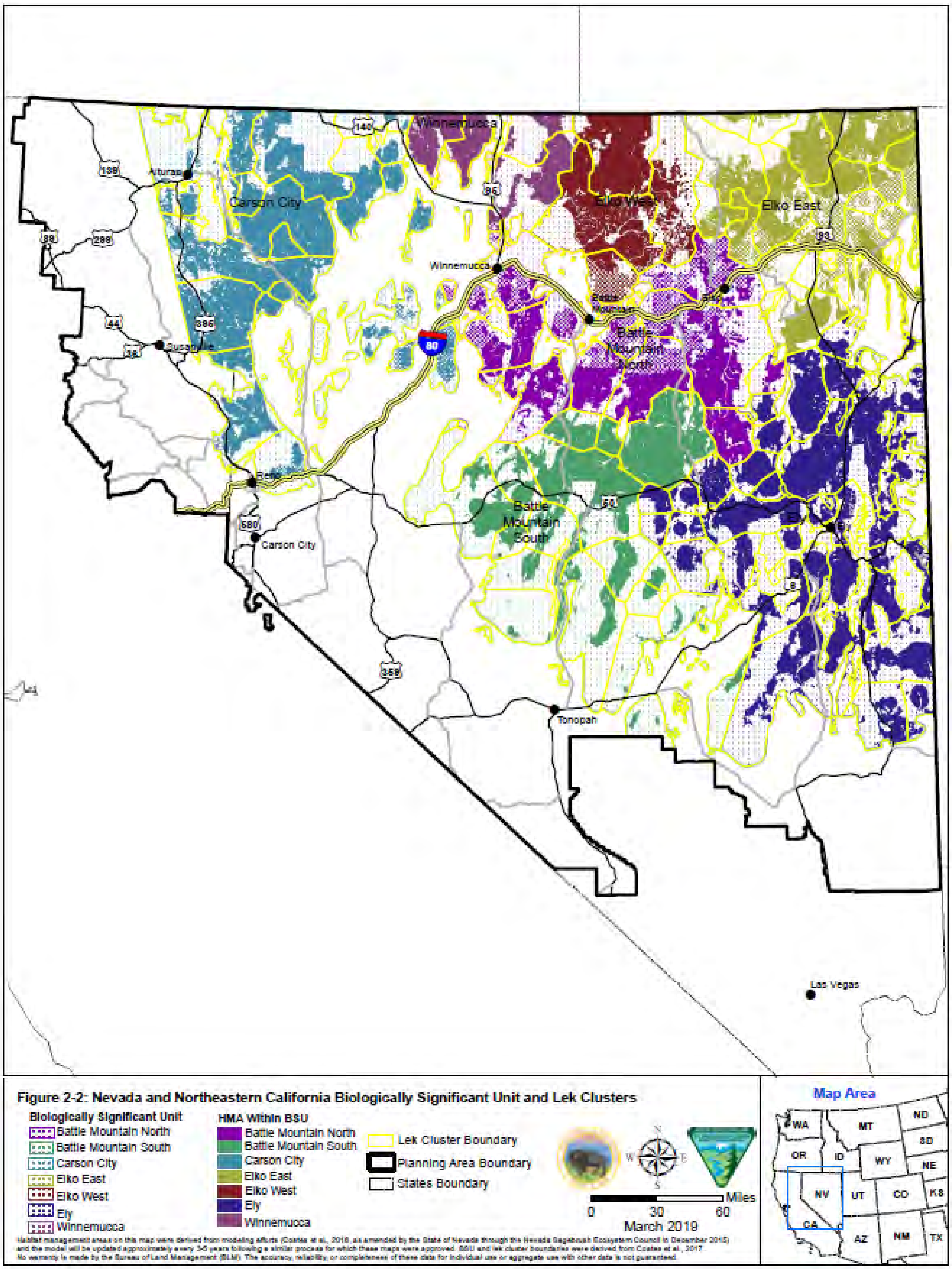
ADAPTIVE MANAGEMENT ANALYSIS SCALES

The scales used to analyze population triggers and apply management responses are at the individual lek, lek cluster, and biologically significant units (BSU) as defined below (Figure 2-2). Adaptive management responses would only apply to habitat management areas (HMAs), which includes Priority, General and Other HMAs within these scales. Habitat adaptive management warnings and triggers would be analyzed only at the lek cluster scale. The boundaries of the BSU and lek clusters may be adjusted over time, based on the understanding of local GRSG population interactions, genetic sampling and climate variation. Population and habitat analysis used to identify warnings and triggers may be updated based on new science and advances in technology (e.g., integrated population models).

The hierarchy of GRSG population and habitat scales is as follows:

- Lek—Individual breeding display sites where male and female GRSG congregate, with males performing courtship displays to gain mating opportunities with females.
- Lek cluster—A group of leks in the same vicinity, among which GRSG may interchange over time and representing a group of closely related individuals.
- BSU— represents nested lek clusters with similar climate and vegetation conditions.

Figure 2-2. Biologically Significant Units and Lek Clusters for GRSG in the Nevada and Northeastern California Sub-region.



DEFINITIONS OF ADAPTIVE MANAGEMENT WARNINGS, SOFT TRIGGERS, AND HARD TRIGGERS

Population

Warnings

Adaptive management population warnings are identified within the GRSG state-space model (Coates et al. 2017) (described below) that could lead to reaching a population soft or hard trigger. Warnings are the result of cumulative factors that negatively affect population growth rate. A warning could be identified when population rates of change (lambda) within any of the three analyzed spatial scales falls below an established threshold as defined in Coates et al. (2017).

Soft Triggers

Soft triggers represent a threshold that indicates management actions should be considered at the project or implementation level to address GRSG population declines.

Hard Triggers

Hard triggers represent a threshold that indicates that immediate action needs be considered to address significant deviations from GRSG population declines.

Habitat

Warnings

Adaptive management habitat warnings include fire risk (e.g., annual and perennial fine or woody fuel loads, fire risk models, etc.), the occurrence of wildfire or natural disturbance (e.g., sagebrush die-off) larger than 1,000 acres, or new anthropogenic disturbance that results in direct and indirect effects as determined using the Habitat Quantification Tool (HQT; DCNR 2018) within a lek cluster.

Fire risk would be analyzed using various applicable data sources and support tools including but not limited to current vegetation composition and biomass, precipitation, fire regime condition class, fire risk or predictive models, and other applicable resources to identify areas that have the potential for high fine or woody fuel loads or have a high probability for wildfire risk. The Great Basin Coordination Center and appropriate fuels management specialists would also be consulted to refine areas of high fire potential.

Disturbances of any size could have significant impacts to GRSG habitat. Due to the complexity of identifying the extent and severity of habitat disturbances in a consistent process, this effort would focus on disturbances to GRSG habitat as reported by state and federal agencies (e.g., wildfires > 1,000 acres) that would be considered warnings in order to assess the magnitude of each disturbance (as identified below in Triggers).

Triggers

Habitat triggers are warnings evaluated by a statewide technical team of specialists (as defined in the Adaptive Management Analysis section) that are determined to warrant significant management responses to address GRSG habitat declines. Generally, a management response would be warranted if an action could be taken that could effectively improve conditions for GRSG.

Management Responses

If a trigger is reached, the appropriate land management agency(s) would evaluate the appropriate management responses to address the known or probable causes of the decline in GRSG habitats or populations, with consideration of local knowledge and conditions in coordination with appropriate federal, state, and local agencies, and affected authorized land users. See Step 3 below for examples of potential management responses.

ADAPTIVE MANAGEMENT POPULATION ANALYSIS

Population Rate of Change Calculation for Triggers

The most current version of the Hierarchical Population Monitoring of Greater Sage-Grouse in Nevada and Northeastern California (USGS Open-File Report 2017-1089; Coates et al. 2017) state-space model would be used to estimate the rate of GRSG population change (lambda) and the number of males at three hierarchically nested spatial scales: individual lek, lek cluster, and BSU. Lek count data provided by NDOW and CDFW would inform the state-space model and be used to determine thresholds for population stability and decoupling from higher-order scales. Some lek clusters may need additional monitoring of leks to gain adequate sampling data in order to be modeled (Coates et al. 2017).

In addition to analyzing annual lek trend data, the benefit of using the USGS state-space model is that it differentiates whether a population decline is likely due to localized disturbances that may be more manageable, or connected to a larger scale, regional environmental or climactic conditions that are typically less manageable. A trigger is less likely to be reached at smaller spatial scales (e.g., lek, lek cluster) if regional environmental (e.g., BSU) conditions are influencing population decline (Figure 2). The framework also accounts for natural variations in populations, which would allow managers to target populations that can be most affected by adaptive management responses.

Population Soft and Hard Triggers

On an annual basis as lek data are finalized by the state wildlife management agencies, the USGS state-space model would be used to establish population rates of change at the lek, lek cluster, and BSU levels. The rate at which a population trend destabilizes (population decline) and decouples from the trend at the associated higher-order scale would dictate whether or not a soft or hard trigger is reached. Thresholds for stability and decoupling for soft and hard triggers were initially determined from simulation analyses that used 17 years of lek data (2000-2016). These simulations estimated the range of values where management actions would have an effect on stabilizing population change or synchronizing decoupled scales. The threshold value for each criteria represents the most likely threshold value (from a range of values), that if crossed, would associate most strongly with continued decline or decoupling if management action is not taken (Coates et al. 2017).

Information on the methods used to determine if a soft or hard trigger for GRSG populations has been reached at the lek, lek cluster or BSU can be found in Coates et al. 2017, *Hierarchical population monitoring of greater sage-grouse (Centrocercus urophasianus) in Nevada and California—Identifying populations for management at the appropriate spatial scale*: U.S. Geological Survey Open-File Report 2017-1089 (as updated by USGS), in the Evaluation Process Section.

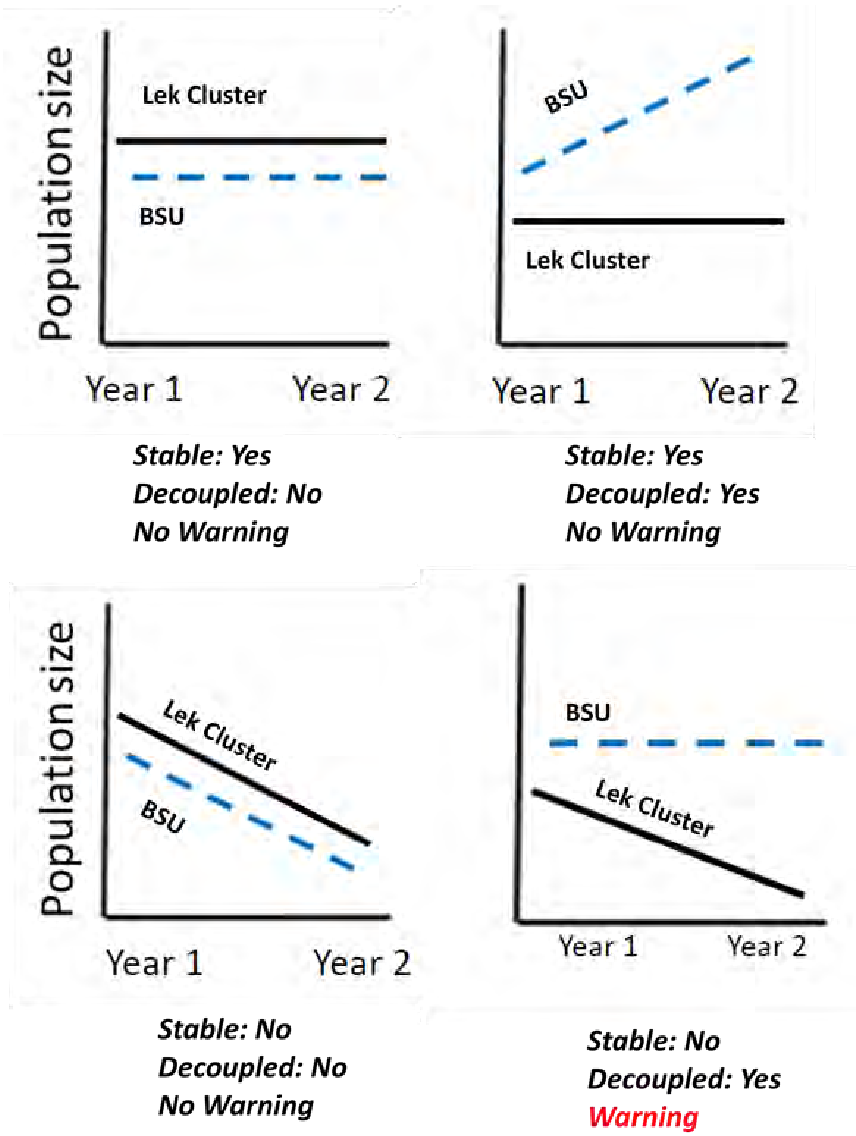


Figure E-2. Scenarios depicting population stability (trend) and decoupling from the higher-order spatial scales (Coates et al. 2017). A population that is destabilized and decoupled is considered a warning at that spatial scale. Multiple annual warnings are required to reach a soft or hard population trigger.

ADAPTIVE MANAGEMENT HABITAT ANALYSIS

Habitat Trends for Warnings and Triggers

Warnings for habitat would be evaluated at the lek cluster scale based on annual habitat loss within HMAs. Habitat warnings and triggers would be evaluated using the process described below and would not apply to the BSU scale.

Habitat Warnings and Triggers

1. At the lek cluster scale:
   a. Habitat warnings would be evaluated annually by a statewide technical team of specialists (similar to a science work group) from the BLM, Forest Service, NDOW and/or CDFW, SETT, USGS, FWS, UNR, and other appropriate local, state or federal partners to determine the ecological impact and magnitude of the habitat warnings. The statewide technical team would determine which habitat warnings warrant a management response. Within a lek cluster, habitat warnings that warrant a significant GRSG focused management response can be considered triggers and prioritized based on available science, site-specific conditions, and ecological criteria (e.g., ecological site description, resistance and resilience, state and transition models, disturbance response group, invasive plant species dominance, etc.). The statewide technical team would make a recommendation to the appropriate agency's authorizing official responsible for addressing the trigger(s). More information on prioritization is included under Step 2.
   b. Habitat warnings that had insufficient funds and resources available to implement significant GRSG focused projects would remain on the habitat warning list and could be re-prioritized as a trigger if warranted in the next annual evaluation by the sub-regional technical team. The sub-regional technical team would also review the trigger list annually and determine whether a habitat trigger remains on the list or should be removed.
   c. If a population soft trigger is reached within a lek cluster that has also reached a habitat soft trigger, this may result in a population hard trigger response for that lek cluster, as determined by the sub-regional technical team.

CAUSAL FACTOR ANALYSIS AND MANAGEMENT RESPONSE PROCESS

Step 1-<u>Assessment of GRSG Population and Habitat Conditions</u>: The sub-regional technical team and other appropriate state and local agency partners would use the processes outlined above to evaluate population and habitat data to identify population and habitat warnings and triggers that have been reached. The sub-regional technical team would meet semi-annually during the spring and late summer or fall of each year to evaluate population data using the results of the USGS state-space model (Coates et al. 2017, most recent version), habitat data from the land and resource management agencies (BLM, Forest Service, and other state and local agencies) and data sources to identify the potential for high fine or woody fuel loads that indicate a high probability for wildfire risk. The data sources may be adapted as new information becomes available from appropriate partners. Some applicable data sources are outlined in the habitat warnings definitions section.

Habitat warnings that warrant a management response would be elevated to the level of a trigger. Following the identification of habitat triggers, a list of criteria and a ranking system that considers available science, site-specific conditions, ecological criteria (e.g., ecological site descriptions, resistance and resilience, invasive plant species dominance, etc.), and available resources would be used to consistently prioritize and rank habitat triggers among lek clusters. This prioritization is only an initial evaluation, as the adaptive management process progresses, local information and expertise would be used to further refine the priority list for habitat triggers. Once the annual population and habitat information has been assessed and hard or soft triggers have been identified, the appropriate land management agency would notify the appropriate local districts and field offices.

Step 2-Determine the Causal Factor(s): Within four weeks (or sooner if possible) after Step 1 is completed and population and habitat triggers have been identified, the appropriate land management agency, in coordination with the sub-regional technical team would organize and invite federal, state and local agencies and partners (including but not limited to local area conservation groups, grazing permittees, and other affected authorized land users,) to participate, comment, and provide input during the causal factor analysis. This group would be referred to as the 'Adaptive Management Response Team' (AMRT). The causal factor analysis would be completed as soon as practicable given available resources. The casual factor analyses area at each scale are as follows:

a. Lek (population only): GRSG seasonal habitats associated with the lek. An individual lek boundary is defined as a minimum of a four-mile buffer around a lek;
b. Lek cluster: GRSG seasonal habitats associated with the lek cluster. A lek cluster boundary is defined by minimal GRSG movement between clusters so demographic rates are influenced by birth/death rates rather than immigration/emigration (as delineated by Coates et al. 2017, most recent version);
c. BSU (population only): GRSG seasonal habitats associated with the BSU. A BSU boundary is defined by similar environmental conditions where GRSG population dynamics are likely more driven by larger scale variations (e.g., climate), as delineated by Coates et al. 2017, most recent version.

The causal factor(s) for habitat triggers could be fire risk, wildfire, natural causes or anthropogenic disturbances based on the analysis conducted in Step 1. To identify the causal factor(s) of a population trigger, the AMRT would consider all available information and examine potential causal factor(s). Questions to be answered may include, but are not limited to the following:

- Did factors and events outside the triggered scale contribute to population or habitat decline (e.g., previously burned areas within the lek cluster or BSU that have not recovered)?
- Did the event or outcome arise from the interaction of more than one potential causal factor(s)?
- What natural and human-caused events have occurred within the causal factor analysis area?
- What is the magnitude of the impact to GRSG populations or habitat (e.g., what is the current anthropogenic disturbance in the area and how would these changes impact GRSG populations or habitat)?
- Can GRSG populations and/or habitat recover on its own without intervention?
- What is the expected length of the recovery period?
- Can the management actions already included in the 2015 Approved RMP Amendment and the 2019 Approved RMP Amendment accelerate recovery or are different actions necessary?

Findings from the causal factor analysis process would be documented in a report, which would be prepared by the AMRT. The AMRT report would also include recommendations for additional analyses or data collection if applicable. If the causal factor(s) cannot be determined, the AMRT would address threats that were identified and continue to explore opportunities for conservation in areas where impacts have occurred, when warranted.

Step 3-Identify Appropriate Trigger Responses: The AMRT would identify appropriate trigger responses to be applied to the individual lek (population only), lek cluster, and/or BSU (population only) that reached a trigger. Appropriate management responses would be included in the AMRT report.

Management responses would only be applied within HMAs. Both reactive and pro-active management responses may be applied to address existing or anticipated threats in areas where warnings or triggers have been reached. In either case they should be strategically targeted to address the causal factor(s) of the existing disturbance or to address similar threats that led to a warning or trigger within a lek, lek cluster, or BSU. This plan identifies two main response groups to address fine and woody fuel loads that may require different management responses with varying spatial and temporal scales associated with the response:

1) Short-term management – Identify areas of high fine fuel loads that would benefit from fuels management treatments (e.g., targeted grazing, season specific fall grazing, fuel breaks, etc.) of annual grasses.
2) Long-term management – Identify areas of high woody fuel loads to strategically target areas for appropriate fuel breaks, and vegetation treatments to better manage wildfires when they do occur.

Types of short- and long-term management or implementation actions that the appropriate land management agency(s) would evaluate or consider applying within an individual lek (population only), lek cluster, or BSU (population only) to address triggers may include, but are not be limited to the following:

- Delaying issuance of new permits and authorizations (e.g., geothermal, solar, wind, oil and gas, etc.);
- Delaying issuance of new or pending rights-of-ways outside of existing designated corridors;
- Use of tools and techniques that are included within the Programmatic Environmental Assessments for targeted grazing that are currently under development;
- Proactively apply targeted grazing to reduce fine fuels (e.g., use of free use permits, Temporary non-renewable grazing permits, etc.)
- Use of full force and effect decisions when appropriate to address fire risk from fine or woody fuels;
- Requiring new permits and authorizations to include an adaptive management process if additional impacts to GRSG populations or habitats are identified;
- Strategically place fuel breaks depending on landscape/habitat continuity, vegetation composition, fuel loads, accessibility, and use of Programmatic EISs for Fuel Breaks and Restoration Management;
- Use existing or develop new predictive tools to forecast and plan for anticipated plant growth based upon annual and seasonal precipitation in unison with existing (from previous growing season(s)) fine and woody fuels presence;
- Halting or delaying planned prescribed fire;
- Increasing fire prevention patrols;
- Increasing fire prevention inspections of motorized equipment;
- Prohibiting open campfires outside of established fire pits and outside of stoves in designated recreation areas during high fire seasons;
- Increasing inspections to ensure Required Design Features (RDFs) for limiting the spread of invasive plants are being implemented;
- Increasing surveys to detect and treat new infestations of invasive plants, especially invasive annual grasses;

- Delaying certain planned vegetation treatments until after the breeding and brood-rearing season;
- Halting, delaying, accelerating, or stimulating planned fuels treatments in GRSG winter habitat, depending on conditions and needs;
- Installing anti-perching devices on tall structures;
- Installing bird flight diverters on guy wires and fences;
- Delaying planned construction of new recreation facilities (e.g., kiosks, toilets, and signs);
- Increasing litter patrols in and around heavily used recreation areas;
- Increasing educational contacts with visitors concerning the role of litter and garbage in attracting GRSG predators;
- Increasing enforcement efforts on travel restrictions;
- Limiting noise and/or light pollution;
- Voluntary written agreements for items outside of BLM jurisdiction (such as activities on adjacent non-BLM land);
- Habitat improvement projects including pinyon and/or juniper removal;
- Developing Allotment Management Plans;
- Conducting emergency wild horse and burro gathers;
- Off-site water development by the water rights holder; and/or
- Voluntary establishment of livestock herding/stockmanship.

Some of the actions listed may require further NEPA analysis that would delay immediate implementation and response.

The appropriate land management agency local district or field offices would consider whether approval of pending authorizations within the affected adaptive management response area (lek, lek cluster or BSU) would exacerbate the population or habitat decline or would otherwise be inconsistent with the trigger responses. The land management agency would coordinate with appropriate federal, state and local agencies, and affected authorized land users for any action completed under this step.

In addition, the AMRT report would also identify an emergency/contingency plan that would outline immediate management actions that would take place, in the event the trigger is exacerbated. Such a plan should include goals, objectives, management actions and monitoring requirements developed specifically for the appropriate geographic area and/or populations being affected (e.g., lek, lek cluster, and/or BSU).

If a hard trigger is reached, district and/or field offices would implement the site specific actions outlined in the emergency/contingency response plan developed as part of the soft trigger response. If the hard trigger was reached, but not preceded by a soft trigger or the emergency/contingency response was not developed, the BLM (in coordination with Federal, State, and local partners) may implement temporary closures (in accordance with 43 CFR Part 8364.1, and as directed under BLM Instruction Memorandum No. 2013-035) to respond to a causal factor(s) that have resulted in a catastrophic event (i.e., wildfire). In addition, the BLM would no longer permit exceptions to allocation decisions in areas (e.g., lek, lek cluster, and/or BSU) that have reached a hard trigger and may delay issuance of new permits and authorizations until populations and/or habitat levels fall below the trigger threshold and the trigger has been determined to be reversed by the process outlined below (Longevity of Trigger Responses).

Management objectives in response to triggers would be SMART (Specific, Measurable, Achievable/Attainable, Relevant/Realistic, and Trackable/Timely or time specified).

Step 4-Implement Trigger Responses: The AMRT would submit the report to the appropriate land management agency's local district and/or field offices for implementation of specific management responses at the scale in which the trigger was reached (e.g., lek, lek cluster, and/or BSU), as contained in the report referenced in Steps 2 and 3.

Step 5-Monitor Responses: The AMRT with the appropriate land management agency's local district and/or field offices would continue to monitor (e.g., monitoring guidance within the Nevada Rangeland Monitoring Handbook, Stiver et al. 2015, etc.) the lek(s), lek cluster(s) and/or BSU(s) in which a trigger response is being applied to determine if the responses are adequately addressing the reason for the population and/or habitat decline. This information would be used in Step 1 above, "Assessment of GRSG Population and Habitat Conditions" the following year.

LONGEVITY OF TRIGGER RESPONSES (REMOVING THE TRIGGER RESPONSE)

The sub-regional technical team would work with the appropriate land management agency to develop criteria that would be used to evaluate whether a lek, lek cluster, and/or BSU that reached a trigger has recovered sufficiently or is trending in a positive direction. Longevity of a trigger response would be appropriate and apply to the type of management action being implemented.

Population and/or habitat triggers that resulted in management responses would be evaluated annually to determine their effectiveness. If implementation activities are successful or are improving populations or habitat conditions, these actions would be continued or re-prioritized by the AMRT using information from annual evaluation and monitoring.

For population and/or habitat trigger management responses that resulted in an allocation restriction, the federal land management agency would work with the AMRT to determine when a population or habitat trigger has been adequately addressed to remove the trigger response.

The process for evaluating population and habitat trigger responses may include, but are not limited to the following:

- Identification of upward population trends, based on an annual analysis of the GRSG state-spaced model (Coates et al. 2017 as updated).
- Response of vegetation communities and habitat following fire or other disturbance;
- Changes in GRSG HMAs based on periodic mapping updates;
- Evaluation of habitat or population responses based on an adaptive management process to determine what management actions are successful, what actions are unlikely to be successful and should be discontinued, what objectives should be modified to better reflect an achievable goal, and what actions should be changed to achieve the desired outcome;
- Evaluation of assessments completed following *the Sage-Grouse Habitat Assessment Framework: A Multiscale Assessment Tool.* Technical Reference 6710-1 (Stiver et al. 2015).
- In cases where efforts to improve habitat become infeasible (i.e., the area has passed an ecological threshold), the AMRT may decide to recommend removal of triggers.

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Appendix F

Fire and Invasives Assessment Tool

Appendix F. Fire and Invasives Assessment Tool

In the Great Basin Region (WAFWA Management Zones III, IV, and V), the US Fish and Wildlife Service (2013) identified wildfire as a primary threat to Greater Sage-Grouse (GRSG) and its habitat. In particular, it identified wildfire in response to invasive annual grasses and conifer expansion. The Fire and Invasives Assessment Tool (FIAT) provides the BLM and other land management agencies with a framework for prioritizing wildfire management and GRSG habitat conservation.

Supported by US Forest Service General Technical Report 326 (Chambers et. al. 2014; see **Attachment 1**), FIAT provides the BLM and other agencies with a mechanism to identify and prioritize areas within GRSG habitat for potential treatment based on their resistance and resilience characteristics. In the cold desert ecosystem typical throughout the Great Basin, soil moisture and temperature fundamentally influence a landscape's ability to resist environmental change. These factors also influence the landscape's ability to be resilient after long-term ecosystem shifts following a disturbance event, such as wildfire. Low resistance and resilient landscapes are typically characterized by low elevations, south-facing slopes, and porous soils. These areas will likely respond differently to fuels management, wildfire, and subsequent rehabilitation compared to more resistant and resilient landscapes, such as those at higher elevations or on north-facing slopes.

At the resource management planning level, FIAT consists of the following parts:

- The identification of areas at the landscape level, based on national datasets and scientific literature, where the threat to GRSG and its habitat from conifer expansion and wildfire/invasive annual grass is highest
- The identification of regional and local areas where focused wildfire and habitat management is critical to GRSG conservation efforts
- The identification of overarching management strategies for conifer expansion and invasive annual grasses in the areas of habitat recovery/restoration, fuels management, fire operations, and post-fire rehabilitation/emergency stabilization and rehabilitation (ESR)

Attachment 2 outlines the FIAT landscape-level framework and describes the anticipated process for implementing the resource management strategies in the BLM district office and National Forest Unit.

Ultimately, the outcomes of the FIAT process will provide land managers with spatially defined priorities and management protocols for the following:

- Operational decision-making during fires
- Implementation of NEPA projects for invasive annual grass and conifer reduction, fuel breaks, and ESR efforts in GRSG habitat

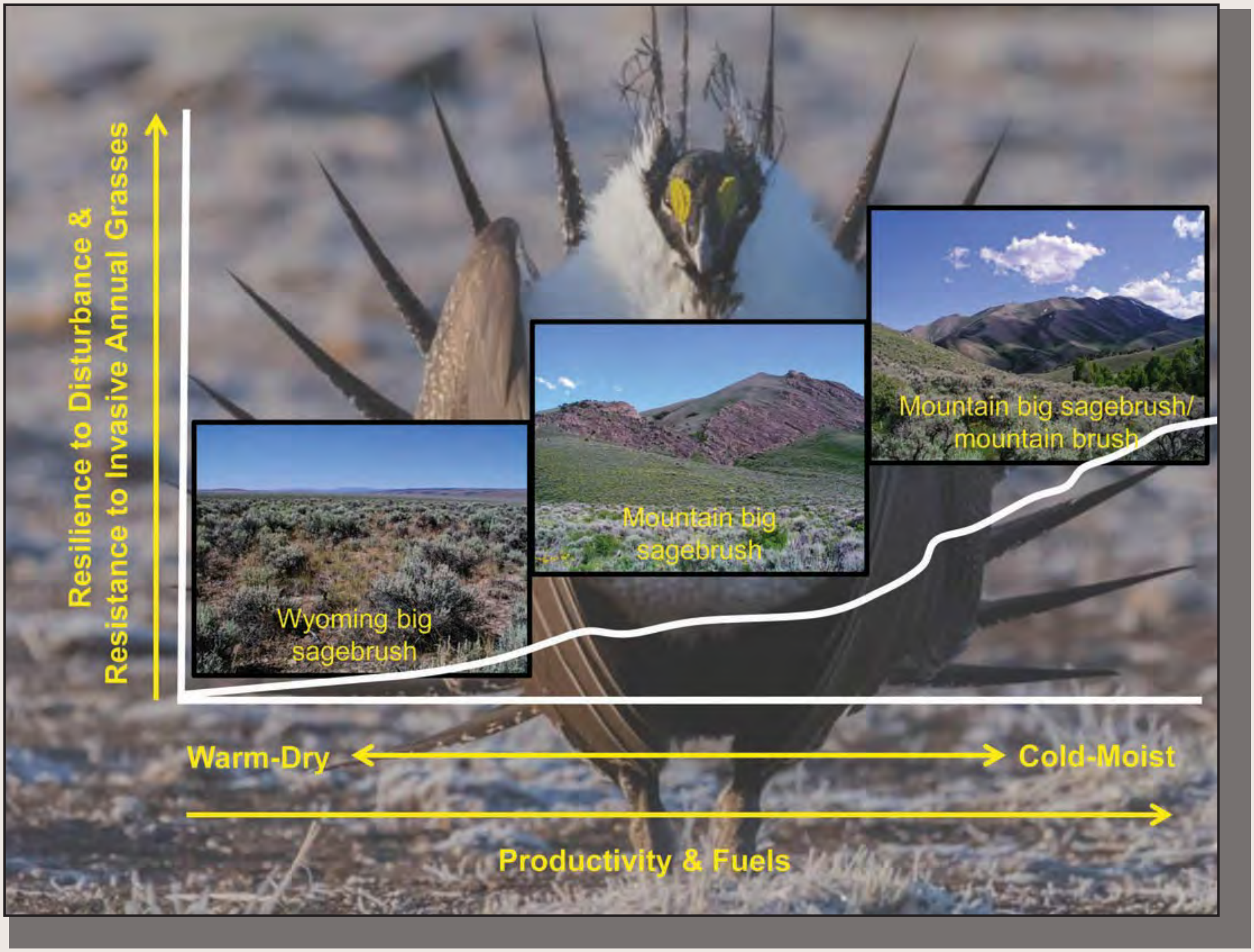
Attachment 1—Chambers et al. 2014 report

Attachment 2—Greater Sage-Grouse Wildfire, Invasive Annual Grasses, and Conifer Expansion Assessment

United States Department of Agriculture

Using Resistance and Resilience Concepts to Reduce Impacts of Invasive Annual Grasses and Altered Fire Regimes on the Sagebrush Ecosystem and Greater Sage-Grouse: A Strategic Multi-Scale Approach

Jeanne C. Chambers, David A. Pyke, Jeremy D. Maestas, Mike Pellant, Chad S. Boyd, Steven B. Campbell, Shawn Espinosa, Douglas W. Havlina, Kenneth E. Mayer, and Amarina Wuenschel



Forest Service Rocky Mountain Research Station General Technical Report RMRS-GTR-326 September 2014

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Abstract

This Report provides a strategic approach for conservation of sagebrush ecosystems and Greater Sage-Grouse (sage-grouse) that focuses specifically on habitat threats caused by invasive annual grasses and altered fire regimes. It uses information on factors that influence (1) sagebrush ecosystem resilience to disturbance and resistance to invasive annual grasses and (2) distribution, relative abundance, and persistence of sage-grouse populations to develop management strategies at both landscape and site scales. A sage-grouse habitat matrix links relative resilience and resistance of sagebrush ecosystems with sage-grouse habitat requirements for landscape cover of sagebrush to help decision makers assess risks and determine appropriate management strategies at landscape scales. Focal areas for management are assessed by overlaying matrix components with sage-grouse Priority Areas for Conservation (PACs), breeding bird densities, and specific habitat threats. Decision tools are discussed for determining the suitability of focal areas for treatment and the most appropriate management treatments.

Keywords: sagebrush habitat, Greater Sage-Grouse, fire effects, invasive annual grasses, management prioritization, conservation, prevention, restoration

Cover photos: *Greater Sage-grouse photo by Rick McEwan; sagebrush habitat photos by Jeanne Chambers.*

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Introduction

An unprecedented conservation effort is underway across 11 States in the western United States to reduce threats to Greater Sage-Grouse (*Centrocercus urophasianus*; hereafter, sage-grouse) and the sagebrush ecosystems on which they depend (fig. 1). Recent efforts were accelerated by the March 2010 determination that sage-grouse warrant protection under the Federal Endangered Species Act, and by increased emphasis on broad collaboration among state and Federal partners to proactively identify and implement actions to reverse current trends (USFWS 2010, 2013). Conservation success hinges on being able to achieve "the long-term conservation of sage-grouse and healthy sagebrush shrub and native perennial grass and forb communities by maintaining viable, connected, and well-distributed populations and habitats across their range, through threat amelioration, conservation of key habitats, and restoration activities" (USFWS 2013). While strides are being made to curtail a host of threats across the range, habitat loss and fragmentation due to wildfire and invasive plants remain persistent challenges to

Figure 1. Greater Sage-Grouse (*Centrocercus urophasianus*) (photo by Charlotte Ganskopp).

achieving desired outcomes – particularly in the western portion of the range (Miller et al. 2011; USFWS 2010; 2013). Management responses to date have not been able to match the scale of this problem. Natural resource managers are seeking coordinated approaches that focus appropriate management actions in the right places to maximize conservation effectiveness (Wisdom and Chambers 2009; Murphy et al. 2013).

Improving our ability to manage for resilience to disturbance and resistance to invasive species is fundamental to achieving long-term sage-grouse conservation objectives. Resilient ecosystems have the capacity to ***regain*** their fundamental structure, processes, and functioning when altered by stressors like drought and disturbances like inappropriate livestock grazing and altered fire regimes (Holling 1973; Allen et al. 2005). Species resilience refers to the ability of a species to recover from stressors and disturbances (USFWS 2013), and is closely linked to ecosystem resilience. Resistant ecosystems have the capacity to ***retain*** their fundamental structure, processes, and functioning when exposed to stresses, disturbances, or invasive species (Folke et al. 2004). Resistance to invasion by nonnative plants is increasingly important in sagebrush ecosystems; it is a function of the abiotic and biotic attributes and ecological processes of an ecosystem that limit the population growth of an invading species (D'Antonio and Thomsen 2004**)**. A detailed explanation of the factors that influence resilience and resistance in sagebrush ecosystems is found in Chambers et al. 2014.

In general, species are likely to be more resilient if large populations exist in large blocks of high quality habitat across the full breadth of environmental variability to which the species is adapted (Redford et al. 2011). Because sage-grouse are a broadly distributed and often wide-ranging species that may move long-distances between seasonal habitats (Connelly et al. 2011a,b), a strategic approach that integrates both landscape prioritization and site-scale decision tools is needed. This document develops such an approach for the conservation of sagebrush habitats across the range of sage-grouse with an emphasis on the western portion of the range. In recent years, information and tools have been developed that significantly increase our understanding of factors that influence the resilience of sagebrush ecosystems and the distribution of sage-grouse populations, and that allow us to strategically prioritize management activities where they are most likely to be effective and to benefit the species. Although the emphasis of this Report is on the western portion of the sage-grouse range, the approach has management applicability to other sagebrush ecosystems.

In this report, we briefly review causes and effects of invasive annual grasses and altered fire regimes, and then discuss factors that determine resilience to disturbances like wildfire and resistance to invasive annual grasses in sagebrush ecosystems. We illustrate how an understanding of resilience and resistance, sagebrush habitat requirements for sage-grouse, and consequences that invasive annual grasses and wildfire have on sage-grouse populations can be used to develop management strategies at both landscape and site scales. A sage-grouse habitat matrix is provided that links relative resilience and resistance with habitat requirements for landscape cover of sagebrush to both identify priority areas for management and determine effective management strategies at landscape scales. An approach for assessing focal areas for sage-grouse habitat management is described that overlays Priority Areas for Conservation (PACs) and breeding bird densities with resilience and resistance and habitat suitability to spatially link sage-grouse populations with habitat conditions and risks. The use of this approach is illustrated for the western portion of the range and for a diverse area in the northeast corner of Nevada. It concludes with a discussion of the tools available for determining the suitability of focal areas for treatment and the most appropriate management treatments. Throughout the document, the emphasis is on using this approach to guide and assist fire operations, fuels management, post-fire rehabilitation, and habitat restoration activities to maintain or enhance sage-grouse habitat.

Threats of Invasive Annual Grasses and Altered Fire Regimes to Sagebrush Ecosystems and Sage-Grouse

Effects on Sagebrush Ecosystems

Sage-grouse habitat loss and fragmentation due to wildfire and invasive plants are widely recognized as two of the most significant challenges to conservation of the species, particularly in the western portion of the range (Miller et al. 2011; USFWS 2010, 2013). During pre-settlement times, sagebrush-dominated ecosystems had highly variable fire return intervals that ranged from decades to centuries (Frost 1998; Brown and Smith 2000; Miller et al. 2011). At coarse regional scales, fire return intervals in sagebrush ecological types were determined largely by climate and its effects on fuel abundance and continuity. Consequently, fire frequency was higher in sagebrush types with greater productivity at higher elevations and following periods of increased precipitation than in lower elevation and less productive ecosystems (West 1983b; Mensing et al. 2006). At local scales within sagebrush types, fire return intervals likely were determined by topographic and soil effects on productivity and fuels and exhibited high spatial and temporal variability (Miller and Heyerdahl 2008).

Euro-American arrival in sagebrush ecosystems began in the mid-1800s and initiated a series of changes in vegetation composition and structure that altered fire regimes and resulted in major changes in sagebrush habitats. The first major change in fire regimes occurred when inappropriate grazing by livestock led to a decrease in native perennial grasses and forbs and effectively reduced the abundance of fine fuels (Knapp 1996; Miller and Eddleman 2001; Miller et al. 2011). Decreased competition from perennial herbaceous species, in combination with ongoing climate change and favorable conditions for woody species establishment at the turn of the twentieth century, resulted in increased abundance of shrubs (primarily *Artemisia* species) and trees, including juniper (*Juniperus occidentalis*, *J. osteosperma*) and piñon pine (*Pinus monophylla*), at mid to high elevations (Miller and Eddleman 2001; Miller et al. 2011). The initial effect of these changes in fuel structure was a reduction in fire frequency and size. The second major change in fire regimes occurred when non-native annual grasses (e.g., *Bromus tectorum*, *Taeniatherum caput-medusa*) were introduced from Eurasia in the late 1800s and spread rapidly into low to mid-elevation ecosystems with depleted understories (Knapp 1996). The invasive annual grasses increased the amount and continuity of fine fuels in many lower elevation sagebrush habitats and initiated annual grass/fire cycles characterized by shortened fire return intervals and larger, more contiguous fires (fig. 2; D'Antonio and Vitousek 1992; Brooks et al. 2004). Since settlement of the region, cheatgrass came to dominate as much as 4 million hectares (9.9 million acres) in the states of Nevada and Utah alone (fig. 3; Bradley and Mustard 2005). The final change in fire regimes occurred as a result of expansion of juniper and piñon pine trees into sagebrush types at mid to high elevations and a reduction of the grass, forb, and shrub species associated with these types. Ongoing infilling of trees is increasing woody fuels, but reducing fine fuels and resulting in less frequent fires (fig. 4; Miller et al. 2013). Extreme burning conditions (high winds, high temperatures, and low relative humidity) in high density (Phase III) stands are resulting in large and severe fires that result in significant losses of above- and below-ground organic matter (sensu Keeley 2009) and have detrimental ecosystem effects (Miller et al. 2013). Based on tree-ring analyses at several Great Basin sites, it is estimated that the extent of piñon and/or juniper woodland increased two to six fold since settlement, and most of that area will exhibit canopy closure within the next 50 years (Miller et al. 2008).

Figure 2. A wildfire that burned through a Wyoming big sagebrush ecosystem with an invasive annual grass understory in southern Idaho (top) (photo by Douglas J. Shinneman), and a close-up of a fire in a Wyoming big sagebrush ecosystem (bottom) (photo by Scott Schaff).

Figure 3. A wildfire that started in invasive annual grass adjacent to a railroad track and burned upslope into a mountain big sagebrush and Jeffrey pine ecosystem in northeast Nevada (top). A big sagebrush ecosystem that has been converted to invasive annual grass in north central Nevada (bottom) (photos by Nolan E. Preece).

Figure 4. Expansion of Utah juniper trees into a mountain big sagebrush ecosystem in east central Utah (top) that is resulting in progressive infilling of the trees and exclusion of native understory species (bottom) (photos by Bruce A. Roundy).

Effects on Sage-Grouse Habitat Selection and Population Dynamics

Understanding the effects of landscape changes on sage-grouse habitat selection and population dynamics can help managers apply more strategic and targeted conservation actions to reduce risks. Two key land cover shifts resulting from invasive annual grasses and altered fire regimes are affecting the ability to achieve the range-wide goal of stable-to-increasing population trends − large-scale reduction of sagebrush cover and conversion of sagebrush ecosystems to annual grasslands.

Sage-grouse are true sagebrush obligates that require large and intact sagebrush landscapes. Consequently, wildfires occurring at the extremes of the natural range of variability that remove sagebrush, even temporarily, over large areas and over short time periods often have negative consequences for sage-grouse. Several range-wide studies have identified the proportion of sagebrush-dominated land cover as a key indicator of sage-grouse population persistence and, importantly, have revealed critical levels of sagebrush landscape cover required by sage-grouse (see Appendix 2 for a description of landscape cover and how it is derived). Knick et al. (2013) found that 90% of active leks in the western portion of the range had more than 40% landscape cover of sagebrush within a 5-km (3.1-mi) radius of leks. Another range-wide analysis documented a high risk of extirpation with <27% sagebrush landscape cover and high probability of persistence with >50% sagebrush landscape cover within 18-km (11.2-mi) of leks (Wisdom et al. 2011). Similarly, Aldridge et al. (2008) found long-term sage-grouse persistence required a minimum of 25%, and preferably at least 65%, sagebrush landscape cover at the 30-km (18.6-mi) scale. Considered collectively, cumulative disturbances that reduce the cover of sagebrush to less than a quarter of the landscape have a high likelihood of resulting in local population extirpation, while the probability of maintaining persistent populations goes up considerably as the proportion of sagebrush cover exceeds two-thirds or more of the landscape. Reduction of sagebrush cover is most critical in low to mid elevations where natural recovery of sagebrush can be very limited within timeframes important to sage-grouse population dynamics (Davies et al. 2011).

Nonnative annual grasses and forbs have invaded vast portions of the sage-grouse range, reducing both habitat quantity and quality (Beck and Mitchell 2000; Rowland et al. 2006; Miller et al. 2011; Balch et al. 2013). Due to repeated fires, some low- to mid-elevation native sagebrush communities are shifting to novel annual grassland states resulting in habitat loss that may be irreversible with current technologies (Davies et al. 2011; Miller et al. 2011; Chambers et al. 2014). At the broadest scales, the presence of non-native annual grasslands on the landscape may be influencing both sage-grouse distribution and abundance. In their analysis of active leks, Knick et al. (2013) found that most leks had very little annual grassland cover (2.2%) within a 5-km (3.1-mi) radius of the leks; leks that were no longer used had almost five times as much annual grassland cover as active leks. Johnson et al. (2011) found that lek use became progressively less as the cover of invasive annual species increased at both the 5-km (3.1-mi) and 18-km (11.2-mi) scales. Also, few leks had >8% invasive annual vegetation cover within both buffer distances.

Patterns of nest site selection also suggest local impacts of invasive annual grasses on birds. In western Nevada, Lockyer (2012) found that sage-grouse selected large expanses of sagebrush-dominated areas and, within those areas, sage-grouse selected microsites with higher shrub canopy cover and lower cheatgrass cover. Average cheatgrass cover at selected locations was 7.1% compared to 13.3% at available locations. Sage-grouse hens essentially avoided nesting in areas with higher cheatgrass cover. Kirol et al. (2012) also found nest-site selection was negatively correlated with the presence of cheatgrass in south-central Wyoming.

Sage-grouse population demographic studies in northern Nevada show that recruitment and annual survival also are affected by presence of annual grasslands at larger scales. Blomberg et al. (2012) analyzed land cover within a 5-km (3.1-mi) radius of leks and found that leks impacted by annual grasslands experienced lower recruitment than non-impacted leks, even following years of high precipitation. Leks that were not affected by invasive annual grasslands exhibited recruitment rates nearly twice as high as the population average and nearly six times greater than affected leks during years of high precipitation.

Piñon and juniper expansion at mid to upper elevations into sagebrush ecosystems also has altered fire regimes and reduced sage-grouse habitat availability and suitability over large areas with population-level consequences (Miller et al. 2011; Baruch-Mordo et al. 2013; Knick et al. 2013). Conifer expansion results in non-linear declines in sagebrush cover and reductions in perennial native grasses and forbs as conifer canopy cover increases (Miller et al. 2000) and this has direct effects on the amount of available habitat for sagebrush-obligate species. Sites in the late stage of piñon and juniper expansion and infilling (Phase III from Miller et al. 2005) have reduced fire frequency (due to decreased fine fuels), but are prone to higher severity fires (due to increased woody fuels) which significantly reduces the likelihood of sagebrush habitat recovery (fig. 5) (Bates et al. 2013). Even before direct habitat loss occurs, sage-grouse avoid or are negatively associated with conifer cover during all life stages (i.e., nesting, brood-rearing, and wintering; Doherty et al. 2008, 2010a; Atamian et al. 2010; Casazza et al. 2011). Also, sage-grouse incur population-level impacts at a very low level of conifer encroachment. The ability to maintain active leks is severely compromised when conifer canopy exceeds 4% in the immediate vicinity of the lek (Baruch-Mordo et al. 2013), and most active leks average less than 1% conifer cover at landscape scales (Knick et al. 2013).

Figure 5. A post-burn, Phase III, singleleaf piñon and Utah juniper dominated sagebrush ecosystem in which soils are highly erosive and few understory plants remain (photo by Jeanne C. Chambers).

Resilience to Disturbance and Resistance to Invasive Annual Grasses in Sagebrush Ecosystems

Our ability to address the changes occurring in sagebrush habitats can be greatly enhanced by understanding the effects of environmental conditions on resilience to stress and disturbance, and resistance to invasion (Wisdom and Chambers 2009; Brooks and Chambers 2011; Chambers et al. 2014). In cold desert ecosystems, resilience of native ecosystems to stress and disturbance changes along climatic and topographic gradients. In these ecosystems, Wyoming big sagebrush (*Artemisia tridentata* spp. *wyomingensis*), mountain big sagebrush (*A. t.* spp. *vaseyana*), and mountain brush types (e.g., mountain big sagebrush, snowberry [*Symphorocarpus* spp.], bitterbrush [*Purshia tridentata*]) occur at progressively higher elevations and are associated with decreasing temperatures and increasing amounts of precipitation, productivity, and fuels (fig. 6; West and Young 2000). Piñon pine and juniper woodlands are typically associated with mountain big sagebrush types, but can occur with relatively cool and moist Wyoming big sagebrush types and warm and moist mountain brush types (Miller et al. 2013). Resilience to disturbance, including wildfire, has been shown to increase along these elevation gradients (fig. 7A) (Condon et al. 2011; Davies et al. 2012; Chambers et al. 2014; Chambers et al. *in press*). Higher precipitation and cooler temperatures, coupled with greater soil development and plant productivity at mid to high elevations, can result in greater resources and more favorable environmental conditions for plant growth and reproduction (Alexander et al. 1993; Dahlgren et al. 1997). In contrast, minimal precipitation and high temperatures at low elevations result in lower resource availability for plant growth (West 1983a,b;

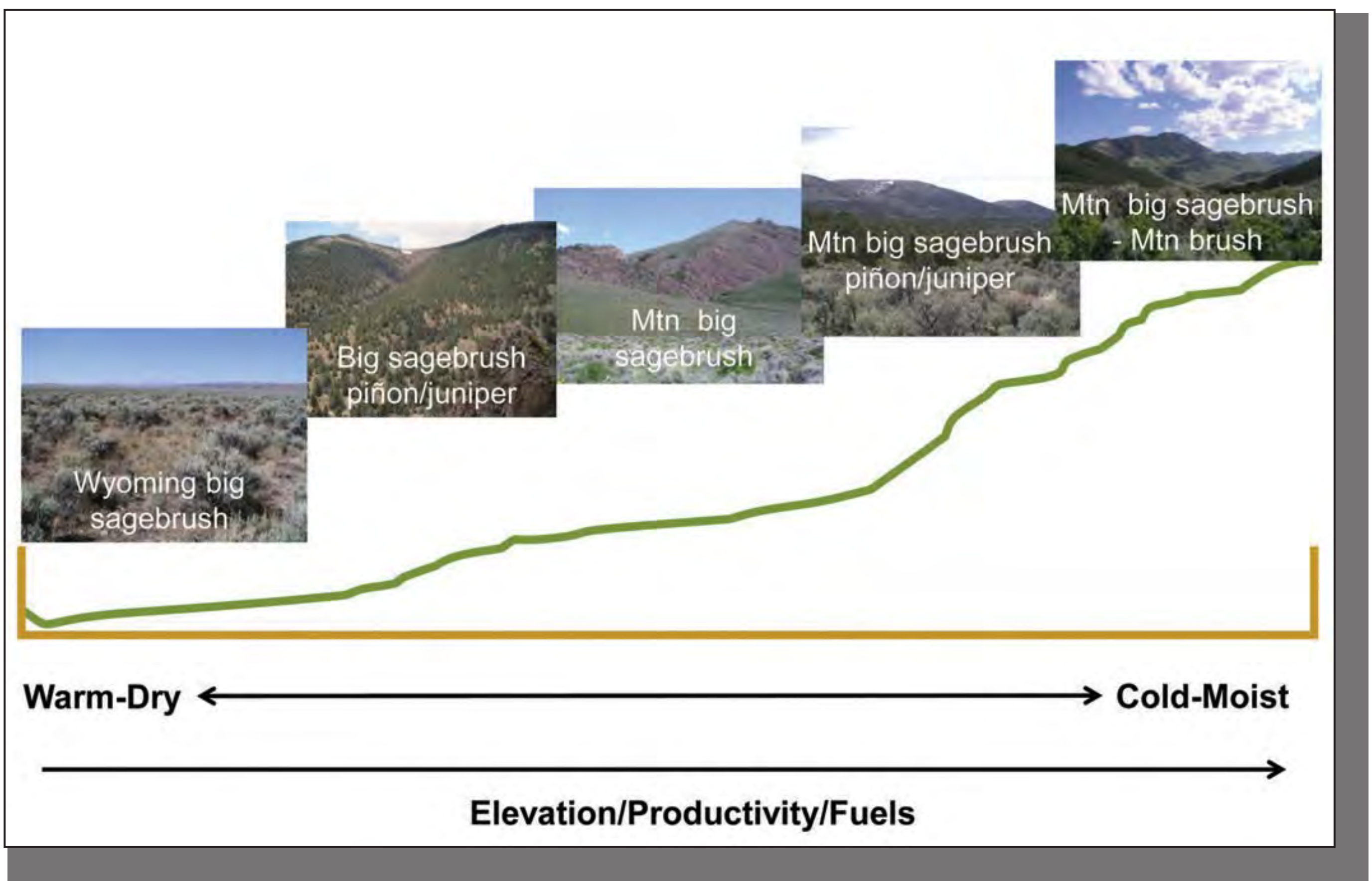

Figure 6. The dominant sagebrush ecological types that occur along environmental gradients in the western United States. As elevation increases, soil temperature and moisture regimes transition from warm and dry to cold and moist and vegetation productivity and fuels become higher.

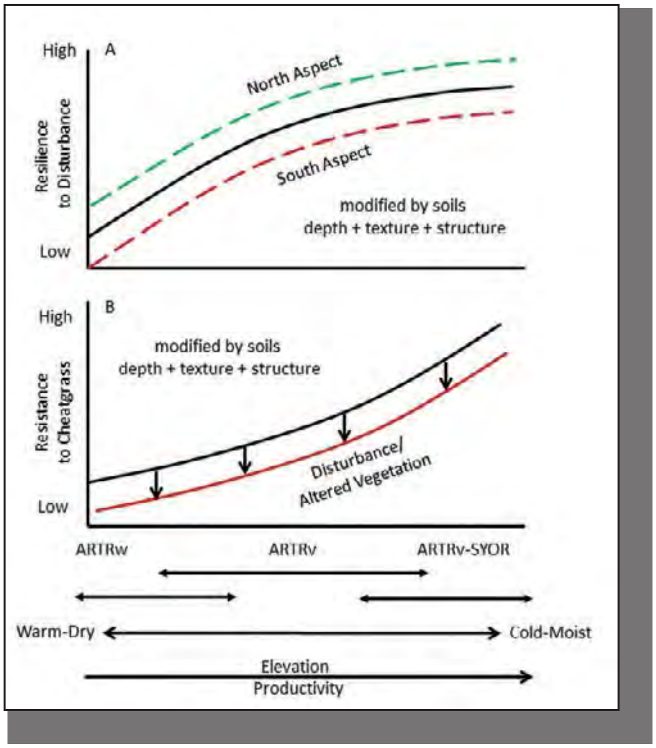

Figure 7. (**A)** Resilience to disturbance and (**B)** resistance to cheatgrass over a typical temperature/precipitation gradient in the cold desert. Dominant ecological sites occur along a continuum that includes Wyoming big sagebrush on warm and dry sites, to mountain big sagebrush on cool and moist sites, to mountain big sagebrush and root-sprouting shrubs on cold and moist sites. Resilience increases along the temperature/precipitation gradient and is influenced by site characteristics like aspect. Resistance also increases along the temperature/precipitation gradient and is affected by disturbances and management treatments that alter vegetation structure and composition and increase resource availability (modified from Chambers et al. 2014; Chambers et al. *in press*).

Smith and Nowak 1990). These relationships also are observed at local plant community scales where aspect, slope, and topographic position affect solar radiation, erosion processes, effective precipitation, soil development and vegetation composition and structure (Condon et al. 2011; Johnson and Miller 2006).

Resistance to invasive annual grasses depends on environmental factors and ecosystem attributes and is a function of (1) the invasive species' physiological and life history requirements for establishment, growth, and reproduction, and (2) interactions with the native perennial plant community including interspecific competition and response to herbivory and pathogens. In cold desert ecosystems, resistance is strongly influenced by soil temperature and moisture regimes (Chambers et al. 2007; Meyer et al. 2001). Germination, growth, and/or reproduction of cheatgrass is physiologically limited at low elevations by frequent, low precipitation years, constrained at high elevations by low soil temperatures, and optimal at mid elevations under relatively moderate temperature and water availability (fig. 7B; Meyer et al. 2001; Chambers et al. 2007). Slope, aspect, and soil characteristics modify soil temperature and moisture and influence resistance to cheatgrass at landscape to plant community scales (Chambers et al. 2007; Condon et al. 2011; Reisner et al. 2013). Genetic variation in cheatgrass results in phenotypic traits that increase survival and persistence in populations from a range of environments, and is likely contributing to the recent range expansion of this highly inbreeding species into marginal habitats (Ramakrishnan et al. 2006; Merrill et al. 2012).

The occurrence and persistence of invasive annual grasses in sagebrush habitats is strongly influenced by interactions with the native perennial plant community (fig. 7B). Cheatgrass, a facultative winter annual that can germinate from early fall through early spring, exhibits root elongation at low soil temperatures, and has higher nutrient uptake and growth rates than most native species (Mack and Pyke 1983; Arredondo et al. 1998; James et al. 2011). Seedlings of native, perennial plant species are generally poor competitors with cheatgrass, but adults of native, perennial grasses and forbs, especially those with similar growth forms and phenology, can be highly effective competitors with the invasive annual (Booth et al. 2003; Chambers et al. 2007; Blank and Morgan 2012).

Also, biological soil crusts, which are an important component of plant communities in warmer and drier sagebrush ecosystems, can reduce germination or establishment of cheatgrass (Eckert et al. 1986; Kaltenecker et al. 1999). Disturbances or management treatments that reduce abundance of native perennial plants and biological soil crusts and increase the distances between perennial plants often are associated with higher resource availability and increased competitive ability of cheatgrass (Chambers et al. 2007; Reisner et al. 2013; Roundy et al. *in press*).

The type, characteristics, and natural range of variability of stress and disturbance strongly influence both resilience and resistance (Jackson 2006). Disturbances like overgrazing of perennial plants by livestock, wild horses, and burros and more frequent or more severe fires are typically outside of the natural range of conditions and can reduce the resilience of sagebrush ecosystems. Reduced resilience is triggered by changes in environmental factors like temperature regimes, abiotic attributes like water and nutrient availability, and biotic attributes such as vegetation structure, composition, and productivity (Chambers et al. 2014) and cover of biological soil crusts (Reisner et al. 2013). Resistance to an invasive species can change when changes in abiotic and biotic attributes result in increased resource availability or altered habitat suitability that influences an invasive species' ability to establish and persist and/or compete with native species. Progressive losses of resilience and resistance can result in the crossing of abiotic and/or biotic thresholds and an inability of the system to recover to the reference state (Beisner et al. 2003; Seastedt et al. 2008).

Interactions among disturbances and stressors may have cumulative effects (Chambers et al. 2014). Climate change already may be shifting fire regimes outside of the natural range of occurrence (i.e., longer wildfire seasons with more frequent and longer duration wildfires) (Westerling et al. 2006). Sagebrush ecosystems generally have low productivity, and the largest number of acres burned often occurs a year or two after warm, wet conditions in winter and spring that result in higher fine fuel loads (Littell et al. 2009). Thus, annual grass fire cycles may be promoted by warm, wet winters and a subsequent increase in establishment and growth of invasive winter annuals. These cycles may be exacerbated by rising atmospheric CO_2 concentrations, N deposition, and increases in human activities that result in soil surface disturbance and invasion corridors (Chambers et al. 2014). Modern deviations from historic conditions will likely continue to alter disturbance regimes and sagebrush ecosystem response to disturbances; thus, management strategies that rely on returning to historical or "pre-settlement" conditions may be insufficient, or even misguided, given novel ecosystem dynamics (Davies et al. 2009).

Integrating Resilience and Resistance Concepts With Sage-Grouse Habitat Requirements to Manage Wildfire and Invasive Annual Grass Threats at Landscape Scales

The changes in sagebrush ecosystem dynamics due to invasive annual species and longer, hotter, and drier fire seasons due to a warming climate make it unlikely that these threats can be ameliorated completely (Abatzoglou and Kolden 2011; USFWS 2013). Consequently, a strategic approach is necessary to conserve sagebrush habitat and sage-grouse (Wisdom et al. 2005; Meinke et al. 2009; Wisdom and Chambers 2009; Pyke 2011). This strategic approach requires the ability to (1) identify those locations that provide current or potential habitat for sage-grouse and (2) prioritize management actions based on the capacity of the ecosystem to respond in the desired manner and to effectively allocate resources to achieve desired objectives. Current understanding of the relationship of landscape cover of sagebrush to sage-grouse habitat provides the capacity to identify those locations on the landscape that have a high probability of sage-grouse persistence (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). Similarly, knowledge of the relationships of environmental characteristics, specifically soil temperature and moisture regimes, to ecological types and their inherent resilience and resistance gives us the capacity to prioritize management actions based on probable effectiveness of those actions (Wisdom and Chambers 2009; Brooks and Chambers 2011; Miller et al. 2013; Chambers et al. 2014; Chambers et al. *in press*,).

In this section, we discuss the use of landscape cover of sagebrush as an indicator of sage-grouse habitat, and the use of soil temperature and moisture regimes as an indicator of resilience to disturbance, resistance to invasive annual grasses and, ultimately, the capacity to achieve desired objectives. We then show how these two concepts can be coupled in a sage-grouse habitat matrix and used to determine potential management strategies at the landscape scales on which sage-grouse depends.

Landscape Cover of Sagebrush as an Indicator of Sage-Grouse Habitat

Landscape cover of sagebrush is closely related to the probability of maintaining active sage-grouse leks, and is used as one of the primary indicators of sage-grouse habitat potential at landscape scales (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). Landscape cover of sagebrush less than about 25% has a low probability of sustaining active sage-grouse leks (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). Above 25% landscape cover of sagebrush, the probability of maintaining active sage-grouse leks increases with increasing sagebrush landscape cover. At landscape cover of sagebrush ranging from 50 to 85%, the probability of sustaining sage-grouse leks becomes relatively constant (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). For purposes of prioritizing landscapes for sage-grouse habitat management, we use 25% as the level below which there is a low probability of maintaining sage-grouse leks and 65% as the level above which there is little additional increase in the probability of sustaining active leks with further increases of landscape cover of sagebrush (fig. 8; Knick et al. 2013). Between about 25% and 65% landscape sagebrush cover, increases in landscape cover of sagebrush have a constant positive relationship with sage-grouse lek probability (fig. 8; Knick et al. 2013). Restoration and management activities that result in an increase in the amount of sagebrush dominated landscape within areas of pre-existing landscape cover between 25% and 65% likely will result in a higher probability of sage-grouse persistence, while declines in landscape cover of sagebrush likely will result in reductions in sage-grouse (Knick et al. 2013). It is important to note that

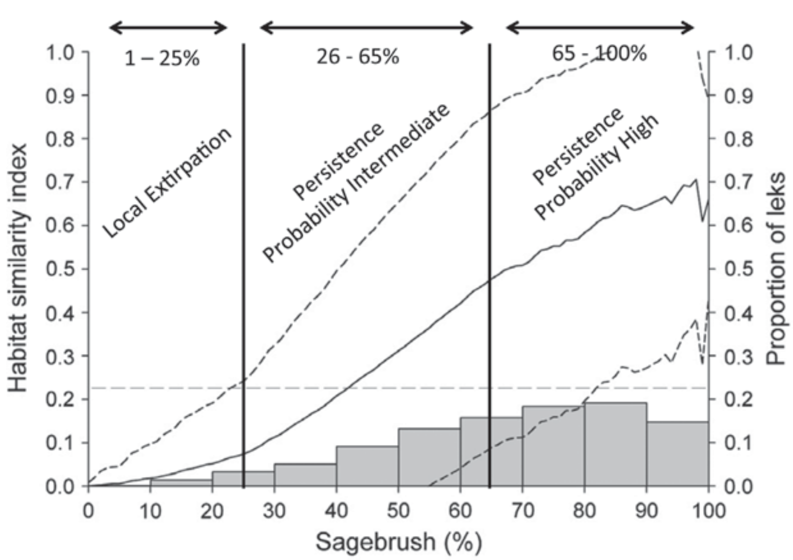

Figure 8. The proportion of sage-grouse leks and habitat similarity index (HSI) as related to the percent landscape cover of sagebrush. The HSI indicates the relationship of environmental variables at map locations across the western portion of the range to minimum requirements for sage-grouse defined by land cover, anthropogenic variables, soil, topography, and climate. HSI is the solid black line ± 1 SD (stippled lines). Proportion of leks are the grey bars. Dashed line indicates HSI values above which characterizes 90% of active leks (0.22). The categories at the top of the figure and the interpretation of lek persistence were added based on Aldridge et al. 2008; Wisdom et al. 2011; and Knick et al. 2013 (figure modified from Knick et al. 2013).

these data and interpretations relate only to persistence (i.e., whether or not a lek remains active) and it is likely that higher proportions of sagebrush cover or improved condition of sagebrush ecosystems may be required for population growth.

For the purposes of delineating sagebrush habitat relative to sage-grouse requirements for landscape cover of sagebrush, we calculated the percentage landscape sagebrush cover within each of the selected categories (1-25%, 26-65%, >65%) for the range of sage-grouse (fig. 9, 10). An explanation of how landscape cover of sagebrush is derived is in Appendix 2. Large areas of landscape sagebrush cover >65% are found primarily in Management Zones (MZ) II (Wyoming Basin), IV (Snake River Plains), and V (Northern Great Basin). In contrast, relatively small areas of landscape sagebrush cover >65% are located in MZ I (Great Plains), III (Southern Great Basin), VI (Columbia Basin), and VII (Colorado Plateau). Sagebrush is naturally less common in the Great Plains region compared to other parts of the range and previous work suggested that sage-grouse populations in MZ I may be more vulnerable to extirpation with further reductions in sagebrush cover (Wisdom et al. 2011). In the western portion of the range, where the threat of invasive annual grasses and wildfire is greatest, the area of sagebrush cover >65% differs among MZs. MZ III is a relatively arid and topographically diverse area in which the greatest extent of sagebrush cover >65% is in higher elevation, mountainous areas. MZs IV and V have relatively large extents of sagebrush cover >65% in relatively cooler and wetter areas, and MZs IV and VI have lower extents of sagebrush cover >65% in warmer and dryer areas and in areas with significant agricultural development. These differences in landscape cover of sagebrush indicate that different sets of management strategies may apply to the various MZs.

Soil Temperature and Moisture Regimes as Indicators of Ecosystem Resilience and Resistance

Potential resilience and resistance to invasive annual grasses reflect the biophysical conditions that an area is capable of supporting. In general, the highest potential resilience and resistance occur with ***cool*** to ***cold*** (frigid to cryic) soil temperature regimes and relatively ***moist*** (xeric to ustic) soil moisture regimes, while the lowest potential resilience and resistance occur with ***warm*** (mesic) soil temperatures and relatively ***dry*** (aridic) soil moisture regimes (Chambers et al. 2014, Chambers et al. *in press*). Definitions of soil temperature and moisture regimes are in Appendix 3. Productivity is elevated by high soil moisture and thus resilience is increased (Chambers et al. 2014); annual grass growth and reproduction is limited by cold soil temperatures and thus resistance is increased (Chambers et al. 2007). The timing of precipitation also is important because cheatgrass and many other invasive annual grasses are particularly well-adapted to Mediterranean type climates with cool and wet winters and warm and dry summers (Bradford and Lauenroth 2006; Bradley 2009). In contrast, areas that receive regular summer precipitation (ustic soil moisture regimes) often are dominated by warm and/or cool season grasses (Sala et al. 1997) that likely create a more competitive environment and result in greater resistance to annual grass invasion and spread (Bradford and Lauenroth 2006; Bradley 2009).

Much of the remaining sage-grouse habitat in MZs I (Great Plains), II (Wyoming Basin), VII (Colorado Plateau), and cool-to-cold or moist sites scattered across the range, are characterized by moderate to high resilience and resistance as indicated by soil temperature and moisture regimes (fig. 11). Sagebrush habitats across MZ I are unique from a range-wide perspective because soils are predominantly cool and ustic, or bordering on ustic as a result of summer precipitation; this soil moisture regime appears to result in higher resilience and resistance (Bradford and Lauenroth 2006).

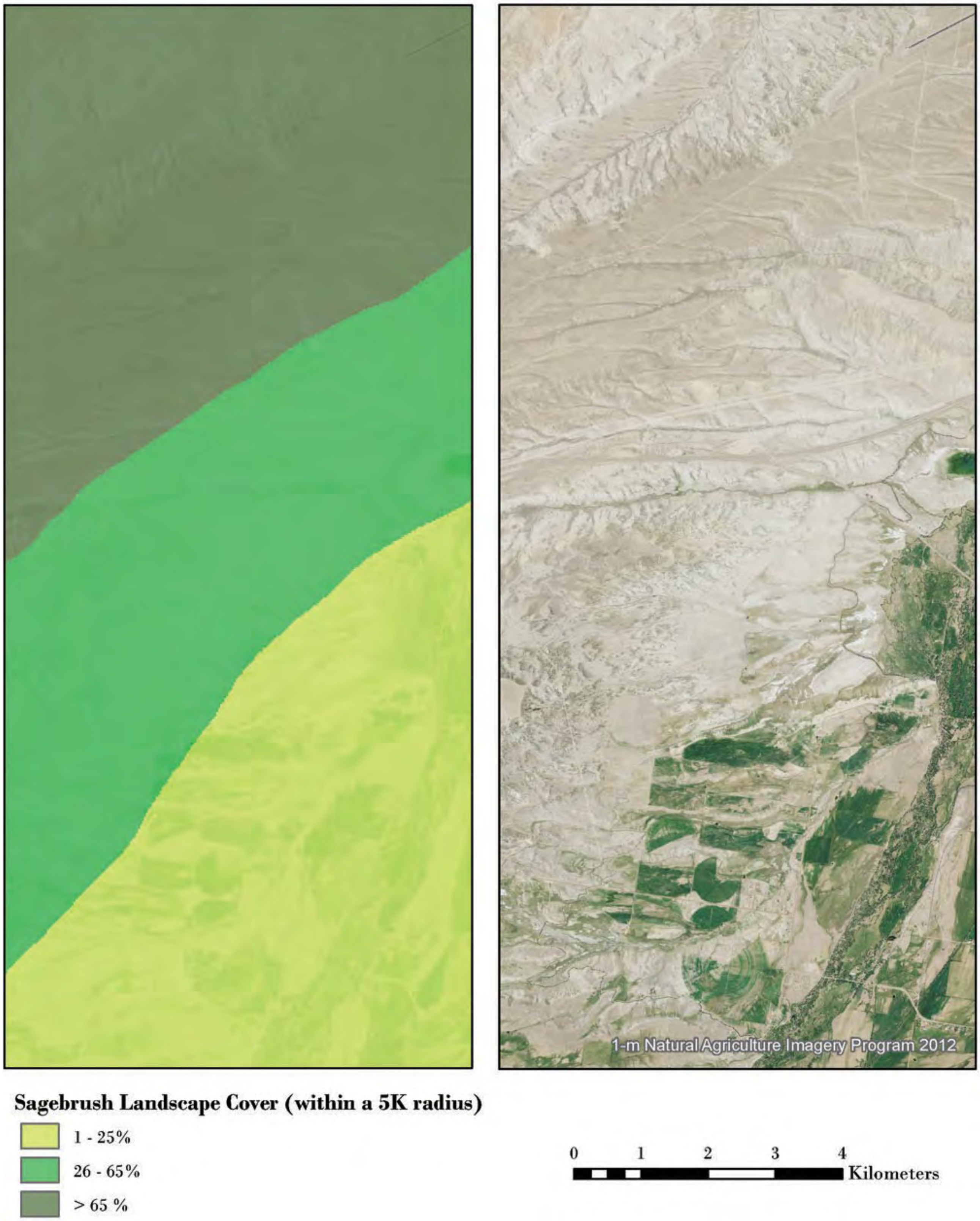

Figure 9. Landscape cover of sagebrush from 1-m National Agricultural Imagery (right) and the corresponding sagebrush landscape cover for the 1-25%, 26-65%, and >65% categories (left). See Appendix 2 for an explanation of how the categories are determined.

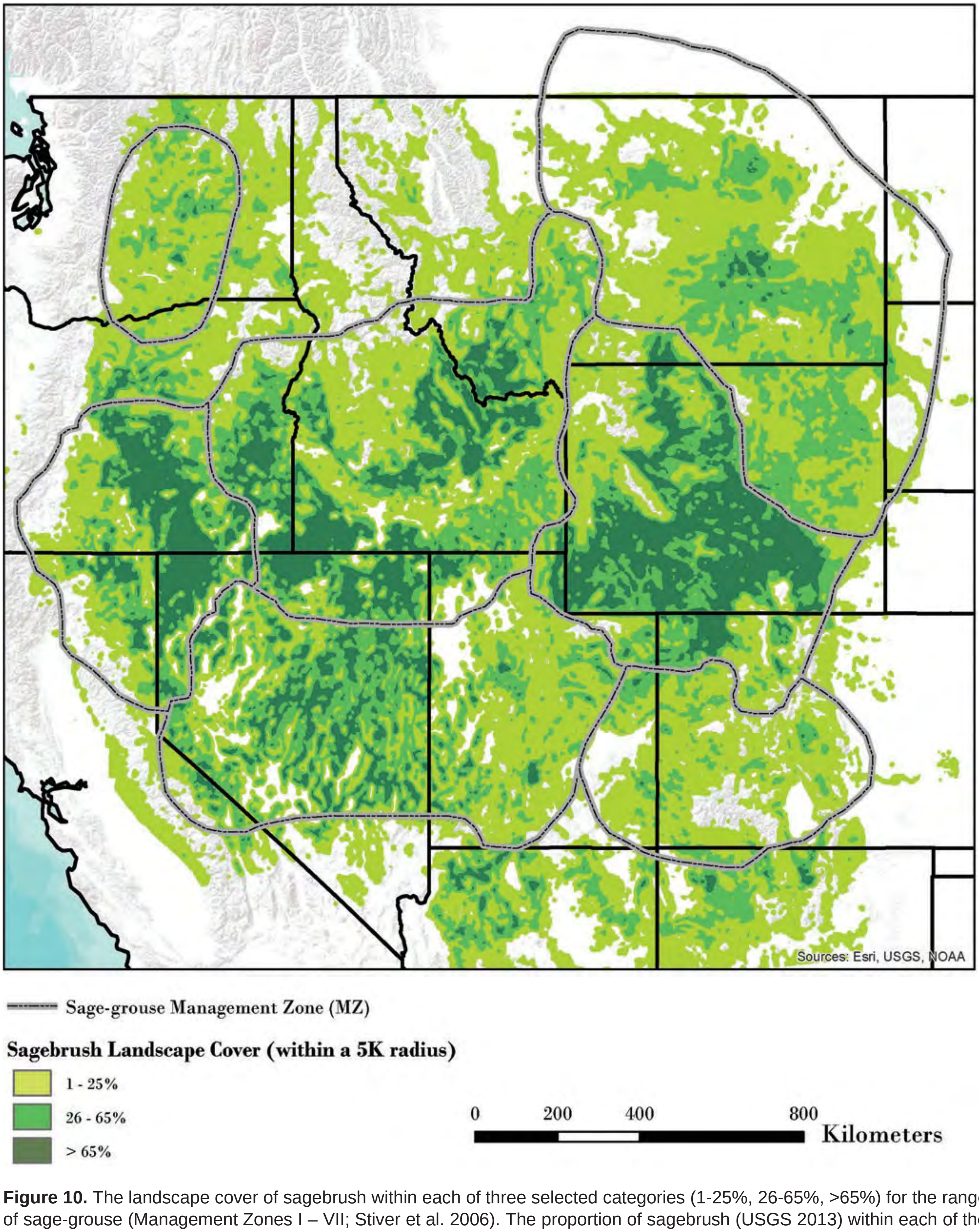

Figure 10. The landscape cover of sagebrush within each of three selected categories (1-25%, 26-65%, >65%) for the range of sage-grouse (Management Zones I – VII; Stiver et al. 2006). The proportion of sagebrush (USGS 2013) within each of the categories in a 5-km (3.1-mi) radius surrounding each pixel was calculated relative to other land cover types for locations with sagebrush cover.

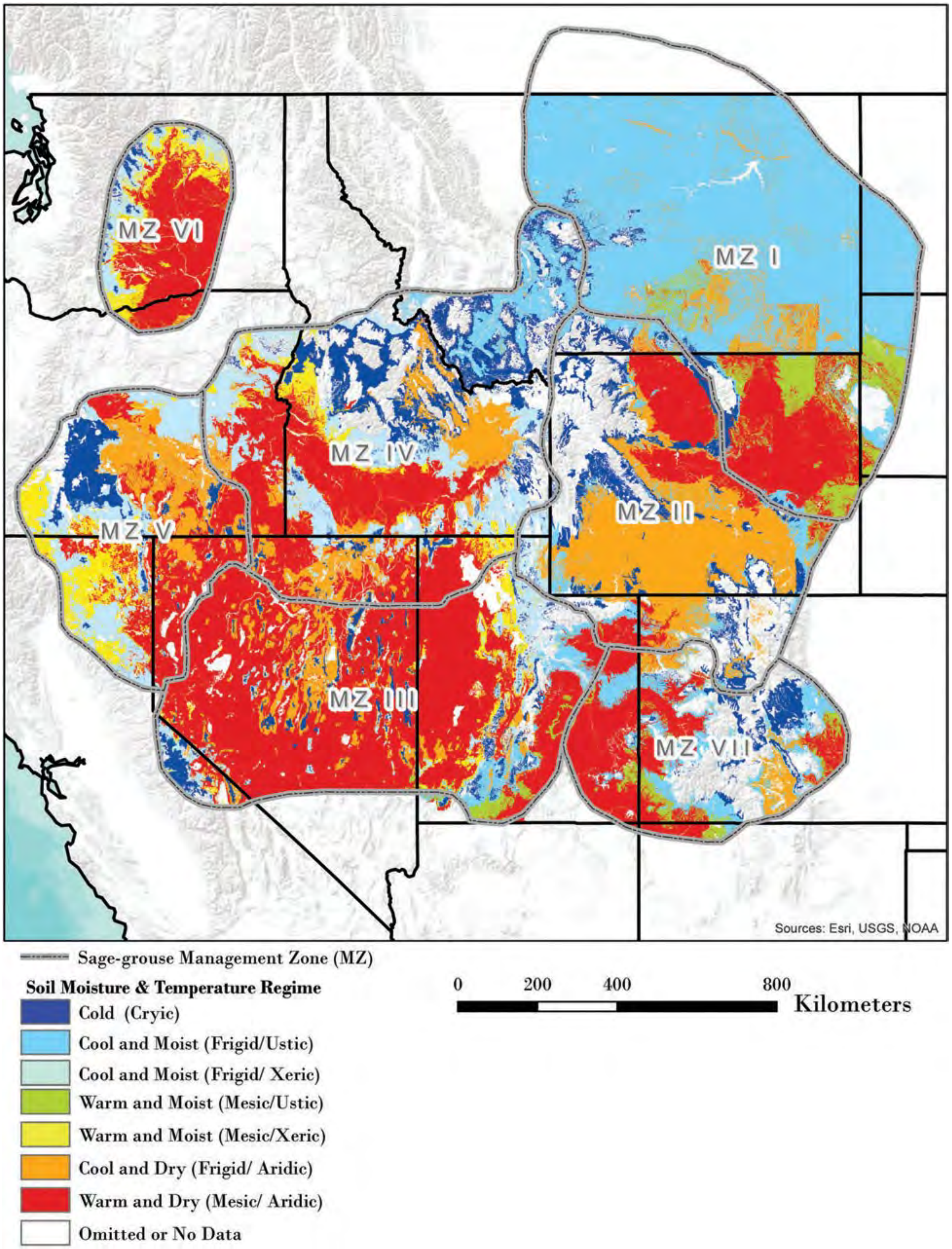

Figure 11. The soil temperature and moisture regimes for the range of sage-grouse (Management Zones I – VII; Stiver et al. 2006). Soil temperature and moisture classes were derived from the Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) (Soil Survey Staff 2014a). Gaps in that dataset were filled in with the NRCS State Soil Geographic Database (STATSGO) (Soil Survey Staff 2014b).

However, significant portions of MZs III (Southern Great Basin), much of IV (Snake River Plains), V (Northern Great Basin), and VI (Columbia Basin) are characterized largely by either warm and dry, or warm to cool and moist ecological types with moderate to low resilience and resistance (fig. 11; table 1). Areas within these MZs that have warm and dry soils are typically characterized by Wyoming big sagebrush ecosystems with low to moderately low resilience and resistance and are currently of greatest concern for sage-grouse conservation (fig. 12A). Areas with warm to cool soil temperature regimes and moist precipitation regimes are typically characterized by either Wyoming or mountain big sagebrush, have moderate to moderately low resilience and resistance,

Table 1. Predominant sagebrush ecological types in Sage-Grouse Management Zones III, IV, V, and VI based on soil temperature and soil moisture regimes, typical characteristics, and resilience to disturbance and resistance to invasive annual grasses (modified from Miller et al. 2014 a,b). Relative abundance of sagebrush species and composition of understory vegetation vary depending on Major Land Resource Area and ecological site type.

Ecological type	Characteristics	Resilience and resistance
Cold and Moist (Cryic/Xeric)	Ppt: 14 inches + Typical shrubs: *Mountain big sagebrush, snowfield sagebrush, snowberry, serviceberry, silver sagebrush, and/or low sagebrushes*	*Resilience* – **Moderately high**. Precipitation and productivity are generally high. Short growing seasons can decrease resilience on coldest sites. *Resistance*– **High**. Low climate suitability to invasive annual grasses
Cool and Moist (Frigid/Xeric)	Ppt: 12-22 inches Typical shrubs: *Mountain big sagebrush, antelope bitterbrush, snowberry, and/or low sagebrushes* Piñon pine and juniper potential in some areas	*Resilience* – **Moderately high**. Precipitation and productivity are generally high. Decreases in site productivity, herbaceous perennial species, and ecological conditions can decrease resilience. *Resistance* – **Moderate**. Climate suitability to invasive annual grasses is moderate, but increases as soil temperatures increase.
Warm and Moist (Mesic/Xeric)	Ppt: 12-16 inches Typical shrubs: *Wyoming big sagebrush, mountain big sagebrush, Bonneville big sagebrush, and/or low sagebrushes* Piñon pine and juniper potential in some areas	*Resilience* – **Moderate**. Precipitation and productivity are moderately high. Decreases in site productivity, herbaceous perennial species, and ecological conditions can decrease resilience. *Resistance* – **Moderately low**. Climate suitability to invasive annual grasses is moderately low, but increases as soil temperatures increase.
Cool and Dry (Frigid/Aridic)	Ppt: 6-12 inches Typical shrubs: *Wyoming big sagebrush, black sagebrush, and/or low sagebrushes*	*Resilience* – **Low**. Effective precipitation limits site productivity. Decreases in site productivity, herbaceous perennial species, and ecological conditions further decrease resilience. *Resistance* – **Moderate**. Climate suitability to invasive annual grasses is moderate, but increases as soil temperatures increase.
Warm and Dry (Mesic/Aridic, bordering on Xeric)	Ppt: 8-12 inches Typical shrubs: *Wyoming big sagebrush, black sagebrush and/or low sagebrushes*	*Resilience* – **Low.** Effective precipitation limits site productivity. Decreases in site productivity, herbaceous perennial species, and ecological conditions further decrease resilience. Cool season grasses susceptibility to grazing and fire, along with hot dry summer fire conditions, promote cheatgrass establishment and persistence. *Resistance* – **Low.** High climate suitability to cheatgrass and other invasive annual grasses. Resistance generally decreases as soil temperature increases, but establishment and growth are highly dependent on precipitation.

and have the potential for piñon and juniper expansion (Miller et al. 2014a; Chambers et al. *in press*). Many of these areas also are of conservation concern because piñon and juniper expansion and tree infilling can result in progressive loss of understory species and altered fire regimes (Miller et al. 2013). In contrast, areas with cool to cold soil temperature regimes and moist precipitation regimes have moderately high resilience and high resistance and are likely to recover in a reasonable amount of time following wildfires and other disturbances (Miller et al. 2013) (fig. 12B)

Figure 12. A Wyoming big sagebrush ecosystem with warm and dry soils in southeast Oregon (top) (photo by Richard F. Miller), compared to a mountain big sagebrush ecosystem with cool and moist soils in central Nevada (bottom) (photo by Jeanne C. Chambers).

Management Strategies Based on Landscape Cover of Sagebrush and Ecosystem Resilience and Resistance: The Sage-Grouse Habitat Matrix

Knowledge of the potential resilience and resistance of sagebrush ecosystems can be used in conjunction with sage-grouse habitat requirements to determine priority areas for management and identify effective management strategies at landscape scales (Wisdom and Chambers 2009). The sage-grouse habitat matrix (table 2) illustrates the relative resilience to disturbance and resistance to invasive annual grasses of sagebrush ecosystems in relation to the proportion of sagebrush cover on the landscape. As resilience and resistance go from high to low, as indicated by the rows in the matrix, decreases in sagebrush regeneration and abundance of perennial grasses and forbs progressively limit the capacity of a sagebrush ecosystem to recover after fire or other disturbances. The risk of annual invasives increases and the ability to successfully restore burned or otherwise disturbed areas decreases. As sagebrush cover goes from low to high within these same ecosystems, as indicated by the columns in the matrix, the capacity to provide adequate habitat cover for sage-grouse increases. Areas with less than 25% landscape cover of sagebrush are unlikely to provide adequate habitat for sage-grouse; areas with 26-65% landscape cover of sagebrush can provide habitat for sage-grouse but are at risk if sagebrush loss occurs without recovery; and areas with >65% landscape cover of sagebrush provide the necessary habitat conditions for sage-grouse to persist. Potential landscape scale management strategies can be determined by considering (1) resilience to disturbance, (2) resistance to invasive annuals, and (3) sage-grouse land cover requirements. Overarching management strategies to maintain or increase sage-grouse habitat at landscape scales based on these considerations are conservation, prevention, restoration, and monitoring and adaptive management (table 3; see Chambers et al. 2014). These strategies have been adapted for each of the primary agency programs including fire operations, fuels management, post-fire rehabilitation, and habitat restoration (table 4). Because sagebrush ecosystems occur over continuums of environmental conditions, such as soil temperature and moisture, and have differing land use histories and species composition, careful assessment of the area of concern always will be necessary to determine the relevance of a particular strategy (Pyke 2011; Chambers et al. 2014; Miller et al. 2014 a, b). The necessary information for conducting this type of assessment is found in the "Putting It All Together" section of this report.

Although the sage-grouse habitat matrix (table 2) can be viewed as partitioning land units into spatially discrete categories (i.e., landscapes or portions thereof can be categorized as belonging to one of nine categories), it is not meant to serve as a strict guide to spatial allocation of resources or to prescribe specific management strategies. Instead, the matrix should serve as a decision support tool for helping managers implement strategies that consider both the resilience and resistance of the landscape and landscape sagebrush cover requirements of sage-grouse. For example, low elevation Wyoming big sagebrush plant communities with relatively low resilience and resistance may provide important winter habitat resources for a given sage-grouse population. In a predominantly Wyoming big sagebrush area comprised of relatively low sagebrush landscape cover, a high level of management input may be needed to realize conservation benefits for sage-grouse. This doesn't mean that management activities should not be undertaken if critical or limiting sage-grouse habitat resources are present, but indicates that inputs will be intensive, potentially more expensive, and less likely to succeed relative to more resilient landscapes. It is up to the user of the matrix to determine how such tradeoffs influence management actions.

Table 2. Sage-grouse habitat matrix based on resilience and resistance concepts from Chambers et al. 2014, and sage-grouse habitat requirements from Aldridge et al. 2008, Wisdom et al. 2011, and Knick et al. 2013. Rows show the ecosystems relative resilience to disturbance and resistance to invasive annual grasses derived from the sagebrush ecological types in table 1 (1 = high resilience and resistance; 2 = moderate resilience and resistance; 3 = low resilience and resistance). Columns show the current proportion of the landscape (5-km rolling window) dominated by sagebrush (A = 1-25% land cover; B = 26-65% land cover; 3 = >65% land cover). Use of the matrix is explained in text. Overarching management strategies that consider resilience and resistance and landscape cover of sagebrush are in table 3. Potential management strategies specific to agency program areas, including fire operations, fuels management, post-fire rehabilitation, and habitat restoration are in table 4.

Proportion of Landscape Dominated by Sagebrush

Ecosystem Resilience to Disturbance and Resistance to Invasive Annual Grasses	**Low 1-25%**	**Moderate 26-65%**	**High >65%**
	Too little sagebrush on the landscape significantly threatens likelihood of sage-grouse persistence.	Sage-grouse are sensitive to the amount of sagebrush remaining on the landscape and populations could be at-risk with additional disturbances that remove sagebrush.	Sufficient sagebrush exists on the landscape and sage-grouse are highly likely to persist.
High	**1A** Natural sagebrush recovery is likely to occur, but if large, contiguous areas lack sagebrush, the time required for recovery may be too great.	**1B** Natural sagebrush recovery is likely to occur, but certain areas may lack connectivity.	**1C** Natural sagebrush recovery is likely to occur.
	Perennial herbaceous species are typically sufficient for recovery. Risk of annual invasives is low. Seeding/transplanting success is high. Recovery following inappropriate livestock use is often possible given changes in management.		
Moderate	**2A** Natural sagebrush recovery is likely on cooler and moister sites, but if large, contiguous areas lack sagebrush, the time required for recovery may be too great.	**2B** Natural sagebrush recovery is likely on cooler and moister sites, but certain areas may lack connectivity.	**2C** Natural sagebrush recovery is likely on cooler and moister sites.
	Perennial herbaceous species are usually adequate for recovery on cooler and moister sites. Risk of annual invasives is moderately high on warmer and drier sites. Seeding-transplanting success depends on site characteristics, and more than one intervention may be required especially on warmer and drier sites. Recovery following inappropriate livestock use depends on site characteristics and management.		
Low	**3A** Natural sagebrush recovery is not likely.	**3B** Natural sagebrush recovery may occur, but the time required will likely be too great and certain areas may lack connectivity.	**3C** Natural sagebrush recovery may occur, but the time required will likely be too great.
	Perennial herbaceous species are typically inadequate for recovery. Risk of annual invasives is high. Seeding/transplanting success depends on site characteristics, annual invasives, and post-treatment precipitation but is often low. More than one intervention likely will be required. Recovery following inappropriate livestock use is unlikely.		

Table 3. Potential management strategies based on resilience to disturbance, resistance to annual grass invasion, and sage-grouse habitat requirements based on Aldridge et al. 2008; Wisdom et al. 2011; and Knick et al. 2013 (adapted from Chambers et al. 2014).

Conserve – maintain or increase resilience to disturbance and resistance to invasive annuals in areas with high conservation value	
Priorities	• Ecosystems with low to moderate resilience to fire and resistance to invasive species that still have large patches of landscape sagebrush cover and adequate perennial grasses and forbs – *ecological types with warm and dry and cool and dry soil temperature/moisture regimes.* • Ecosystems with a high probability of providing habitat for sage-grouse, especially those with >65% landscape cover of sagebrush and adequate perennial herbaceous species – *all ecological types.*
Objective	• Minimize impacts of current and future human-caused disturbances and stressors.
Activities	• Immediately suppress fire in moderate to low resilience and resistance sagebrush and wooded shrublands to prevent an invasive annual grass-fire cycle. Large sagebrush patches are high priority for protection from wildfires. • Implement strategic fuel break networks to provide anchor points for suppression and reduce losses when wildfires escape initial attack. • Manage livestock grazing to prevent loss of perennial native grasses and forbs and biological soil crusts and allow natural regeneration. • Limit anthropogenic activities that cause surface disturbance, invasion, and fragmentation. (e.g., road and utility corridors, urban expansion, OHV use, and mineral/energy projects). • Detect and control new weed infestations.
Prevent – maintain or increase resilience and resistance of areas with declining ecological conditions that are at risk of conversion to a degraded, disturbed, or invaded state	
Priorities	• Ecosystems with moderate to high resilience and resistance – *ecological types with relatively cool and moist soil temperature and moisture regimes*. ○ Prioritize landscape patches that exhibit declining conditions due to annual grass invasion and/or tree expansion (e.g., at risk phase in State and Transition Models). • Ecosystems with a moderate to high probability of providing sage-grouse habitat, especially those with 26-65% landscape cover of sagebrush and adequate perennial native grasses and forbs – *all ecological types*.
Objectives	• Reduce fuel loads and decrease the risk of high intensity and high severity fire. • Increase abundance of perennial native grasses and forbs and of biological soil crusts where they naturally occur. • Decrease the longer-term risk of annual invasive grass dominance.
Activities	• Use mechanical treatments like cut and leave or mastication to remove trees, decrease woody fuels, and release native grasses and forbs in warm and moist big sagebrush ecosystems with relatively low resistance to annual invasive grasses that are in the early to mid-phase of piñon and/or juniper expansion. • Use prescribed fire or mechanical treatments to remove trees, decrease woody fuels, and release native grasses and forbs in cool and moist big sagebrush ecosystems with relatively high resistance to annual invasive grass that are in early to mid-phase of piñon and/or juniper expansion. • Actively manage post-treatment areas to increase perennial herbaceous species and minimize secondary weed invasion. • Consider the need for strategic fuel breaks to help constrain fire spread or otherwise augment suppression efforts.
Restore – increase resilience and resistance of disturbed, degraded, or invaded areas	
Priorities	• Areas burned by wildfire – *all ecological types* ○ Prioritize areas with low to moderate resilience and resistance, and that have a reasonable expectation of recovery. ○ Prioritize areas where perennial grasses and forbs have been depleted. ○ Prioritize areas that experienced high severity fire.

(continued)

Table 3. (Continued).

	• Sage-grouse habitat – *all ecological types* ○ Prioritize areas where restoration of sagebrush and/or perennial grasses is needed to create large patches of landscape cover of sagebrush or connect existing patches of sagebrush habitat. ○ Prioritize areas with adequate landscape cover of sagebrush where restoration of perennial grasses and forbs is needed. • Areas affected by anthropogenic activities that cause surface disturbance, invasion, and fragmentation. (e.g., road and utility corridors, urban expansion, OHV use, and mineral/energy projects) – *all ecological types.*
Objectives	• Increase soil stability and curtail dust. • Control/suppress invasive annual grasses and other invasive plants. • Increase landscape cover of sagebrush. • Increase perennial grasses and forbs and biological soil crusts where they naturally occur. • Reduce the risk of large fires that burn sage-grouse habitat.
Activities	• Use integrated strategies to control/suppress annual invasive grass and other annual invaders. • Establish and maintain fuel breaks or greenstrips in areas dominated by invasive annual grasses that are adjacent to areas with >25% landscape sagebrush cover and adequate perennial native grasses and forbs. • Seed perennial grasses and forbs that are adapted to local conditions to increase cover of these species in areas where they are depleted. • Seed and/or transplant sagebrush to restore large patches of sagebrush cover and connect existing patches. • Repeat restoration treatments if they fail initially to ensure restoration success especially in warm and dry soil temperature moisture regimes where weather is often problematic for establishment. • Actively manage restored/rehabilitated areas to increase perennial herbaceous species and minimize secondary weed invasion.
Monitoring and Adaptive Management– implement comprehensive monitoring to track landscape change and management outcomes and provide the basis for adaptive management	
Priorities	• Regional environmental gradients to track changes in plant community and other ecosystem attributes and expansion or contraction of species ranges – *all ecological types.* • Assess treatment effectiveness – *all ecological types.*
Objectives	• Understand effects of wildfire, annual grass invasion, piñon and juniper expansion, climate change and other global stressors in sagebrush ecosystems • Increase understanding of the long- and short-term outcomes of management treatments.
Activities	• Establish a regional network of monitoring sites that includes major environmental gradients. • Collect pre- and post-treatment monitoring data for all major land treatments activities. • Collect data on ecosystem status and trends (for example, land cover type, ground cover, vegetation cover and height [native and invasive], phase of tree expansion, soil and site stability, oddities). • Use consistent methods to monitor indicators. • Use a cross-boundary approach that involves all major land owners. • Use a common data base for all monitoring results (e.g., Land Treatment Digital Library; http://greatbasin.wr.usgs.gov/ltdl/). • Develop monitoring products that track change and provide management implications and adaptations for future management. • Support and improve information sharing on treatment effectiveness and monitoring results across jurisdictional boundaries (e.g., Great Basin Fire Science Delivery Project; www.gbfiresci.org).

Table 4. Specific management strategies by agency program area for the cells within the sage-grouse habitat matrix (table 2). The rows indicate relative resilience and resistance (numbers) and the columns indicate landscape cover of sagebrush by category (letters). Resilience and resistance are based on soil temperature and moisture regimes (fig. 11) and their relationship to ecological types (table 1). Percentage of the landscape dominated by sagebrush is based on the capacity of large landscapes to support viable sage-grouse populations over the long term (fig. 8). Note that these guidelines are related to the sage-grouse habitat matrix, and do not preclude other factors from consideration when determining management priorities for program areas. The "Fire Operations" program area includes preparedness, prevention, and suppression activities.

High Resilience to Disturbance and Resistance to Invasive Annual Grasses (1A, 1B, 1C)

Natural sagebrush recovery is likely to occur. Perennial herbaceous species are sufficient for recovery. Risk of invasive annual grasses is typically low.

Fire Operations

- Fire suppression is typically third order priority, but varies with large fire risk and landscape condition (cells 1A, 1B, 1C). Scenarios requiring higher priority may include:
  - Areas of sagebrush that bridge large, contiguous expanses of sagebrush and that are important for providing connectivity for sage-grouse (cells 1B, 1C).
  - Areas where sagebrush communities have been successfully reestablished through seedings or other rehabilitation investments (cells 1A, 1B, 1C)
  - Areas with later phase (Phase III) post-settlement piñon and juniper that have high resistance to control, are subject to large and/or severe fires, and place adjacent sage-grouse habitat at risk (cells 1A, 1B).
  - All areas when critical burning environment conditions exist. These conditions may be identified by a number of products including, but not limited to: Predictive Services 7-Day Significant Fire Potential Forecasts; National Weather Service Fire Weather Watches and Red Flag Warnings; fire behavior forecasts or other local knowledge.

Fuels Management

- Fuels management to reduce large sagebrush stand losses is a second order priority, especially in cells 1B and 1C. Management activities include:
  - Strategic placement of fuel breaks to reduce loss of large sagebrush stands by wildfire. Examples include linear features or other strategically placed treatments that serve to constrain fire spread or otherwise augment suppression efforts.
  - Tree removal in early to mid-phase (Phases I, II), post-settlement piñon and juniper expansion areas to maintain shrub/herbaceous cover and reduce fuel loads.
  - Tree removal in later phase (Phase III), post-settlement piñon and juniper areas to reduce risks of large or high severity fires. Because these areas represent non-sage-grouse habitat, prescribed fire may be appropriate on cool and moist sites, but invasive plant control and restoration of sagebrush and perennial native grasses and forbs may be necessary.

Post-Fire Rehabilitation

- Post-fire rehabilitation is generally low priority (cells 1A, 1B, 1C). Areas of higher priority include:
  - Areas where perennial herbaceous cover, density, and species composition is inadequate for recovery.
  - Areas where seeding or transplanting sagebrush is needed to maintain habitat connectivity for sage-grouse.
  - Steep slopes and soils with erosion potential.

Habitat Restoration and Recovery

- Restoration is typically passive and designed to increase or maintain perennial herbaceous species, biological soil crusts and landscape cover of sagebrush (cells 1A, 1B, 1C). Areas to consider for active restoration include:
  - Areas where perennial herbaceous cover density, or composition is inadequate for recovery after surface disturbance.
  - Areas where seeding or transplanting sagebrush is needed to maintain habitat connectivity for sage-grouse.

Moderate Resilience to Disturbance and Resistance to Invasive Annuals (2A, 2B, 2C)

Natural sagebrush recovery is likely to occur on cooler and moister sites, but the time required may be too great if large, contiguous areas lack sagebrush. Perennial herbaceous species are usually adequate for recovery on cooler and moister sites. Risk of invasive annual grasses is moderately high on warmer and drier sites.

Fire Operations

- Fire suppression is typically second order priority (cells 2A, 2B, 2C). Scenarios requiring higher priority may include:
  - Areas of sagebrush that bridge large, contiguous expanses of sagebrush and that are important for providing connectivity for sage-grouse (cells 2B, 2C).

(continued)

Table 4. (Continued).

	○ Areas where sagebrush communities have been successfully reestablished through seedings or other rehabilitation investments (cells 2A, 2B, 2C) ○ Areas with later phase (Phase III), post-settlement piñon and juniper that have high resistance to control, are subject to large and/or severe fires, and place adjacent sage-grouse habitat at risk (cells 2A, 2B). ○ Areas where annual grasslands place adjacent sage-grouse habitat at risk (cell 2A). ○ All areas when critical burning environment conditions exist. These conditions may be identified by a number of products including, but not limited to: Predictive Services 7-Day Significant Fire Potential Forecasts; National Weather Service Fire Weather Watches and Red Flag Warnings; fire behavior forecasts or other local knowledge.
Fuels Management	• Fuels management to reduce large sagebrush stand losses is a first order priority, especially in cells 2B and 2C. Management activities include: ○ Strategic placement of fuel breaks to reduce loss of large sagebrush stands by wildfire. Examples include linear features or other strategically placed treatments that serve to constrain fire spread or otherwise augment suppression efforts. ○ Tree removal in early to mid-phase (Phase I, II), post-settlement piñon and juniper expansion areas to maintain shrub/herbaceous cover and reduce fuel loads. ○ Tree removal in later phase (Phase III), post-settlement piñon and juniper areas to reduce risks of large or high severity fires. Because these areas represent non-sage-grouse habitat, prescribed fire may be appropriate on cool and moist sites, but restoration of sagebrush and perennial native grasses and forbs may be necessary.
Post-Fire Rehabilitation	• Post-fire rehabilitation is generally low priority (cells 2A, 2B, 2C) in cooler and moister areas. Areas of higher priority include: ○ Areas where perennial herbaceous cover, density, and species composition is inadequate for recovery. ○ Areas where seeding or transplanting sagebrush is needed to maintain habitat connectivity for sage-grouse. ○ Relatively warm and dry areas where annual invasives are expanding. ○ Steep slopes with erosion potential.
Habitat Restoration and Recovery	• Restoration is typically passive on cooler and moister areas and is designed to increase or maintain perennial herbaceous species, biological soil crusts, and landscape cover of sagebrush (cells 2A, 2B, 2C). Areas to consider for active restoration include: ○ Areas where perennial herbaceous cover, density, and species composition is inadequate for recovery after surface disturbance. ○ Areas where seeding or transplanting sagebrush is needed to maintain habitat connectivity for sage-grouse. ○ Relatively warm and dry areas where annual invasives are expanding.
Low Resilience to Disturbance and Resistance to Invasive Annuals (3A, 3B, 3C)	
Natural sagebrush recovery is not likely. Perennial herbaceous species are typically inadequate for recovery. Risk of invasive annual grasses is high.	
Fire Operations	• Fire suppression priority depends on the landscape cover of sagebrush: ○ Areas with <25% landscape cover of sagebrush are typically third order priority (cell 3A). These areas may be a higher priority if they are adjacent to intact sage-grouse habitat or are essential for connectivity. ○ Areas with 26-65% landscape cover of sagebrush are typically second order priority (cell 3B). These areas are higher priority if they have intact understories and if they are adjacent to sage-grouse habitat. ○ Areas with >65% landscape cover of sagebrush are first order priority (cell 3C). ○ Areas where sagebrush communities have been successfully reestablished through seedings or other rehabilitation investments (cells 3A, 3B, 3C).

(continued)

Table 4. (Continued).

Fuels Management	• Fuels management priority and management activities depend on the landscape cover of sagebrush: ○ Areas with <25% landscape cover of sagebrush are typically third order priority (cell 3A). Strategic placement of fuel breaks may be needed to reduce loss of adjacent sage-grouse habitat by wildfire. Examples include linear features or other strategically placed treatments that serve to constrain fire spread or otherwise augment suppression efforts. ○ Areas with 26-65% landscape cover of sagebrush are typically second order priority (cell 3B). These areas are higher priority if they have intact understories and if they are adjacent to sage-grouse habitat. Strategic placement of fuel breaks may be needed to reduce loss of large sagebrush stands by wildfire. ○ Areas with >65% landscape cover of sagebrush are first order priority (cell 3C). Strategic placement of fuel breaks may be needed to reduce loss of large sagebrush stands by wildfire. ○ Areas where sagebrush communities have been successfully reestablished through seedings or other rehabilitation investments (cells 3A, 3B, 3C). Strategic placement of fuel breaks may be needed to protect investments from repeated loss to wildfire.
Post-Fire Rehabilitation	• Post-fire rehabilitation priority and management activities depend on the landscape cover of sagebrush: ○ Areas with <25% landscape cover of sagebrush are typically third order priority (cell 3A). Exceptions include (1) sites that are relatively cool and moist and (2) areas adjacent to sage-grouse habitat where seeding can be used to increase connectivity and prevent annual invasive spread. In highly invaded areas, integrated strategies that include seeding of perennial herbaceous species and seeding and/or transplanting sagebrush will be required. Success will likely require more than one intervention due to low and variable precipitation. ○ Areas with 26-65% landscape cover of sagebrush are typically second order priority (cell 3B). Exceptions include (1) sites that are relatively cool and moist or that are not highly invaded, and (2) areas adjacent to sage-grouse habitat where seeding can be used to increase connectivity and prevent annual invasive spread. Seeding of perennial herbaceous species will be required where cover, density and species composition of these species is inadequate for recovery. Seeding and/or transplanting sagebrush as soon as possible is necessary for rehabilitating sage-grouse habitat. Success will likely require more than one intervention due to low and variable precipitation. ○ Areas with >65% landscape cover of sagebrush are first order priority, especially if they are part of a larger, contiguous area of sagebrush (cell 3C). Seeding of perennial herbaceous species will be required where cover, density and species composition of these species is inadequate for recovery. Seeding and/or transplanting sagebrush as soon as possible is necessary for rehabilitating sage-grouse habitat. Success will likely require more than one intervention due to low and variable precipitation.
Habitat Restoration and Recovery	• Restoration priority and management activities depends on the landscape cover of sagebrush: ○ Areas with <25% landscape cover of sagebrush are typically third order priority. Exceptions include (1) surface disturbances and (2) areas adjacent to sage-grouse habitat where seeding can be used to prevent annual invasive spread (cell 3A). In highly invaded areas, integrated strategies that include seeding of perennial herbaceous species and seeding and/or transplanting sagebrush will be required. Success will likely require more than one intervention due to low and variable precipitation. ○ Areas with 26-65% landscape cover of sagebrush are typically second order priority (cell 3B). Exceptions include (1) surface disturbances, (2) sites that are relatively cool and moist or that are not highly invaded, and (3) areas adjacent to sage-grouse habitat where seeding can be used to increase connectivity and prevent annual invasive spread. Seeding of perennial herbaceous species may be required where cover, density and species composition of these species is inadequate. Seeding and/or transplanting sagebrush as soon as possible is necessary for restoring sage-grouse habitat. Success will likely require more than one intervention due to low and variable precipitation. ○ Areas with >65% landscape cover of sagebrush are first order priority, especially if they are part of a larger, contiguous area of sagebrush (cell 3C). Seeding of perennial herbaceous species may be required where cover, density, and species composition of these species is inadequate. Seeding and/or transplanting sagebrush as soon as possible is necessary for restoring sage-grouse habitat. Success will likely require more than one intervention due to low and variable precipitation.

Another important consideration is that ecological processes such as wildfire can occur either within or across categories in the sage-grouse habitat matrix and it is necessary to determine the appropriate spatial context when evaluating management opportunities based on resilience and resistance and sage-grouse habitat. For example, if critical sage-grouse habitat occurs in close proximity to landscapes comprised mainly of annual grass-dominated plant communities, then fire risk to adjacent sage-grouse habitat can increase dramatically (Balch et al. 2013). In this scenario, management actions could include reducing the influence of invasive annual grasses with a strategic fuel break on the perimeter of intact sagebrush. Thus, management actions may have value to sustaining existing sage-grouse habitat, even if these measures are applied in locations that are currently not habitat; the spatial relationships of sagebrush and invasive annual grasses should be considered when prioritizing management actions and associated conservation measures.

Informing Wildfire and Fuels Management Strategies to Conserve Sage-Grouse

Collectively, responses to wildfires and implementation of fuels management projects are important contributors to sage-grouse conservation. Resilience and resistance concepts provide a science-based background that can inform fire operations and fuels management strategies and allocation of scarce assets during periods of high fire activity. In fire operations, firefighter and public safety is the overriding objective in all decisions. In addition, land managers consider numerous other values at risk, including the Wildland-Urban Interface (WUI), habitats, and infrastructure when allocating assets and prioritizing efforts. Resilience and resistance concepts are especially relevant for evaluating tradeoffs related to current ecological conditions and rates of recovery and possible ecological consequences of different fire management activities. For example, prioritizing initial attack efforts based on ecological types and their resilience and resistance at fire locations is a possible future application of resilience and resistance concepts. Also, fire prevention efforts can be concentrated where human ignitions have commonly occurred near intact, high quality habitats that also have inherently low resilience and resistance.

Fuels management projects are often applied to (1) constrain or minimize fire spread; (2) alter species composition; (3) modify fire intensity, severity, or effects; or (4) create fuel breaks or anchor points that augment fire management efforts (fig. 13). These activities are selectively used based on the projected ecosystem response, anticipated fire patterns, and probability of success. For example, in areas that are difficult to restore due to low to moderate resilience, fuel treatments can be placed to minimize fire spread and conserve sagebrush habitat. In cooler and moister areas with moderate to high resilience and resistance, mechanical or prescribed fire treatments may be appropriate to prevent conifer expansion and dominance. Given projected climate change and longer fire seasons across the western United States, fuels management represents a proactive approach for modifying large fire trends. Fire operations and fuels management programs contribute to a strategic, landscape approach when coupled with data that illustrate the likelihood of fire occurrence, potential fire behavior, and risk assessments (Finney et al. 2010; Oregon Department of Forestry 2013). In tandem with resilience and resistance concepts, these data can further inform fire operations and fuels management decisions.

Figure 13. Fuel breaks may include roads, natural features, or other management imposed treatments intended to modify fire behavior or otherwise augment suppression efforts at the time of a fire. Such changes in fuel type and arrangement may improve suppression effectiveness by modifying flame length and fire intensity, and allow fire operations to be conducted more safely. The top photo shows a burnout operation along an existing road to remove available fuels ahead of an oncoming fire and constrain overall fire growth (photo by BLM Idaho Falls District). The bottom photo shows fuel breaks located along a road, which complimented fire control efforts when a fire intersected the fuel break and road from the right (photo by Ben Dyer, BLM).

Putting it all Together

Effective management and restoration of sage-grouse habitat will benefit from a collaborative approach that prioritizes the best management practices in the most appropriate places. This section describes an approach for assessing focal areas for sage-grouse habitat management based on widely available data, including (1) Priority Areas for Conservation (PACs), (2) breeding bird densities, (3) habitat suitability as indicated by the landscape cover of sagebrush, (4) resilience and resistance and dominant ecological types as indicated by soil temperature and moisture regimes, and (5) habitat threats as indicated by cover of cheatgrass, cover of piñon and juniper, and by fire history. Breeding bird density data are overlain with landscape cover of sagebrush and with resilience and resistance to spatially link sage-grouse populations with habitat conditions and risks. We illustrate the use of this step-down approach for evaluating focal areas for sage-grouse habitat management across the western portion of the range, and we provide a detailed example for a diverse area in the northeast corner of Nevada that is comprised largely of PACs with mixed land ownership. The sage-grouse habitat matrix (table 2) is used as a tool in the decision process, and guidelines are provided to assist in determining appropriate management strategies for the primary agency program areas (fire operations, fuels management, post-fire rehabilitation, habitat restoration) for each cell of the matrix.

We conclude with discussions of the tools available to aid in determining the suitability of an area for treatment and the most appropriate management treatments such as ecological site descriptions and state and transition models and of monitoring and adaptive management. Datasets used to compile the maps in the following sections are in Appendix 4.

Assessing Focal Areas for Sage-Grouse Habitat Management: Key Data Layers

Priority areas for conservation: The recent identification of sage-grouse strongholds, or Priority Areas for Conservation (PACs), greatly improves the ability to target management actions towards habitats expected to be critical for long-term viability of the species (fig. 14; USFWS 2013). Understanding and minimizing risks of large-scale loss of sagebrush and conversion to invasive annual grasses or piñon and juniper in and around PACs will be integral to maintaining sage-grouse distribution and stabilizing population trends. PACs were developed by individual states to identify those areas that are critical for ensuring adequate representation, redundance, and resilience to conserve sage-grouse populations. Methods differed among states; in general, PAC boundaries were identified based on (1) sage-grouse population data including breeding bird density, lek counts, telemetry, nesting areas, known distributions, and sightings/observations; and (2) habitat data including occupied habitat, suitable habitat, seasonal habitat, nesting and brood rearing areas, and connectivity areas or corridors. Sage-grouse habitats outside of PACs also are important in assessing focal areas for management where they provide connectivity between PACs (genetic and habitat linkages), seasonal habitats that may have been underestimated due to emphasis on lek sites to define priority areas, habitat restoration and population expansion opportunities, and flexibility for managing habitat changes that may result from climate change (USFWS 2013). If PAC boundaries are adjusted, they will need to be updated for future analyses.

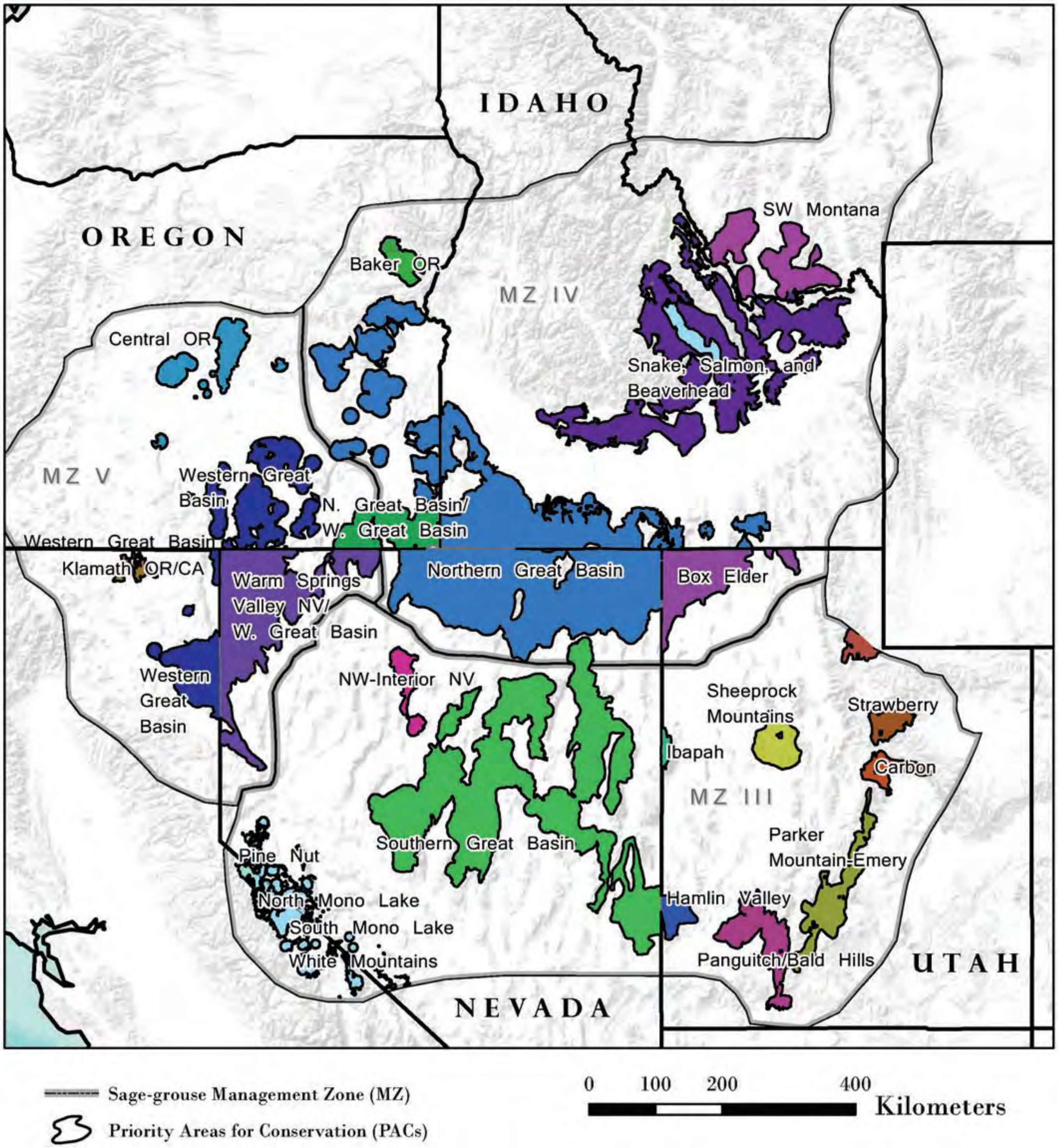

Figure 14. Priority Areas for Conservation (PACs) within the range of sage-grouse (USFWS 2013). Colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

Breeding bird density: Range-wide breeding bird density areas provide one of the few accessible data sets for further prioritizing actions within and adjacent to PACs to maintain species distribution and abundance. Doherty et al. (2010b) developed a useful framework for incorporating population data in their range-wide breeding bird density analysis, which used maximum counts of males on leks (n = 4,885) to delineate breeding bird density areas that contain 25, 50, 75, and 100% of the known breeding population (fig. 15). Leks were mapped according to these abundance values and buffered by a 6.4 to 8.5 km (4.0 to 5.3 mi) radius to delineate nesting areas. Findings showed that while sage-grouse occupy extremely large landscapes, their breeding distribution is highly aggregated in comparably smaller identifiable population centers; 25% of the known population occurs within 3.9% (2.9 million ha; 7.2 million ac) of the species range, and 75% of birds are within 27.0% of the species range (20.4 million ha; 50.4 million ac) (Doherty et al. 2010b). The Doherty et al. (2010b) analysis emphasized breeding habitats primarily because little broad scale data exist for summer and winter habitat use areas. Even though the current breeding bird density data provide the most comprehensive data available, they do not include all existing sage-grouse populations. Incorporating finer scale seasonal habitat use data at local levels where it is available will ensure management actions encompass all seasonal habitat requirements.

For this assessment, we chose to use State-level breeding bird density results from Doherty et al. (2010b) instead of range-wide model results to ensure that important breeding areas in MZs III, IV, and V were not underweighted due to relatively higher bird densities in the eastern portion of the range. It is important to note that breeding density areas were identified using best available information in 2009, so these range-wide data do not reflect the most current lek count information or changes in conditions since the original analysis. Also, breeding density areas should not be viewed as rigid boundaries but rather as the means to prioritize landscapes regionally where step-down assessments and actions may be implemented quickly to conserve the most birds.

Landscape cover of sagebrush: Landscape cover of sagebrush is one of the key determinants of sage-grouse population persistence and, in combination with an understanding of resilience to disturbance and resistance to invasive annuals, provides essential information both for determining priority areas for management and appropriate management actions (fig. 10; tables 2 and 3). Landscape cover of sagebrush is a measure of large, contiguous patches of sagebrush on the landscape and is calculated from remote sensing databases such as LANDFIRE (see Appendix 4). We used the three cover categories of sagebrush landscape cover discussed previously to predict the likelihood of sustaining sage-grouse populations (1-25%, 25-65%, >65%). The sagebrush landscape cover datasets were created using a moving window to summarize the proportion of area (5-km [3.1-mi] radius) dominated by sagebrush surrounding each 30-m pixel and then assigned those areas to the three categories (see Appendix 2). Because available sagebrush cover from sources such as LANDFIRE does not exclude recent fire perimeters, it was necessary to either include these in the analysis of landscape cover of sagebrush or display them separately. Although areas that have burned since 2000 likely do not currently provide desired sage-grouse habitat, areas with the potential to support sagebrush ecological types can provide conservation benefits in the overall planning effort especially within long-term conservation areas like PACs. The landscape cover of sagebrush and recent fire perimeters are illustrated for the western portion of the range (fig.16) and northeast Nevada (fig. 17).

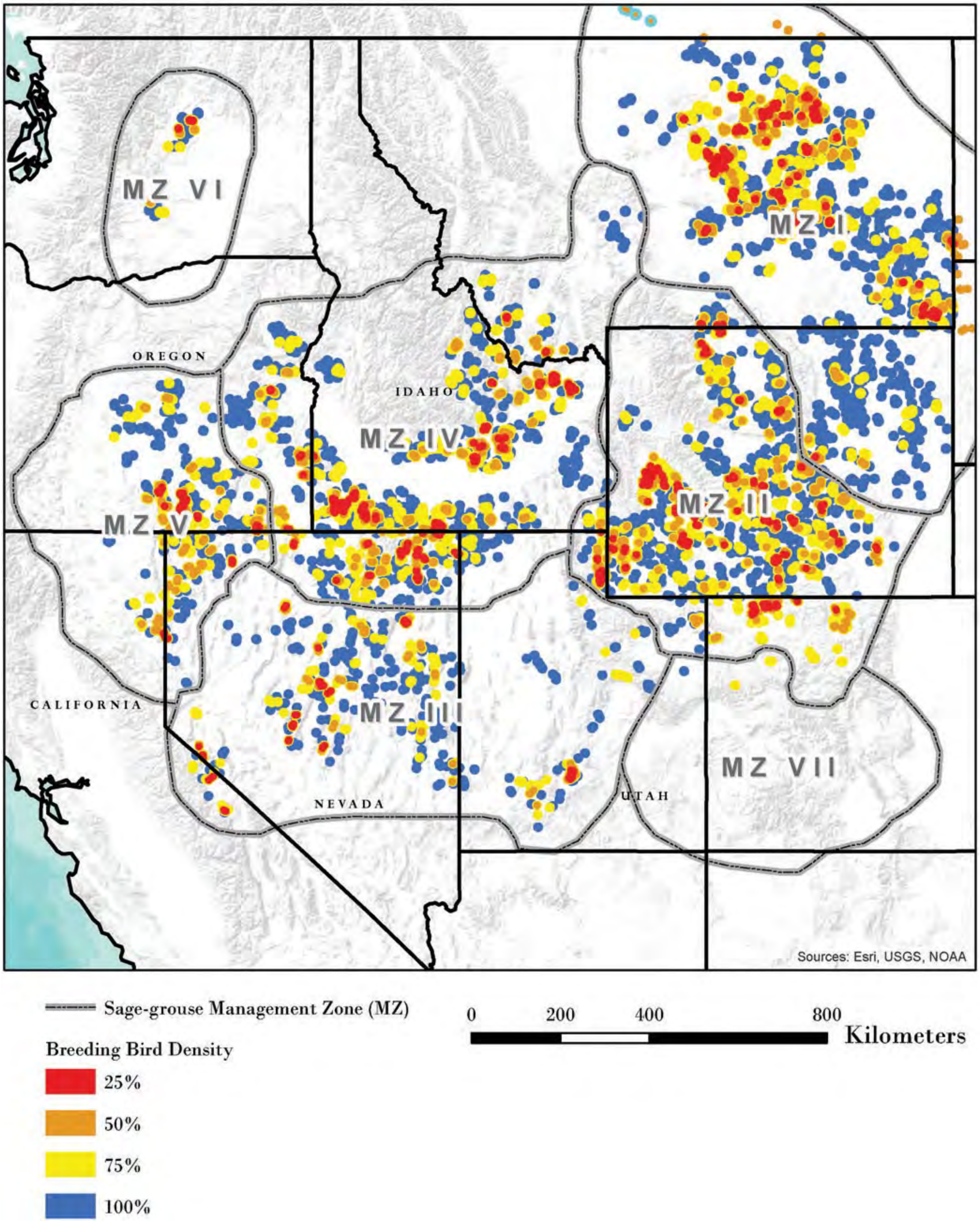

Figure 15. Range-wide sage-grouse breeding bird densities from Doherty et al. 2010. Points illustrate breeding bird density areas that contain 25, 50, 75, and 100% of the known breeding population and are based on maximum counts of males on leks (n = 4,885). Leks were mapped according to abundance values and buffered by 6.4 to 8.5 km (4.0 to 5.2 mi) to delineate nesting areas.

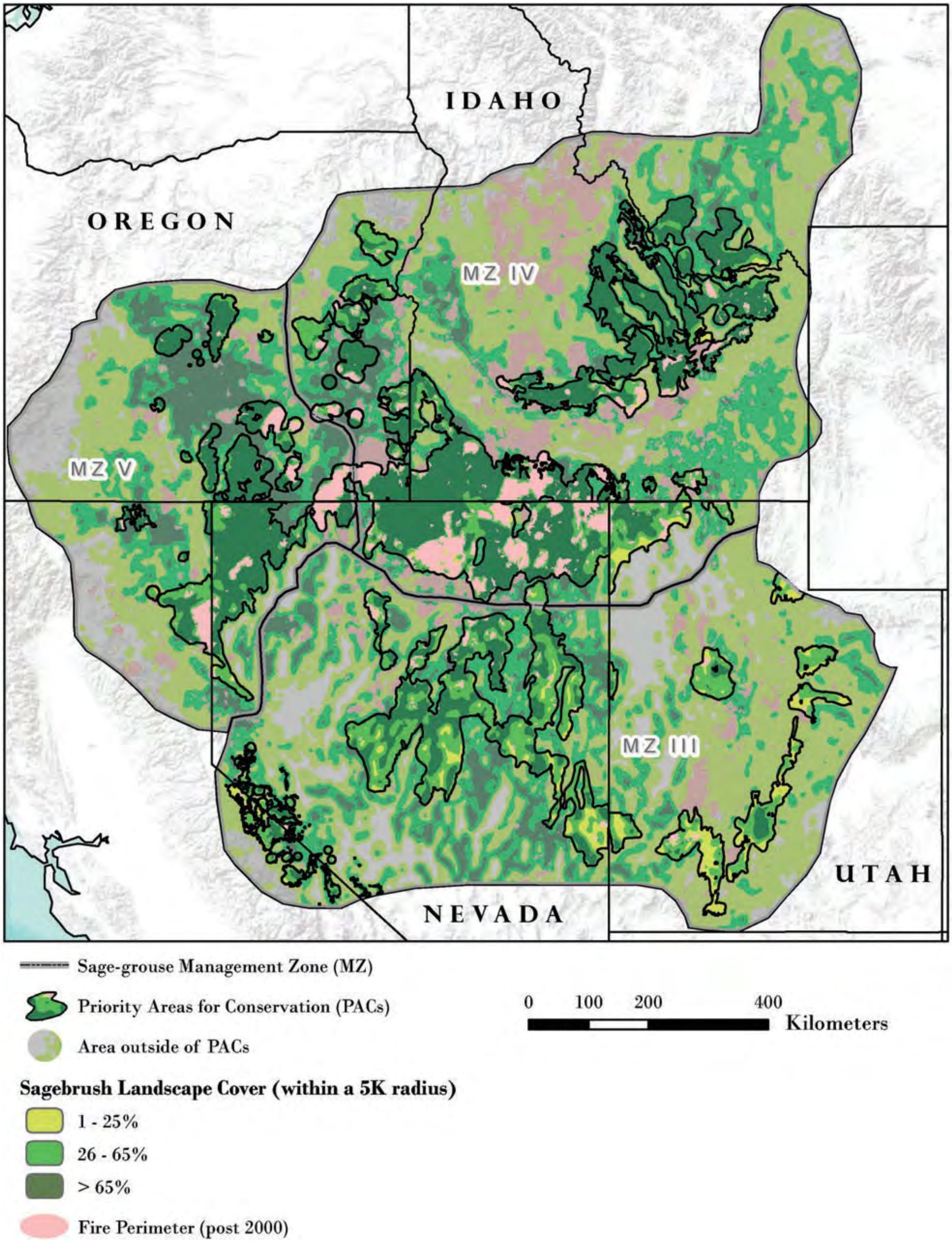

Figure 16. The landscape cover of sagebrush within each of three selected categories (1-25%, 26-65%, >65%) for Management Zones III, IV, and V (Stiver et al. 2006). The proportion of sagebrush (USGS 2013) within each of the categories in a 5-km (3.1-mi) radius surrounding each pixel was calculated relative to other land cover types for locations with sagebrush cover. Darker colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

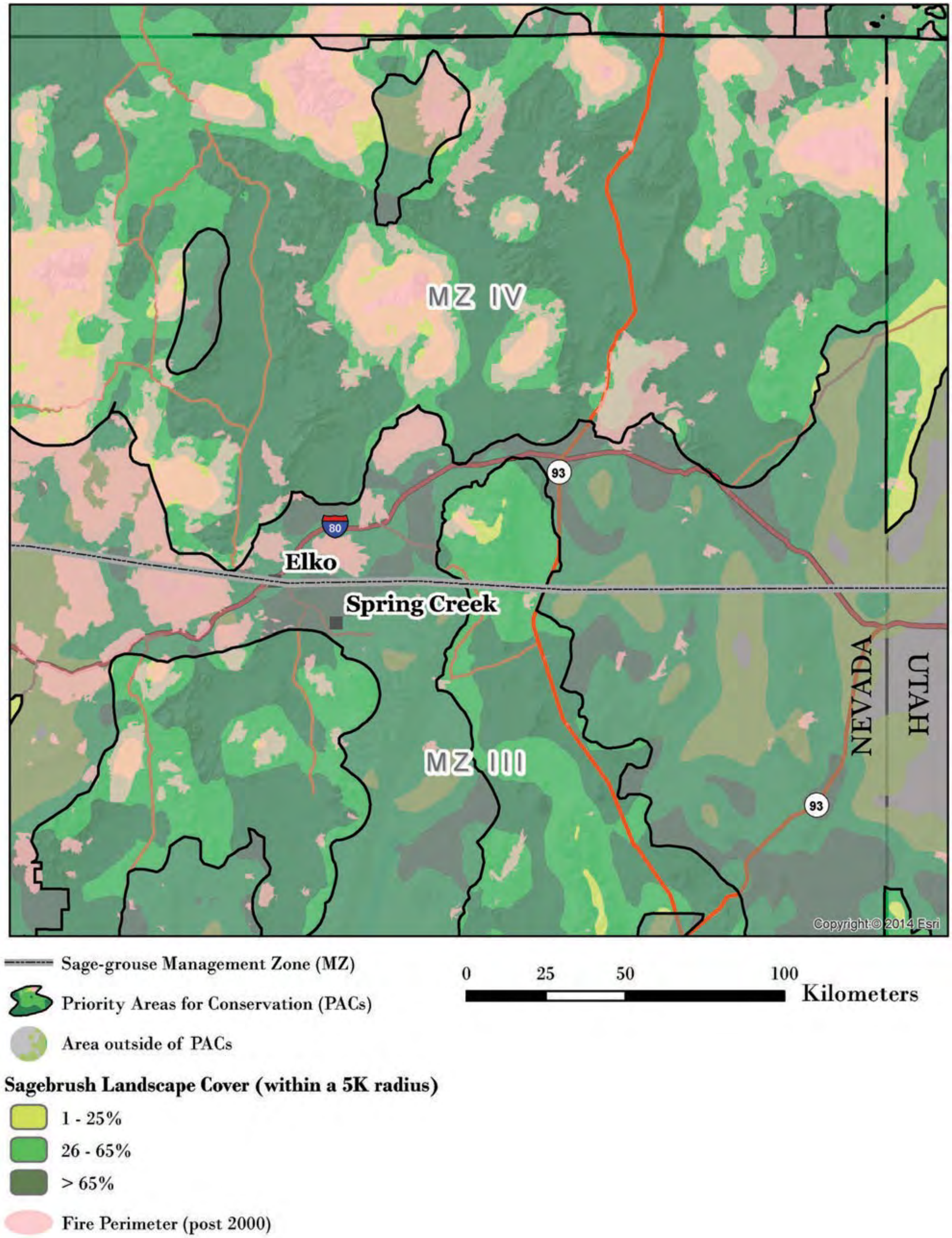

Figure 17. The landscape cover of sagebrush within each of the selected categories (1-25%, 26-65%, >65%) for the northeastern portion of Nevada. The proportion of sagebrush (USGS 2013) within each of the categories in a 5-km (3.1-mi) radius surrounding each pixel was calculated relative to other land cover types for locations with sagebrush cover. Darker colored polygons delineate Priority Areas for Conservation (USFWS 2013).

Resilience to disturbance and resistance to annuals: Soil temperature and moisture regimes are a strong indicator of ecological types and of resilience to disturbance and resistance to invasive annual plants (fig. 11; table 1). Resilience and resistance predictions coupled with landscape cover of sagebrush can provide critical information for determining focal areas for targeted management actions (tables 2, 3, and 4). The available data for the soil temperature and moisture regimes were recently compiled to predict resilience and resistance (see Appendix 3). These data, displayed for the western portion of the range and northeast Nevada (figs. 18 and 19), illustrate the spatial variability within the focal areas. Soil temperature and moisture regimes are two of the primary determinants of ecological types and of more detailed ecological site descriptions, which are described in the section on “Determining the Most Appropriate Management Treatments at the Project Scale.”

Habitat threats: Examining additional land cover data or models of invasive annual grasses and piñon and/or juniper, can provide insights into the current extent of threats in a planning area (e.g., Manier et al. 2013). In addition, evaluating data on fire occurrence and size can provide information on fire history and the rate and pattern of change within the planning area. Data layers for cheatgrass cover have been derived from Landsat imagery (Peterson 2006, 2007) and from model predictions based on species occurrence, climate variables, and anthropogenic disturbance (e.g., the Bureau of Land Management [BLM] Rapid Ecoregional Assessments [REAs]). The REAs contain a large amount of geospatial data that may be useful in providing landscape scale information on invasive species, disturbances, and vegetation types across most of the range of sage-grouse (http://www.blm.gov/wo/st/en/prog/more/Landscape_Approach/reas.html). Similarly, geospatial data for piñon and/or juniper have been developed for various States (e.g., Nevada and Oregon) and are becoming increasingly available rangewide. In addition, more refined data products are often available at local scales. Land managers can evaluate the available land cover datasets and select those land covers with the highest resolution and accuracy for the focal area. Land cover of cheatgrass and piñon and/or juniper and the fire history of the western portion of the range and northeast Nevada are in figures 20-25.

Assessing Focal Areas for Sage-Grouse Habitat Management: Integrating Data Layers

Combining resilience and resistance concepts with sage-grouse habitat and population data can help land managers further gauge relative risks across large landscapes and determine where to focus limited resources to conserve sage-grouse populations. Intersecting breeding bird density areas with soil temperature and moisture regimes provides a spatial tool to depict landscapes with high bird concentrations that may have a higher relative risk of being negatively affected by fire and annual grasses (figs. 26, 27). For prioritization purposes, areas supporting 75% of birds (6.4 to 8.5 km [4.0 to 5.2 mi] buffer around leks) can be categorized as high density while remaining breeding bird density areas (75-100% category; 8.5-km [5.2-mi] buffer around leks) can be categorized as low density. Similarly, warm and dry types can be categorized as having relatively low resilience to fire and resistance to invasive species and all other soil temperature and moisture regimes can be categorized as having relatively moderate to high resilience and resistance. Intersecting breeding bird density areas with landscape cover of sagebrush provides another spatial component revealing large and intact habitat blocks and areas in need of potential restoration to provide continued connectivity (fig. 28).

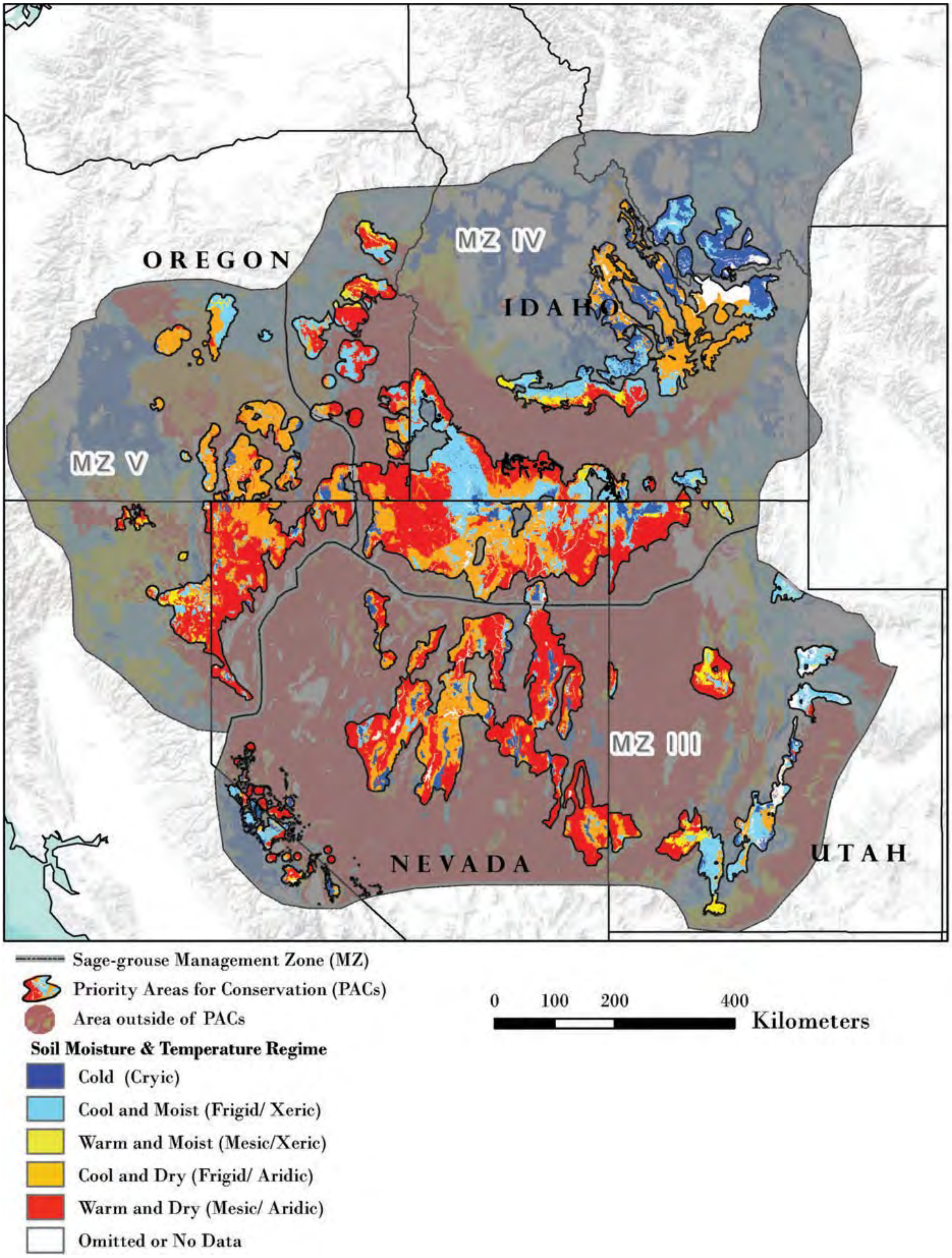

Figure 18. The soil temperature and moisture regimes within sage-grouse Management Zones III, IV, and V (Stiver et al. 2006). Soil temperature and moisture classes were derived from the Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) (Soil Survey Staff 2014a). Gaps in that dataset were filled in with the NRCS State Soil Geographic Database (STATSGO) (Soil Survey Staff 2014b). Darker colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

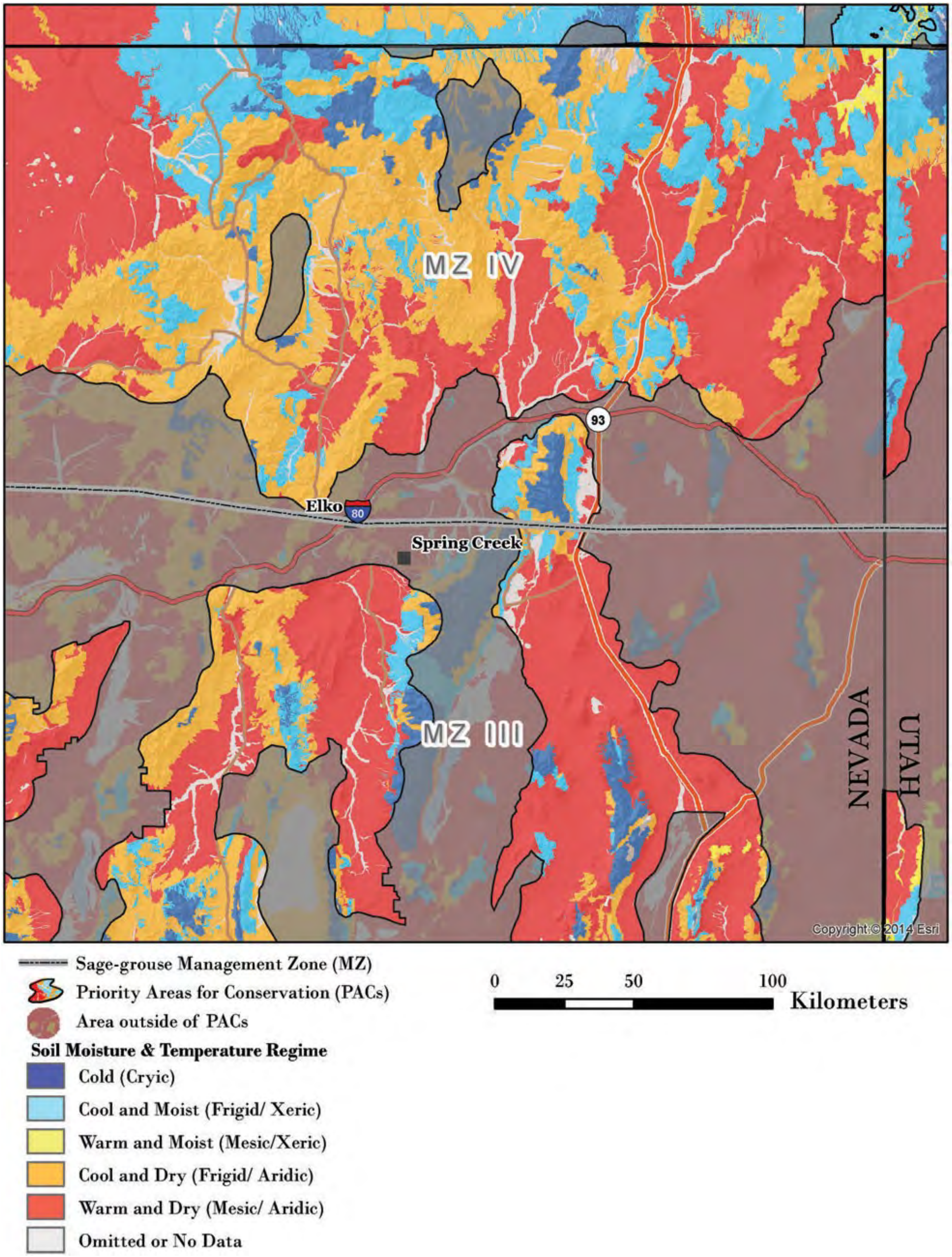

Figure 19. The soil temperature and moisture regimes for the northeast corner of Nevada. Soil temperature and moisture classes were derived from the Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) (Soil Survey Staff 2014a). Gaps in that dataset were filled in with the NRCS State Soil Geographic Database (STATSGO) (Soil Survey Staff 2014b). Darker colored polygons delineate Priority Areas for Conservation (USFWS 2013).

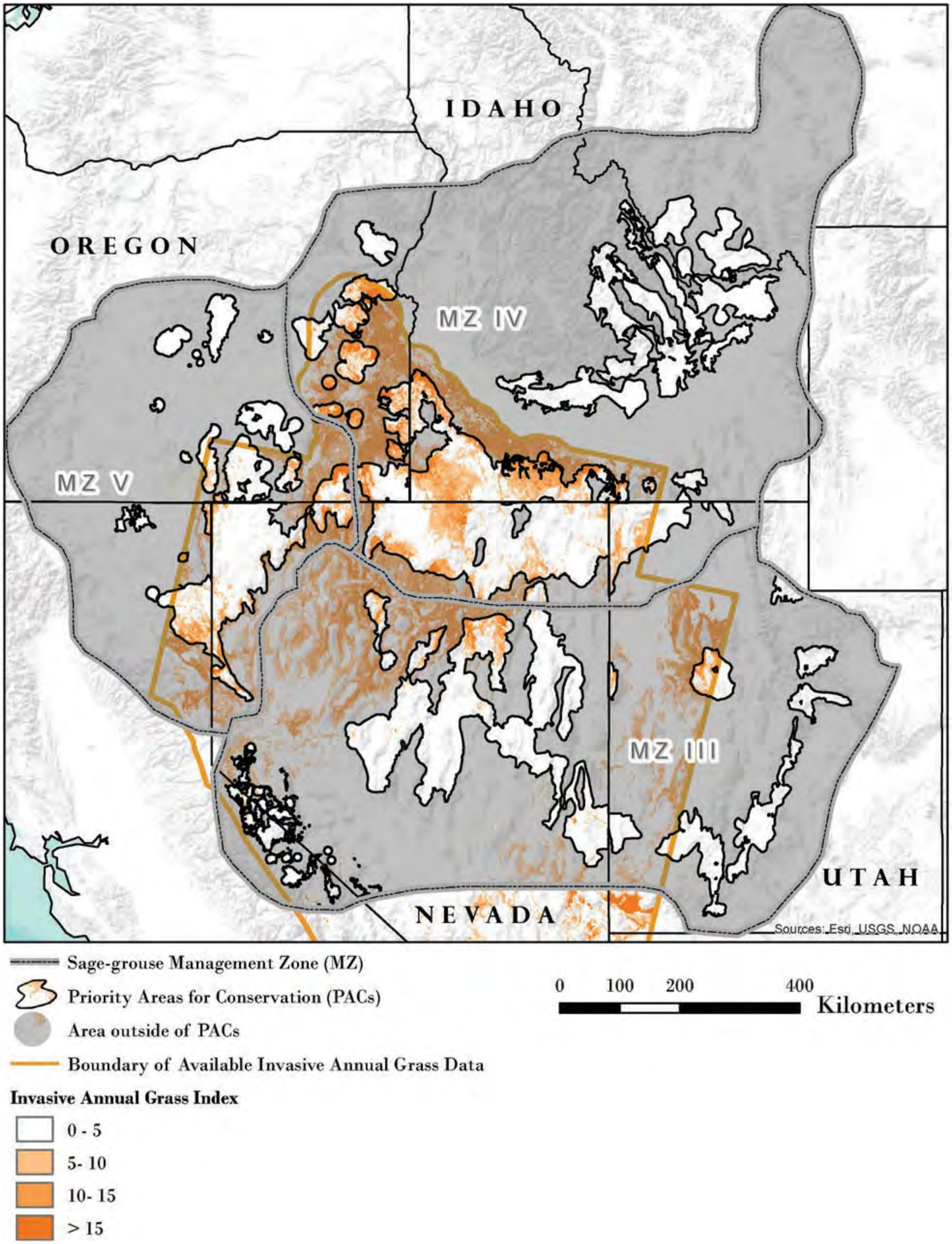

Figure 20. Invasive annual grass index for Nevada (Peterson 2006) and the Owhyee uplands (Peterson 2007) displayed for sage-grouse Management Zones III, IV, and V (Stiver et al. 2006). Lighter colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

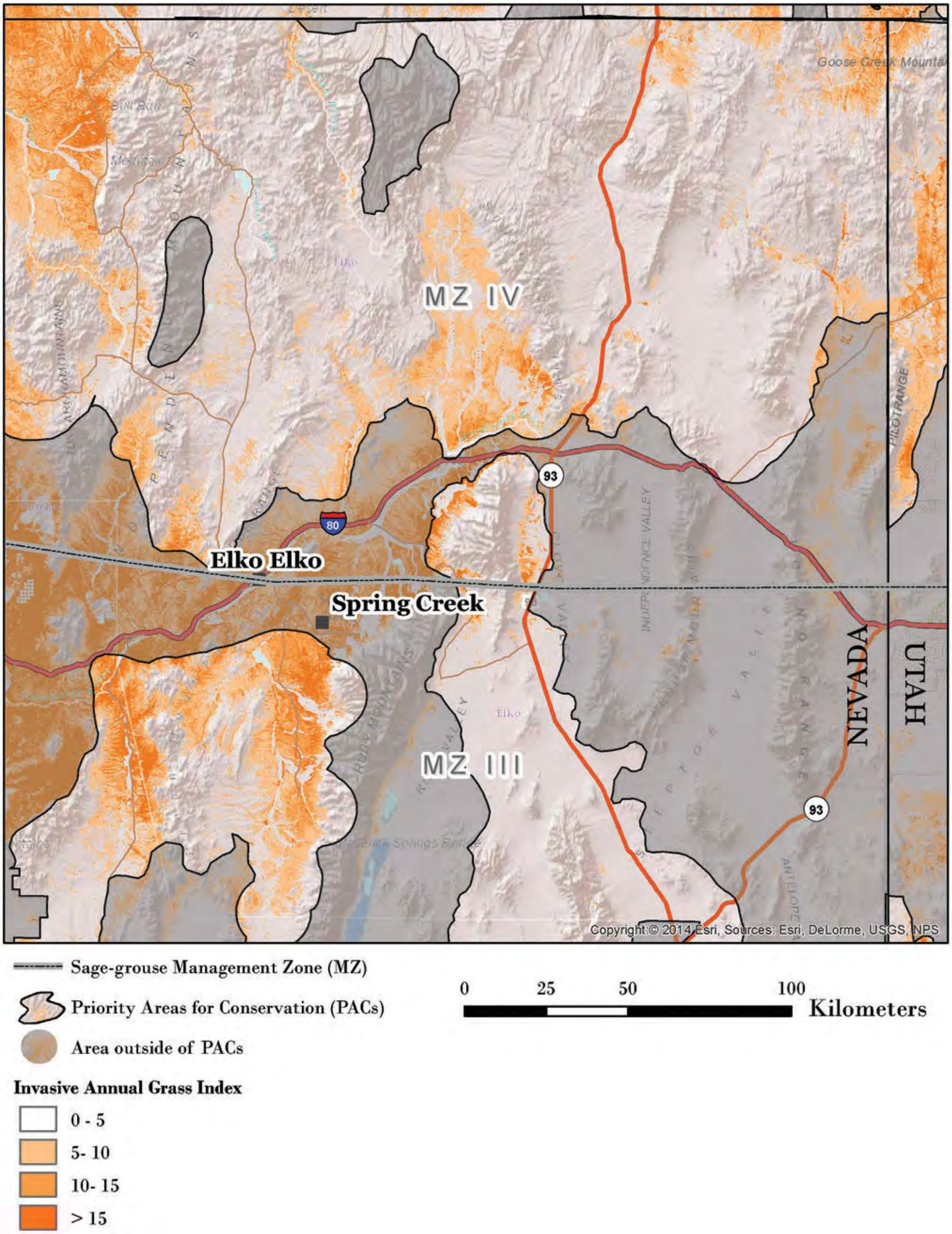

Figure 21. Invasive annual grass index for Nevada (Peterson 2006) and the Owhyee uplands (Peterson 2007) displayed for the northeast corner of Nevada. Lighter colored polygons delineate Priority Areas for Conservation (USFWS 2013).

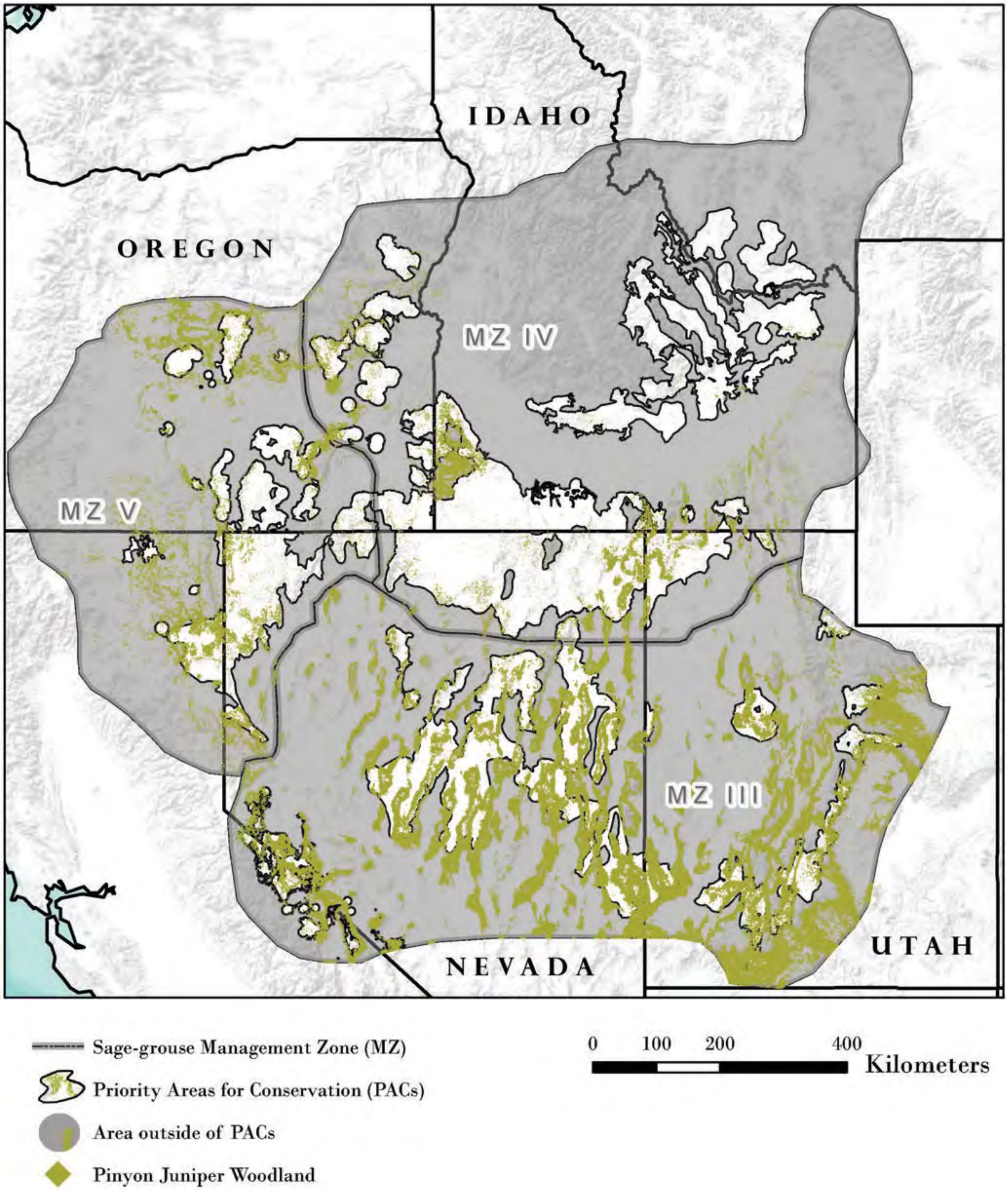

Figure 22. Piñon and/or juniper woodlands (USGS 2004; USGS 2013) within sage-grouse Management Zones III, IV, and V (Stiver et al. 2006). Lighter colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

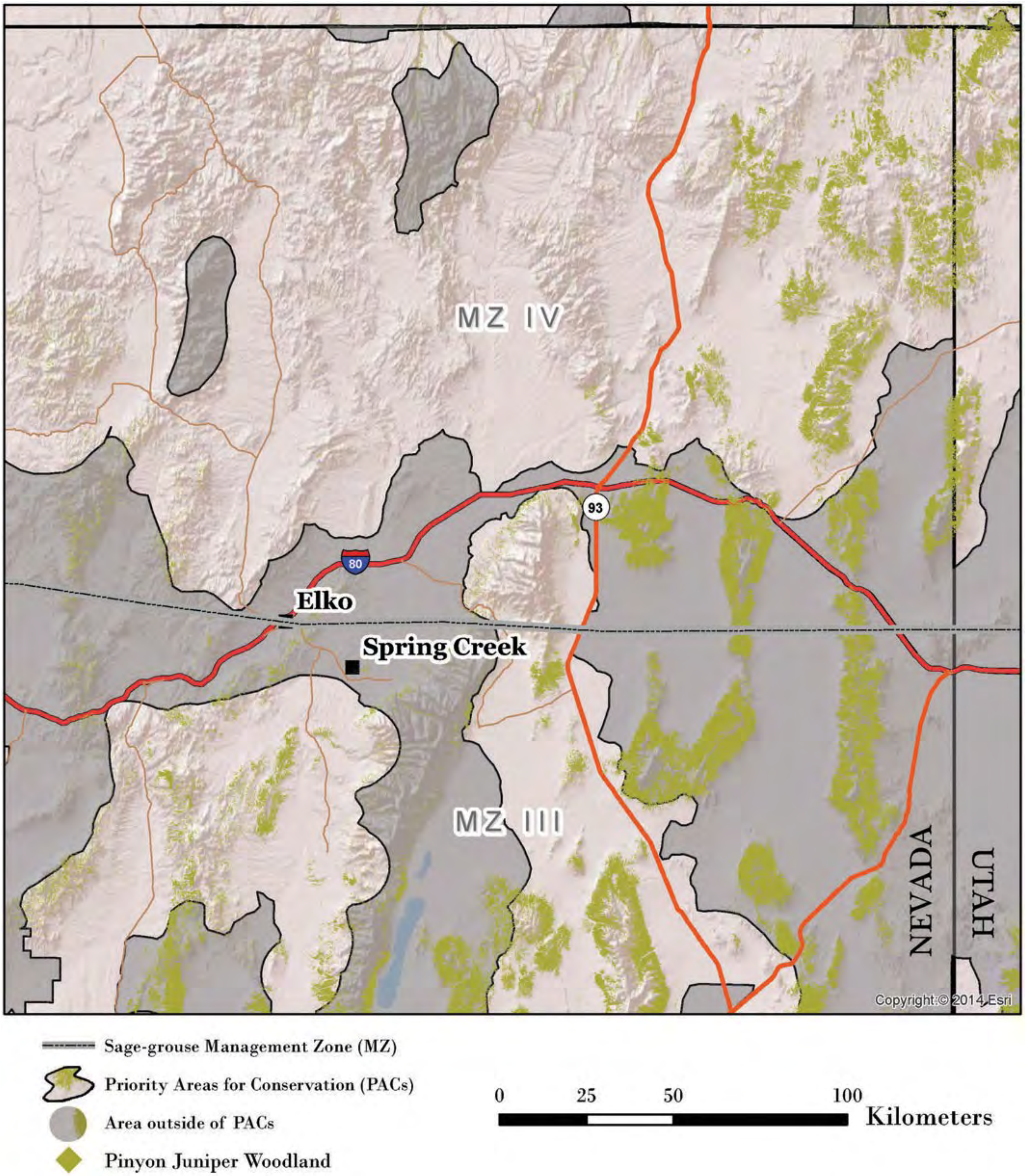

Figure 23. Piñon and/or juniper woodlands (USGS 2004; USGS 2013) within the northeast corner of Nevada. Lighter colored polygons delineate Priority Areas for Conservation (USFWS 2013).

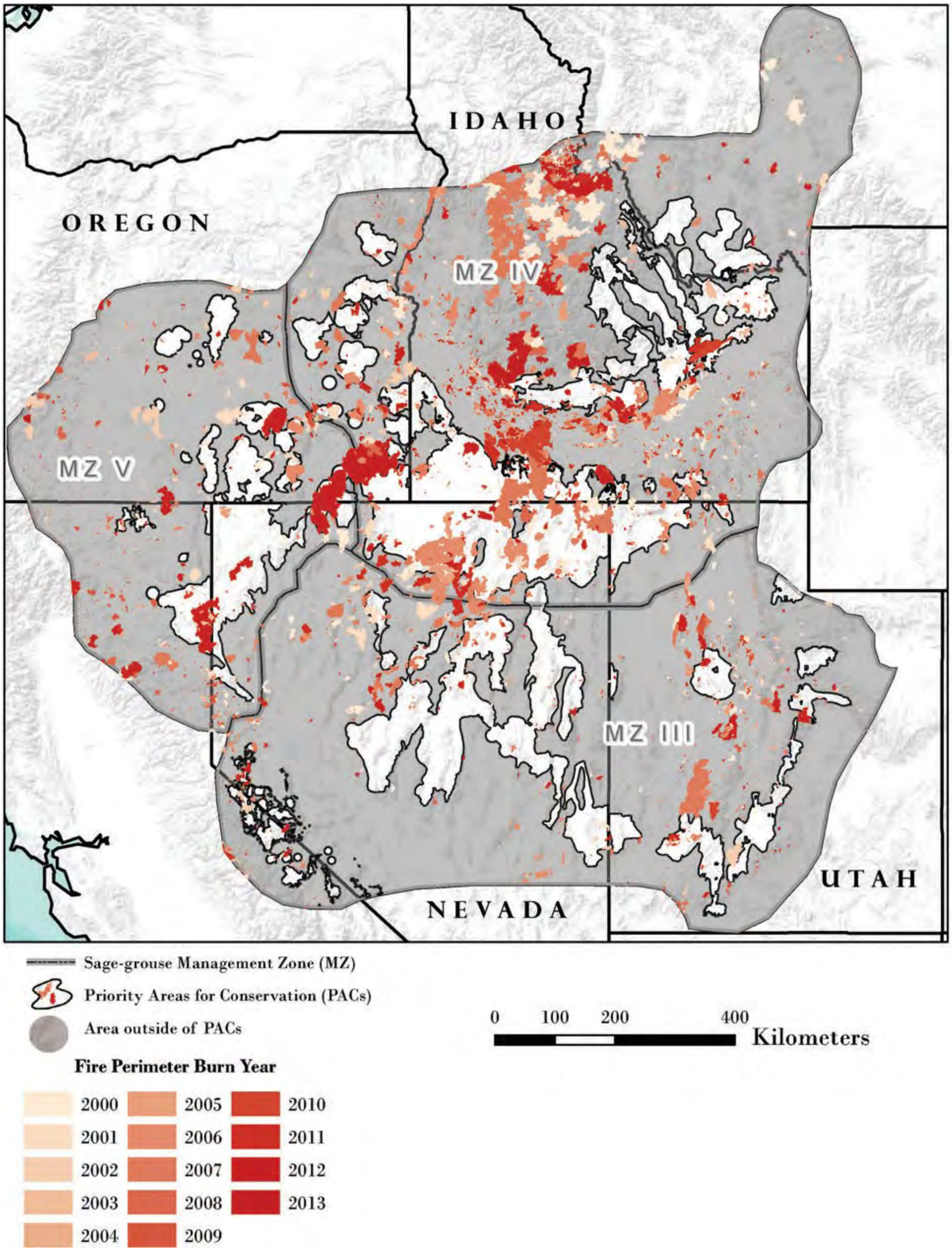

Figure 24. Fire perimeters (Walters et al. 2011; Butler and Bailey 2013) within sage-grouse Management Zones III, IV, and V (Stiver et al. 2006). Ligher colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

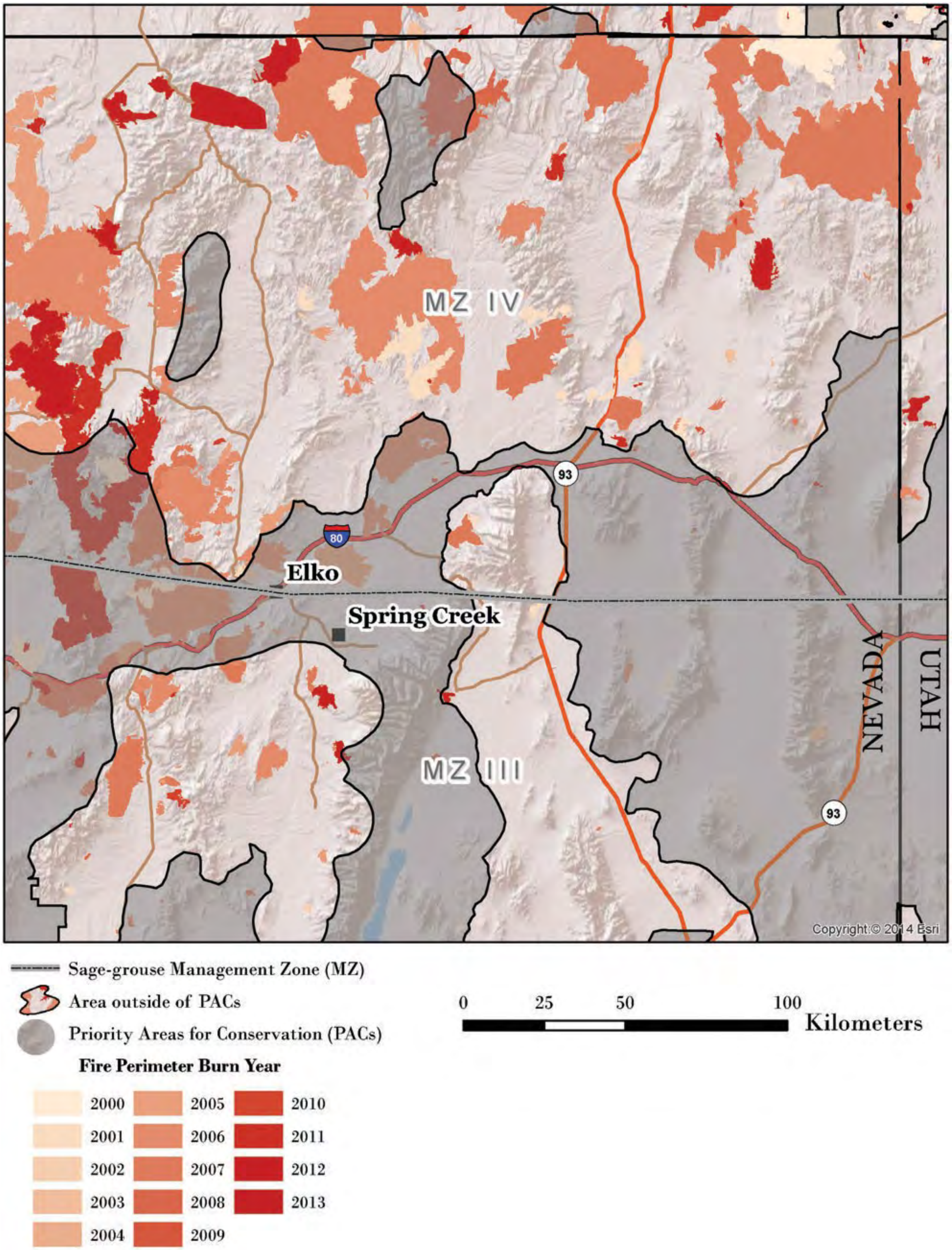

Figure 25. Fire perimeters (Walters et al. 2011; Butler and Bailey 2013) within the northeast corner of Nevada. Lighter colored polygons delineate Priority Areas for Conservation (USFWS 2013).

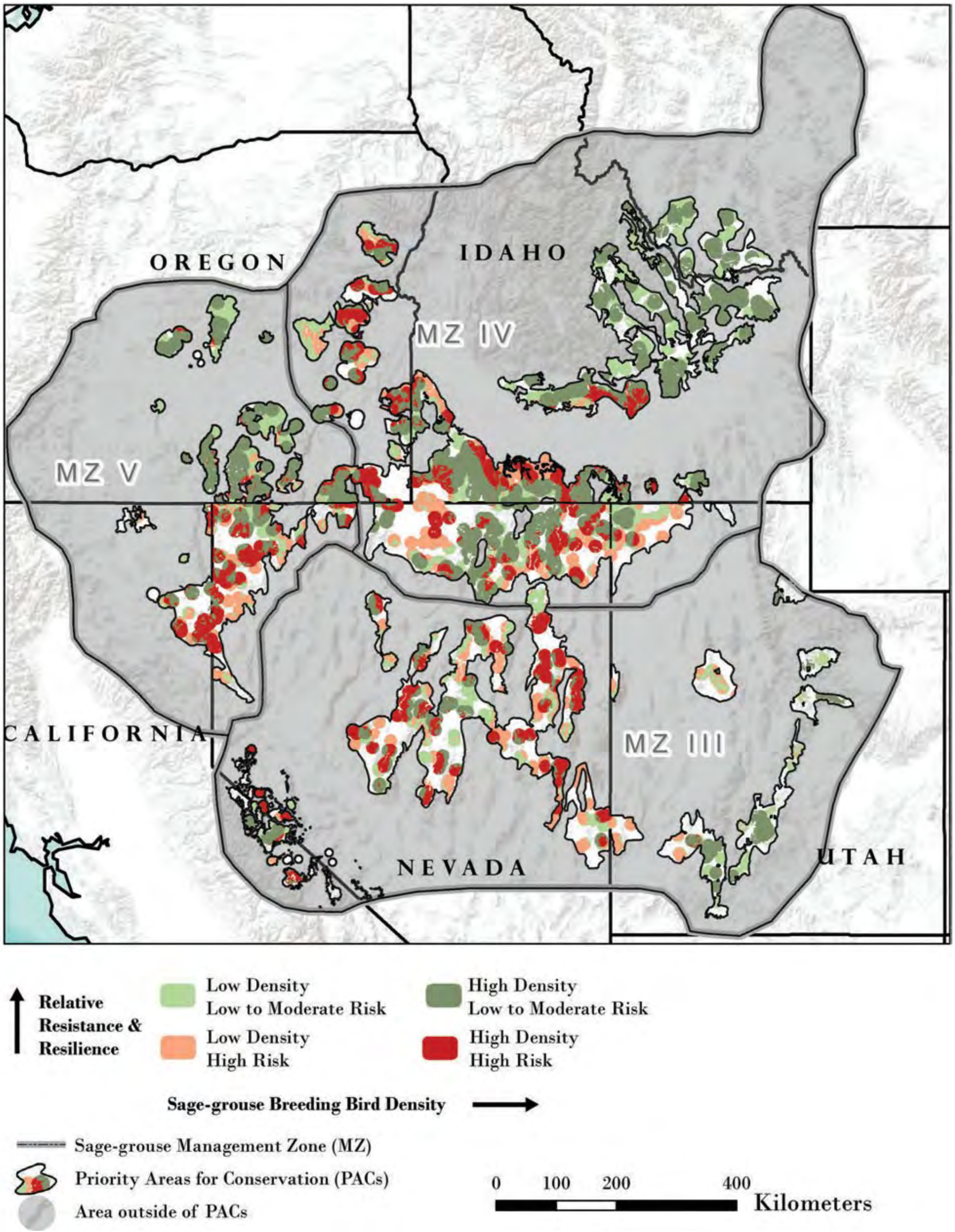

Figure 26. Sage-grouse breeding bird densities (Doherty et al. 2010) for high breeding bird densities (areas that contain 75% of known breeding bird populations) and low breeding bird densities (areas that contain all remaining breeding bird populations) relative to resilience and resistance within sage-grouse Management Zones III, IV, and V (Stiver et al. 2006). Relative resilience and resistance groups are derived from soil moisture and temperature classes (Soil Survey Staff 2014a, b) as described in text, and indicate risk of invasive annual grasses and wildfire. Lighter colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

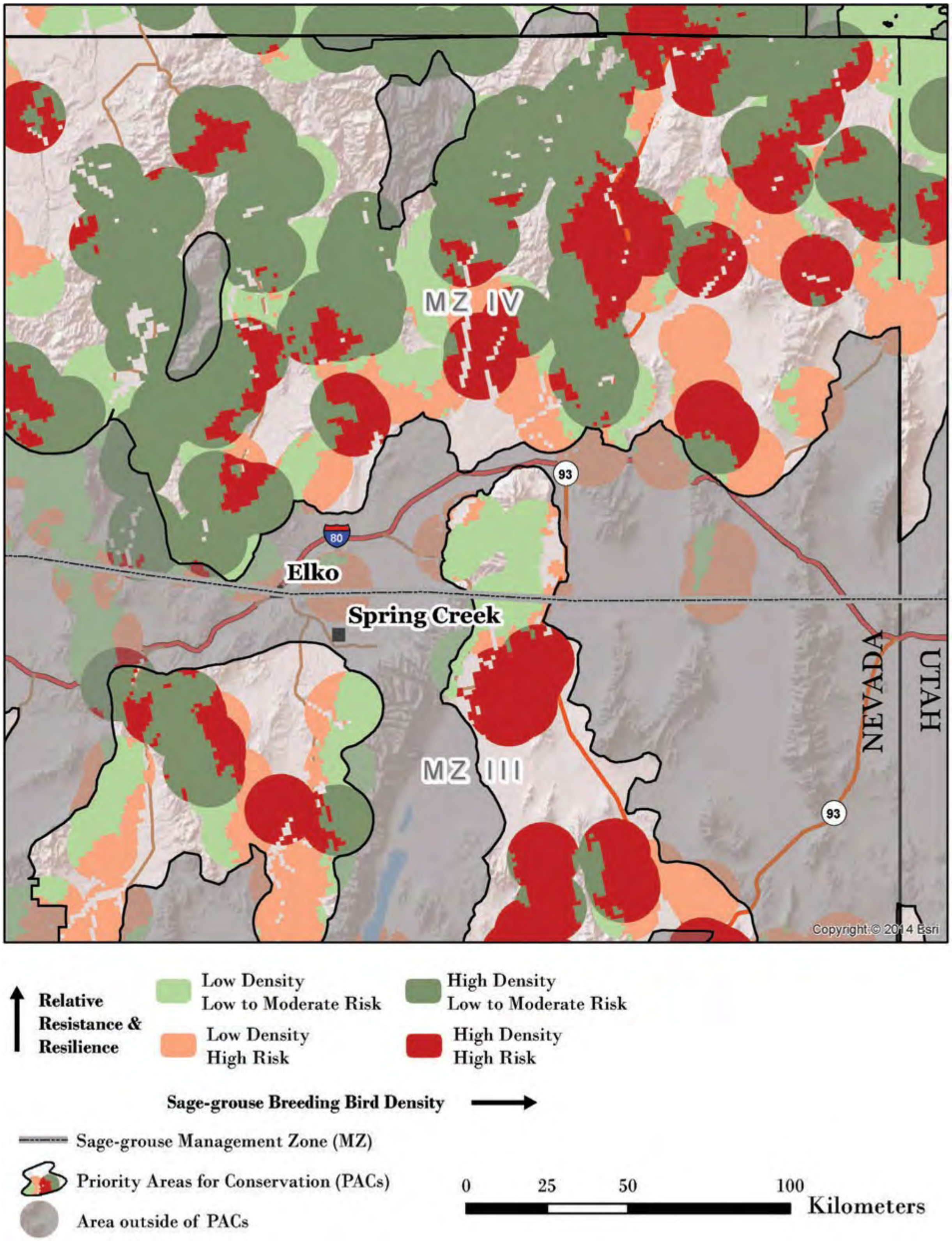

Figure 27. Sage-grouse breeding bird densities (Doherty et al. 2010) for high breeding bird densities (areas that contain 75% of known breeding bird populations) and low breeding bird densities (areas that contain all remaining breeding bird populations) relative to resilience and resistance in the northeast corner of Nevada. Relative resilience and resistance groups are derived from soil moisture and temperature classes (Soil Survey Staff 2014a, b) as described in text, and indicate risk of invasive annual grasses and wildfire. Lighter colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

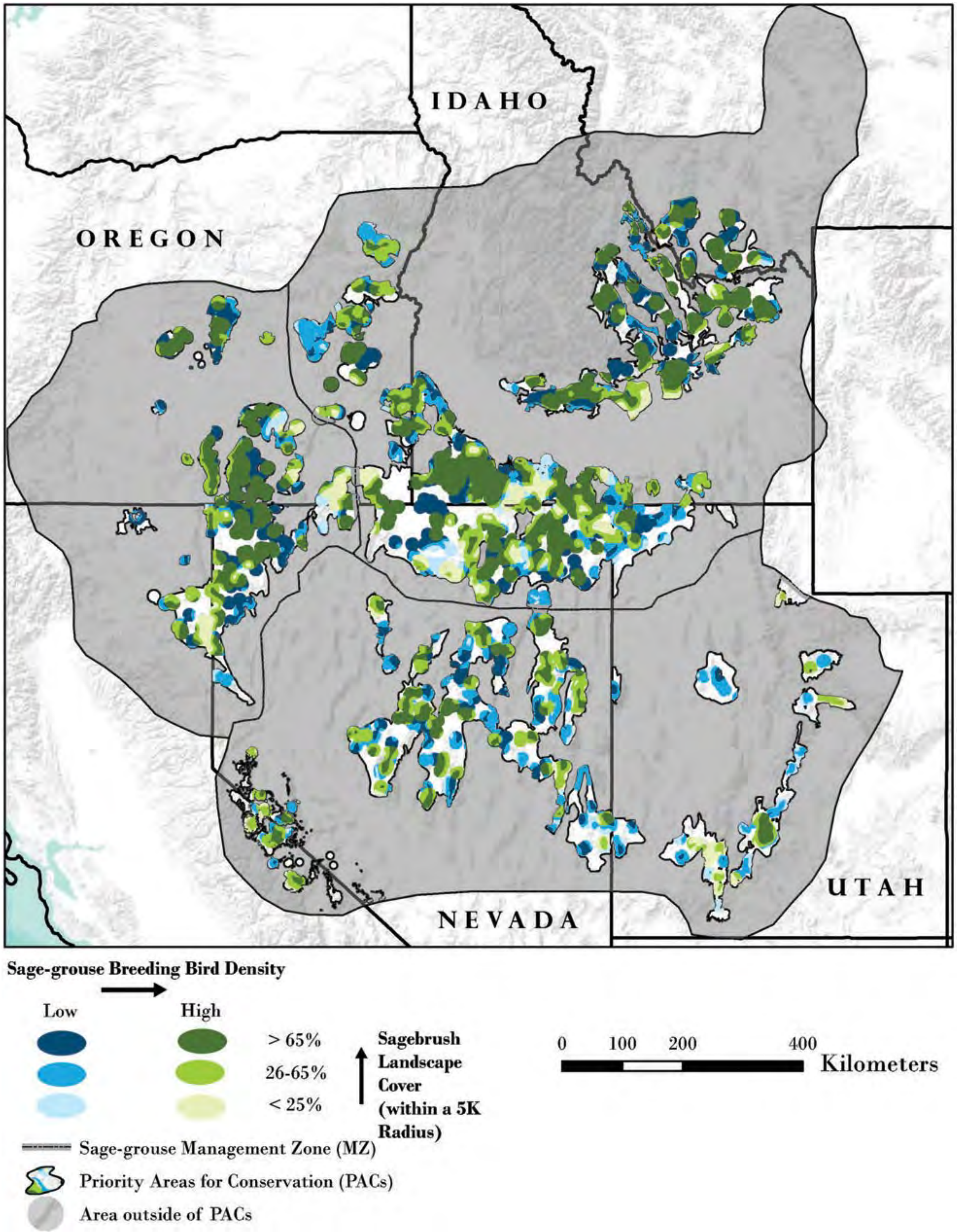

Figure 28. Sage-grouse breeding bird densities (Doherty et al. 2010) for high breeding bird densities (areas that contain 75% of known breeding bird populations) and low breeding bird densities (areas that contain all remaining breeding bird populations) relative to sagebrush cover. Lighter colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

Resilience and resistance and sagebrush cover combined with bird population density data provide land managers a way to evaluate trade-offs of particular management options at the landscape scale. For example, high density, low resilience and resistance landscapes with >65% sagebrush landscape cover may require immediate attention for conservation efforts because they currently support a high concentration of birds but have the lowest potential to recover to desired conditions post-fire and to resist invasive plants when disturbed. Similarly, high density but moderate-to-high resilience and resistance landscapes with 26-65% sagebrush cover may be priorities for preventative actions like conifer removal designed to increase the proportion of sagebrush cover and maintain ecosystem resilience and resistance. Mapping relative resilience and resistance and landscape cover of sagebrush for sage-grouse breeding areas should be viewed as a component of the assessment process that can help local managers allocate resources to accelerate planning and implementation.

Interpretations at the Management Zone (MZ) Scale: Western Portion of the Range

An examination of land cover and additional data layers for the western portion of the range reveals large differences among Management Zones (MZs) III, IV and V. MZs IV and V have larger areas with sagebrush cover >65% than MZ III (fig. 16). This may be partly explained by basin and range topography in MZ III, which is characterized by large differences in both environmental conditions and ecological types over relatively short distances. However, the cover of piñon and juniper in and adjacent to PACs in MZ III also is higher than in either MZ IV or V (fig. 22). The greater cover of piñon and juniper in MZ III appears to largely explain the smaller patches of sagebrush cover in the 26-65% and >65% categories.

Our capacity to quantify understory vegetation cover using remotely sensed data is currently limiting, but a visual examination of estimates for invasive annual grass (fig. 20; Peterson 2006, 2007) suggests a higher index (greater cover) in areas with relatively low resistance (warm soil temperatures) in all MZs (see fig. 18). This is consistent with current understanding of resistance to cheatgrass (Chambers et al. 2014; Chambers et al. *in press*). It is noteworthy that the invasive annual grass index is low for most of the central basin and range (central Nevada). Several factors may be contributing to the low index for this area including climate, the stage of piñon and juniper expansion and linked decrease in fire frequency, the relative lack of human development, and the relative lack of management treatments in recent decades (Wisdom et al. 2005; Miller et al. 2011). Not surprisingly, areas with a high annual grass index are outside or on the periphery of current PACs. However, it is likely that invasive annual grasses are present on many warmer sites and that they may increase following fire or other disturbances. In areas with low resistance to invasive annual grasses, they often exist in the understory of sagebrush ecosystems and are not detected by remote sensing platforms such as Landsat.

The number of hectares burned has been highest in MZ IV, adjacent areas in MZ V, and in areas with relatively low resilience and resistance in the northern portion of MZ III that have a high invasive annual grass index (figs. 18, 20, 24). A total of over 1.1 million hectares (2.7 million acres) burned in 2000 and 2006, while over 1.7 million hectares (4.2 million acres) burned in 2007 and 2012 and almost three quarters of these acres were in MZ IV (table 5). In some cases, these fires appear to be linked to the annual invasive grass index, but in others it clearly is not. At this point, there appears to be little relationship between cover of piñon and juniper and wildfire. Mega-fires comprised of hundreds of thousands of acres have burned in recent years, especially in MZ IV. These fires have occurred primarily in areas with low to moderate resilience and resistance and during periods with extreme burning conditions.

Table 5. The number of hectares (acres) burned in Management Zones III, IV, and V each year from 2000 to 2013.

Year	Management Zone III		Management Zone IV		Management Zone V		Total	
2000	155,159	(383,405)	868,118	(2,145,165)	88,871	(219,606)	1,112,148	(2,748,176)
2001	164,436	(406,330)	272,870	(674,276)	141,454	(349,541)	578,760	(1,430,147)
2002	85,969	(212,433)	100,308	(247,867)	113,555	(280,601)	299,833	(740,902)
2003	21,869	(54,038)	127,028	(313,892)	27,597	(68,192)	176,493	(436,123)
2004	20,477	(50,600)	11,344	(28,032)	13,037	(32,216)	44,858	(110,847)
2005	45,130	(111,520)	374,894	(926,382)	22,039	(54,458)	442,063	(1,092,360)
2006	198,762	(491,150)	860,368	(2,126,014)	117,452	(290,230)	1,176,582	(2,907,394)
2007	371,154	(917,140)	1,240,303	(3,064,853)	134,520	(332,406)	1,745,977	(4,314,399)
2008	14,015	(34,632)	109,151	(269,717)	43,949	(108,599)	167,115	(412,949)
2009	43,399	(107,242)	12,250	(30,271)	47,918	(118,408)	103,568	(255,921)
2010	31,597	(78,078)	280,662	(693,531)	21,940	(54,216)	334,200	(825,825)
2011	83,411	(206,114)	283,675	(700,977)	22,909	(56,608)	389,995	(963,699)
2012	203,680	(503,303)	946,514	(2,338,885)	574,308	(1,419,144)	1,724,501	(4,261,331)
2013	45,976	(113,610)	368,434	(910,419)	15,852	(39,170)	430,262	(1,063,199)
Total	1,485,034	(3,669,595)	5,855,920	(14,470,281)	1,385,400	(3,423,396)	8,726,354	(21,563,271)

Coupling breeding bird densities with landscape cover of sagebrush indicates that populations with low densities tend to occur in areas where sagebrush cover is in the 26-65% category, and few populations occur in areas with <25% sagebrush cover (fig. 27) (Knick et al. 2013). Combining the breeding bird densities with resilience and resistance indicates significant variability in risks among high density populations within PACs (fig. 26). A large proportion of remaining high density centers within PACs occurs on moderate-to-high resilience and resistance habitats, while low density/low resilience and resistance areas tend to occur along the periphery of PACs or are disproportionately located in MZ III and southern parts of MZ V.

Examination of other data layers suggests that different wildfire and invasive species threats exist across the western portion of the range, and that management should target the primary threats to sage-grouse habitat within focal areas. In MZs IV and V invasive annual grasses—especially on the periphery of the PACs—and wildfire are key threats. However, recent wildfires are not necessarily linked to invasive annual grasses. This suggests that management strategies for these MZs emphasize fire operations, fuels management focused on decreasing fire spread, and integrated strategies to control annual grasses and increase post-fire rehabilitation and restoration success. Differences in piñon and/or juniper landscape cover exist among MZs with 5,131,900 ha (12,681,202 ac) in MZ III, 528,377ha (1,305,649 ac) in MZ IV, and 558,880 ha (1,381,024 ac) in MZ V. Portions of MZs IV and V are still largely in early stages of juniper expansion indicating a need to address this threat before woodland succession progresses. Because of generally low resilience and resistance in MZ III, greater emphasis is needed on habitat conservation, specifically minimizing or eliminating stressors. Also, greater emphasis on reducing cover of piñon and juniper is needed to reduce woody fuels and increase sagebrush ecosystem resilience to fire by increasing the recovery potential of native understory species.

Interpretations at Regional and Local Land Management Scales: Northeast Nevada Example

The same land covers and data layers used to assess focal areas for sage-grouse habitat within MZs in the western portion of the species range can be used to evaluate focal areas for management in regional planning areas and land management planning units. The emphasis at the scale of the land planning area or management planning unit is on maintaining or increasing large contiguous areas of sagebrush habitat with covers in the 26-65% and especially >65% category. Resilience to disturbance and resistance to invasive annual grasses as indicated by soil temperature and moisture regimes is used to determine the most appropriate activities within the different cover categories. The sage-grouse habitat matrix in table 2 describes the capacity of areas with differing resilience and resistance to recover following disturbance and resist annual invasive grasses and provides the management implications for each of the different cover categories. Table 4 provides potential management strategies for the different sagebrush cover and resilience and resistance categories (cells) in the sage-grouse habitat matrix by agency program areas (fire operations, fuels management, post-fire rehabilitation, habitat restoration). Note that the guidelines in table 4 are related to the sage-grouse habitat matrix, and do not preclude other factors from consideration when determining management priorities for program areas.

Here, we provide an example of how to apply the concepts and tools discussed in this report by examining an important region identified in the MZ scale assessment. The northeastern corner of Nevada was selected to illustrate the diversity of sage-grouse habitat within planning areas and the need for proactive collaboration both within agencies and across jurisdictional boundaries in devising appropriate management strategies (figs. 17, 19, 21, 23, 25). This part of Nevada has large areas of invasive annual grasses and areas with piñon and juniper expansion, and it has experienced multiple large fires in the last decade. It includes a BLM Field Office, Forest Service (FS) land, State land, multiple private owners, and borders two States (fig. 29), which results in both complex ownership and natural complexity.

In the northeast corner of Nevada, an area 5,403,877 ha (13,353,271 ac) in size, numerous large fires have burned in and around PACs (fig. 25). Since 2000, a total of 1,144,317 ha (2,827,669 ac) have burned with the largest fires occurring in 2000, 2006, and 2007. This suggests that the primary management emphasis be on retaining existing areas of sagebrush in the 26-65% and especially >65% categories and promoting recovery of former sagebrush areas that have burned. Fire suppression in and around large, contiguous areas of sagebrush and also in and around successful habitat restoration or post-fire rehabilitation treatments is a first order priority. Fuels management also is a high priority and is focused on strategic placement of fuel breaks to reduce loss of large sagebrush stands by wildfire without jeopardizing existing habitat quality. Also, in the eastern portion of the area, piñon and juniper land cover comprises 471,645 ha (1,165,459 ac) (fig. 23). In this area, management priorities include (1) targeted tree removal in early to mid-phase (Phase I and II), post-settlement piñon and juniper expansion areas to maintain shrub/herbaceous cover and reduce fuel loads, and (2) targeted tree removal in later phase (Phase III) post-settlement piñon and juniper areas to reduce risk of high severity fire. In areas with moderate to high resilience and resistance, post-fire rehabilitation focuses on accelerating sagebrush establishment and recovery of perennial native herbaceous species. These areas often are capable of unassisted recovery and seeding is likely needed only in areas where perennial native herbaceous species have been depleted (Miller et al. 2013). Seeding introduced species can retard recovery of native perennial grasses and forbs that are important to sage-grouse and should be avoided in these areas (Knutson et al. 2014). Seeding or transplanting of sagebrush may be needed to accelerate establishment in focal areas.

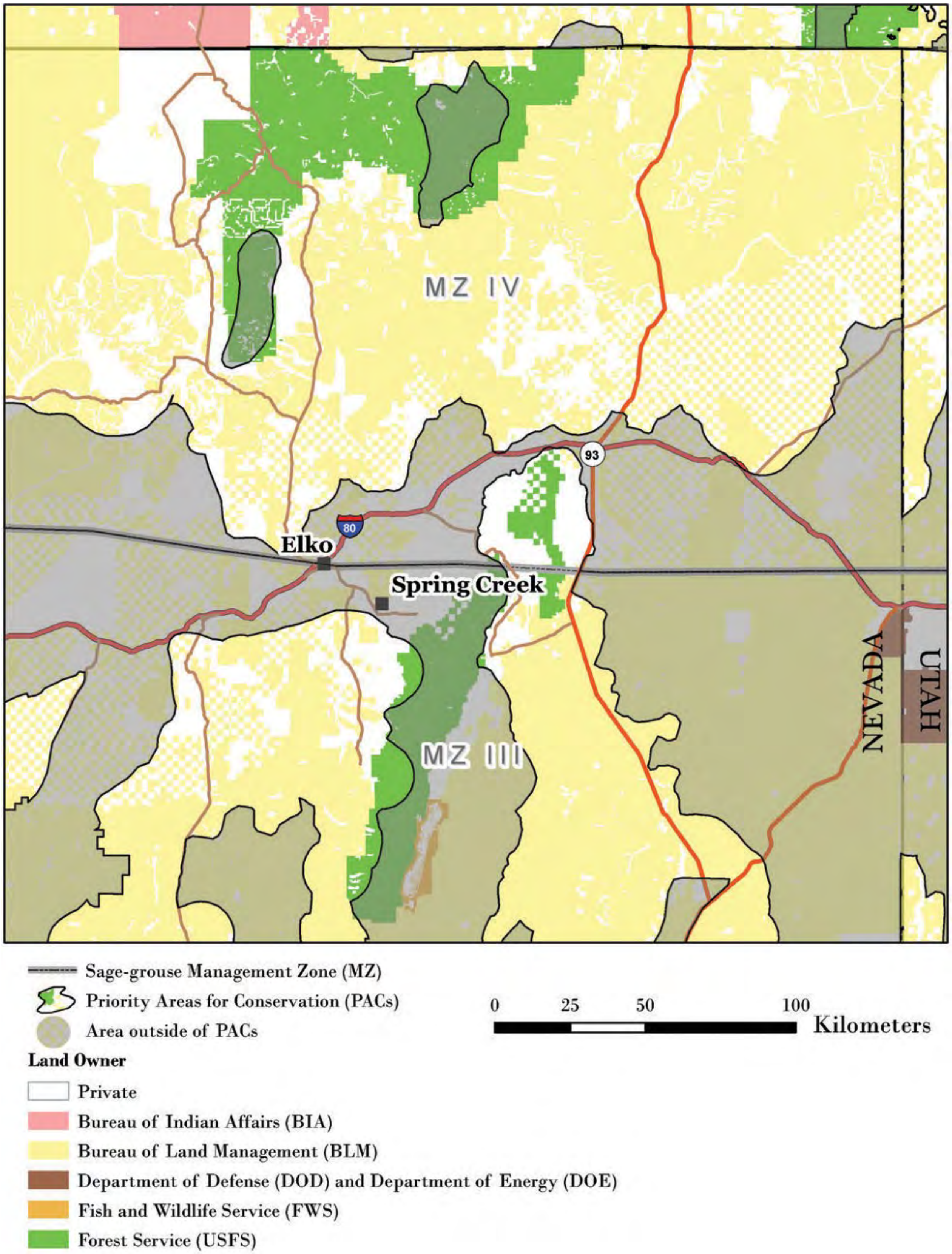

Figure 29. Land ownership for the northeast corner of Nevada. Lighter colored polygons delineate Priority Areas for Conservation (USFWS 2013).

In areas with lower resilience and resistance and high breeding bird densities, large, contiguous areas of sagebrush with intact understories are a high priority for conservation (figs. 17, 19, 27). In these areas, emphasis is on maintaining or increasing habitat conditions by minimizing stressors and disturbance. Post-fire rehabilitation and restoration activities focus on areas that increase connectivity among existing large areas of sagebrush. Because of low and variable precipitation, more than one intervention may be required to achieve restoration or rehabilitation goals. Appropriately managing livestock, wild horse and burro use (if applicable), and recreational use in focal areas is especially important to promote native perennial grass and forb growth and reproduction and to maintain or enhance resilience and resistance.

Determining the Most Appropriate Management Treatments at the Project Scale

Once focal areas and management priorities have been determined, potential treatment areas can be assessed to determine treatment feasibility and appropriate treatment methods. Different treatment options exist (figs. 30, 31) that differ in both suitability for a focal area and likely effectiveness. Field guides for sagebrush ecosystems and piñon and juniper expansion areas that incorporate resilience and resistance concepts are being developed to help guide managers through the process of determining both the suitability of an area for treatment and the most appropriate treatment. These guides are aligned with the different program areas and emphasize (1) fuel treatments (Miller et al. 2014a), (2) post-fire rehabilitation (Miller et al. 2014b), and (3) restoration (Pyke et al., in preparation). Additional information on implementing these types of management treatments is synthesized in Monsen et al. (2004) and Pyke (2011); additional information on treatment response is synthesized in Miller et al. (2013). In this section, we summarize the major steps in the process for determining the suitability of an area for treatment and the most appropriate treatment. We then provide an overview of two of the primary tools in the assessment process – ecological site descriptions (ESDs) and state and transition models (STMs). We conclude with a discussion of the importance of monitoring and adaptive management.

Steps in the process*:* Logical steps in the process of determining the suitability of an area for treatment and the most appropriate treatment(s) include (1) assessing the potential treatment area and identifying ecological sites, (2) determining the current successional state of the site, (3) selecting the appropriate action(s), and (4) monitoring and evaluation to determine post-treatment management. A general approach that uses questions to identify the information required in each step was developed (table 6). These questions can be modified to include the specific information needed for each program area and for treating different ecological sites. This format is used in the field guides described above.

Figure 30. Common vegetation treatments for sagebrush dominated ecosystems with relatively low resilience and resistance include seeding after wildfire in areas that lack sufficient native perennial grasses and forbs for recovery (top) (photo by Chad Boyd), and mowing sagebrush to reinvigorate native perennial grasses and forbs in the understory (bottom) (photo by Scott Schaff). Success of mowing treatments depends on having adequate perennial grasses and forbs on the site to resist invasive annual grasses and to promote recovery.

Figure 31. Vegetation treatments for sagebrush ecosystems exhibiting piñon and juniper expansion include cutting the trees with chainsaws and leaving them in place (top) (photo by Jeremy Roberts) and shredding them with a "bullhog" (middle) (photo by Bruce A. Roundy) on sites with relatively warm soils and moderately low resistance to cheatgrass. Prescribed fire (bottom) (photo by Jeanne C. Chambers) can be a viable treatment on sites with relatively cool and moist soils that have higher resilience to disturbance and resistance to invasive annual grasses. Treatment success depends on having adequate perennial grasses and forbs on the site to resist invasive annual grasses and promote recovery and will be highest on sites with relatively low densities of trees (Phase I to Phase II woodlands).

Table 6. General guidelines for conducting fuels management, fire rehabilitation, and restoration treatments (modified from Miller et al. 2007; Tausch et al. 2009; Pyke 2011; Chambers et al. 2013).

Steps in the process	Questions and considerations
I. Assess potential treatment area and identify ecological sites	1. Where are priority areas for fuels management, fire rehabilitation or restoration within the focal area? Consider sage-grouse habitat needs and resilience and resistance. 2. What are the topographic characteristics and soils of the area? Verify soils mapped to the location and determine soil temperature/moisture regimes. Collect information on soil texture, depth and basic chemistry for restoration projects. 3. How will topographic characteristics and soils affect vegetation recovery, plant establishment and erosion? Evaluate erosion risk based on topography and soil characteristics. 4. What are the potential native plant communities for the area? Match soil components to their correlated ESDs. This provides a list of potential species for the site(s).
II. Determine current state of the site	5. Is the area still within the reference state for the ecological site(s)?
III. Select appropriate action	6. How far do sites deviate from the reference state? How will treatment success be measured? 7. Do sufficient perennial shrubs and perennial grasses and forbs exist to facilitate recovery? 8. Are invasive species a minor component? 9. Do invasive species dominate the sites while native life forms are missing or severely under represented? If so, active restoration is required to restore habitat. 10. Are species from drier or warmer ecological sites present? Restoration with species from the drier or warmer sites should be considered. 11. Have soils or other aspects of the physical environment been altered? Sites may have crossed a threshold and represent a new ecological site type requiring new site-specific treatment/restoration approaches.
IV. Determine post-treatment management	12. How long should the sites be protected before land uses begin? In general, sites with lower resilience and resistance should be protected for longer periods. 13. How will monitoring be performed? Treatment effectiveness monitoring includes a complete set of measurements, analyses, and a report. 14. Are adjustments to the approach needed? Adaptive management is applied to future projects based on consistent findings from multiple locations.

Ecological site descriptions: ESDs and their associated STMs provide essential information for determining treatment feasibility and type of treatment. ESDs are part of a land classification system that describes the potential of a set of climate, topographic, and soil characteristics and natural disturbances to support a dynamic set of plant communities (Bestelmeyer et al. 2009; Stringham et al. 2003). NRCS soil survey data (http://soils.usda.gov/survey/), including soil temperature/moisture regimes and other soil characteristics, are integral to ESD development. ESDs have been developed by the NRCS and their partners to assist land management agencies and private land owners with making resource decisions, and are widely available for the Sage-grouse MZs except where soil surveys have not been completed (for a detailed description of ESDs and access to available ESDs see: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/desc/). ESDs assist managers to step-down generalized vegetation dynamics, including the concepts of resilience and resistance, to local scales. For example, variability in soil characteristics and the local environment (e.g., average annual precipitation as indicated by soil moisture regime) can strongly influence both plant community resilience to fire as well as the resistance of a plant community to invasive annual grasses after fire (table 1). Within a particular ESD, there is a similar level of resilience to disturbance and resistance to invasive annuals and this information can be used to determine the most appropriate management actions.

State and transition models: STMs are a central component of ecological site descriptions that are widely used by managers to illustrate changes in plant communities and associated soil properties, causes of change, and effects of management interventions (Stringham et al. 2003; Briske et al. 2005; USDA NRCS 2007) including in sagebrush ecosystems (Forbis et al. 2006; Barbour et al. 2007; Boyd and Svejcar 2009; Holmes and Miller 2010; Chambers et al. *in press*). These models use ***state*** (a relatively stable set of plant communities that are resilient to disturbance) and ***transition*** (the drivers of change among alternative states) to describe the range in composition and function of plant communities within ESDs (Stringham and others 2003; see Appendix 1 for definitions). The reference state is based on the natural range of conditions associated with natural disturbance regimes and often includes several plant communities (***phases***) that differ in dominant plant species relative to type and time since disturbance (Caudle et al. 2013). Alternative states describe new sets of communities that result from factors such as inappropriate livestock use, invasion by annual grasses, or changes in fire regimes. Changes or transitions among states often are characterized by ***thresholds*** that may persist over time without active intervention, potentially causing irreversible changes in community composition, structure, and function. ***Restoration pathways*** are used to identify the environmental conditions and management actions required for return to a previous state. Detailed STMs that follow current interagency guidelines (Caudle et al. 2013), are aligned with the ecological types (table 1), and are generally applicable to MZs III (Southern Great Basin), IV (Snake River Plains), V (Northern Great Basin), and VI (Columbia Basin) are provided in Appendix 5.

A generalized STM to illustrate the use of STMs is shown in figure 32 for the warm and dry Wyoming big sagebrush ecological type. This ecological type occurs at relatively low elevations in the western part of the range and has low to moderate resilience to disturbance and management treatments and low resistance to invasion (table 1). This type is abundant in the western portion of the range, but as the STM suggests, it is highly susceptible to conversion to invasive annual grass and repeated fire and is difficult to restore. Intact sagebrush areas remaining in the reference state within this ecological type are a high priority for conservation. Invaded states or locations with intact sagebrush that lack adequate native perennial understory are a high priority for restoration where they bridge large, contiguous areas of sagebrush. However, practical methods to accomplish this are largely experimental and/or costly and further development, including adaptive science and management, is needed.

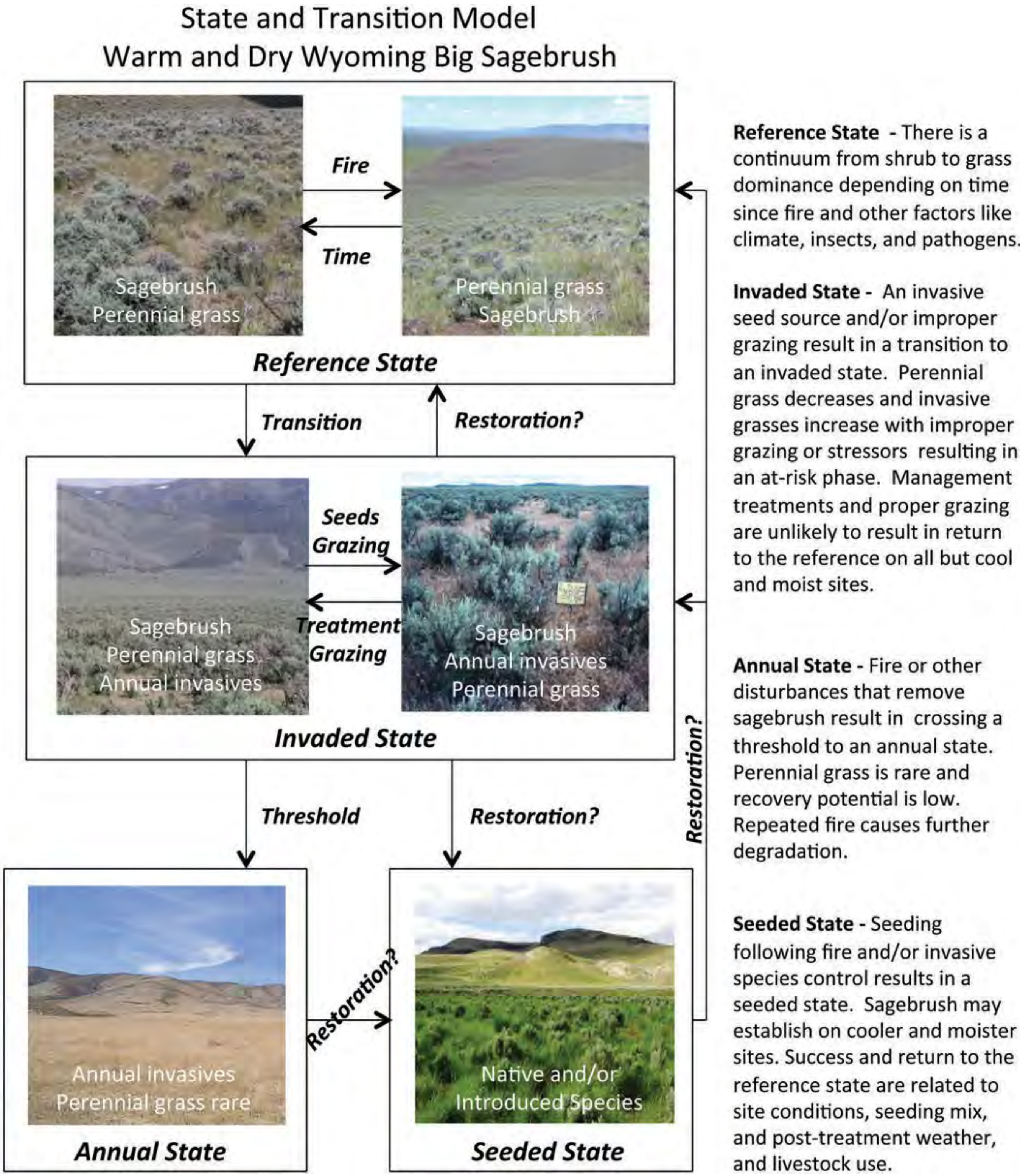

Figure 32. A state and transition model that illustrates vegetation dynamics and restoration pathways for the warm and dry, Wyoming big sagebrush ecological type. This ecological type occurs at relatively low elevations in the western part of the range and has low to moderate resilience to disturbance and management treatments and low resistance to invasion.

Monitoring and adaptive management: Monitoring programs designed to track ecosystem changes in response to both stressors and management actions can be used to increase understanding of ecosystem resilience and resistance, realign management approaches and treatments, and implement adaptive management (Reever-Morghan et al. 2006; Herrick et al. 2012). Information is increasing on likely changes in sagebrush ecosystems with additional stress and climate warming, but a large degree of uncertainty still exits. Currently, the NRCS National Resource Inventory is being used on private lands and is being implemented on public lands managed by BLM to monitor trends in vegetation attributes and land health at the landscape scale under the AIM (Assessment Inventory and Monitoring) strategy. Strategic placement of monitoring sites and repeated measurements of ecosystem status and trends (e.g., land cover type, ground cover, vegetation cover and height of native and invasive species, phase of tree expansion, soil and site stability, oddities) can be used to decrease uncertainty and increase effectiveness of management decisions. Ideally, monitoring sites span environmental/productivity gradients and sagebrush ecological types that characterize sage-grouse habitat. Of particular importance are (1) ecotones between ecological types where changes in response to climate are expected to be largest (Loehle 2000; Stohlgren et al. 2000), (2) ecological types with climatic conditions and soils that are exhibiting invasion and repeated fires, and (3) ecological types with climatic conditions and soils that are exhibiting tree expansion and increased fire risk. Monitoring the response of sagebrush ecosystems to management treatments, including both pre- and post-treatment data, is a first order priority because it provides information on treatment effectiveness that can be used to adjust methodologies.

Monitoring activities are most beneficial when consistent approaches are used among and within agencies to collect, analyze, and report monitoring data. Currently, effectiveness monitoring databases that are used by multiple agencies do not exist. However, several databases have been developed for tracking fire-related and invasive-species management activities. The National Fire Plan Operations and Reporting System (NFPORS) is an interdepartmental and interagency database that accounts for hazardous fuel reduction, burned area rehabilitation and community assistance activities. To our knowledge, NFPORS is not capable of storing and retrieving the type of effectiveness monitoring information that is needed for adaptive management. The FEAT FIREMON Integrated (FFI; https://www.frames.gov/partner-sites/ffi/ffi-home/) is a monitoring software tool designed to assist managers with collection, storage and analysis of ecological information. It was constructed through a complementary integration of the Fire Ecology Assessment Tool (FEAT) and FIREMON. This tool allows the user to select among multiple techniques for effectiveness monitoring. If effectiveness monitoring techniques were agreed on by the agencies, FFI does provide databases with standard structures that could be used in inter-agency effectiveness monitoring. Also, the National Invasive Species Information Management System (NISIMS) is designed to reduce redundant data entry regarding invasive species inventory, management and effectiveness monitoring with the goal of providing information that can be used to determine effective treatments for invasive species. However, NISIMS is currently available only within the BLM.

Common databases can be used by agency partners to record and share monitoring data. The Land Treatment Digital Library (LTDL [USGS 2010]) provides a method of archiving and collecting common information for land treatments and might be used as a framework for data storage and retrieval. Provided databases are relational (maintain a common field for connecting them), creating single corporate databases is not necessary. However, barriers that hinder database access within and among agencies and governmental departments may need to be lowered while still maintaining adequate data security. The LTDL has demonstrated how this can work by accessing a variety of databases to populate useful information relating to land treatments.

For effectiveness of treatments to be easily useable for adaptive management, the agencies involved will need to agree on monitoring methods and a common data storage and retrieval system. Once data can be retrieved, similar treatment projects can be evaluated to determine how well they achieve objectives for sage-grouse habitat, such as the criteria outlined in documents like the Habitat Assessment Framework (Stiver et al. 2006). Results of monitoring activities on treatment effectiveness are most useful when shared across jurisdictional boundaries, and several mechanisms are currently in place to improve information sharing (e.g., the Great Basin Fire Science Delivery Project; www.gbfiresci.org).

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Appendix 1. Definitions of Terms Used in This Document

At-Risk Community Phase — A community phase that can be designated within the reference state and also in alternative states. This community phase is the most vulnerable to transition to an alternative state (Caudle et al. 2013).

Community Phase — A unique assemblage of plants and associated soil properties that can occur within a state (Caudle et al. 2013).

Ecological Site (ES) — An Ecological Site (ES) is a conceptual division of the landscape that is defined as a distinctive kind of land based on recurring soil, landform, geological, and climate characteristics that differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its ability to respond similarly to management actions and natural disturbances (Caudle et al. 2013).

Ecological Site Descriptions (ESD) — The documentation of the characteristics of an ecological site. The documentation includes the data used to define the distinctive properties and characteristics of the ecological site; the biotic and abiotic characteristics that differentiate the site (i.e., climate, topography, soil characteristics, plant communities); and the ecological dynamics of the site that describes how changes in disturbance processes and management can affect the site. An ESD also provides interpretations about the land uses and ecosystem services that a particular ecological site can support and management alternatives for achieving land management (Caudle et al. 2013).

Ecological Type — A category of land with a distinctive (i.e., mappable) combination of landscape elements. The elements making up an ecological type are climate, geology, geomorphology, soils, and potential natural vegetation. Ecological types differ from each other in their ability to produce vegetation and respond to management and natural disturbances (Caudle et al. 2013).

Historical Range of Variability — Range of variability in disturbances, stressors, and ecosystem attributes that allows for maintenance of ecosystem resilience and resistance and that can be used to provide management targets (modified from Jackson 2006).

Resilience — Ability of a species and/or its habitat to recover from stresses and disturbances. Resilient ecosystems regain their fundamental structure, processes, and functioning when altered by stresses like increased CO_2 , nitrogen deposition, and drought and to disturbances like land development and fire (Allen et al. 2005; Holling 1973).

Resistance — Capacity of an ecosystem to retain its fundamental structure, processes and functioning (or remain largely unchanged) despite stresses, disturbances, or invasive species (Folke et al. 2004).

Resistance to Invasion — Abiotic and biotic attributes and ecological processes of an ecosystem that limit the population growth of an invading species (D'Antonio and Thomsen 2004).

Restoration Pathways — Restoration pathways describe the environmental conditions and practices that are required for a state to recover that has undergone a transition (Caudle et al. 2013).

State — A state is a suite of community phases and their inherent soil properties that interact with the abiotic and biotic environment to produce persistent functional and structural attributes associated with a characteristic range of variability (adapted from Briske et al. 2008).

State-and-Transition Model — A method to organize and communicate complex information about the relationships between vegetation, soil, animals, hydrology, disturbances (fire, lack of fire, grazing and browsing, drought, unusually wet periods, insects and disease), and management actions on an ecological site (Caudle et al. 2013).

Thresholds — Conditions sufficient to modify ecosystem structure and function beyond the limits of ecological resilience, resulting in the formation of alternative states (Briske et al. 2008).

Transition — Transitions describe the biotic or abiotic variables or events, acting independently or in combination, that contributes directly to loss of state resilience and result in shifts between states. Transitions are often triggered by disturbances, including natural events (climatic events or fire) and/or management actions (grazing, burning, fire suppression). They can occur quickly as in the case of catastrophic events like fire or flood, or over a long period of time as in the case of a gradual shift in climate patterns or repeated stresses like frequent fires (Caudle et al. 2013).

Appendix 2. An Explanation of the Use of Landscape Measures to Describe Sagebrush Habitat

Understanding landscape concepts of plant cover relative to typical management unit concepts of plant cover is important for prioritizing lands for management of sage-grouse. Ground cover measurements of sagebrush made at a management unit (for example, line-intercept measurements) should not be confused for landscape cover and may not relate well to landscape cover since the areas of examination differ vastly (square meters for management units and square kilometers for landscapes).

A landscape is defined rather arbitrarily as a large area in total spatial extent, somewhere in size between sites (acres or square miles) and regions (100,000s of square miles). The basic unit of a landscape is a patch, which is defined as a bounded area characterized by a similar set of conditions. A habitat patch, for example, may be the polygonal area on a map representing a single land cover type. Landscapes are composed of a mosaic of patches. The arrangement of these patches (the landscape configuration or pattern) has a large influence on the way a landscape functions and for landscape species, such as sage-grouse, sagebrush habitat patches are extremely important for predicting if this bird will be present within the area (Connelly et al. 2011).

Remotely sensed data of land cover is typically used to represent landscapes. These data may combine several sources of data and may include ancillary data, such as elevation, to improve the interpretation of data. These data are organized into pixels that contain a size or grain of land area. For example, LandSat Thematic Mapper spectral data used in determining vegetation cover generally have pixels that represent ground areas of 900 m^2 (30- x 30-m). Each pixel's spectral signature can be interpreted to determine what type of vegetation dominates that pixel. Groups of adjacent pixels with the same dominant vegetation are clustered together into polygons that form patches.

Landscape cover of sagebrush is determined initially by using this vegetation cover map, but a 'rolling window' of a predetermined size (e.g., 5 km^2 or 5,556 pixels that are 30- by 30-m in size) is moved across the region one pixel at a time. The central pixel of the 'window' is reassigned a value for the proportion of pixels where sagebrush is the dominant vegetation. The process is repeated until pixels within the region are completely reassigned to represent the landscape cover of sagebrush within for the region drawn from a 5 km^2 window.

Appendix 3. An Explanation of Soil Temperature and Moisture Regimes Used to Describe Sagebrush Ecosystems

Soil climate regimes (temperature and moisture) are used in Soil Taxonomy to classify soils; they are important to consider in land management decisions, in part, because of the significant influence on the amounts and kinds of vegetation that soils support. Soil temperature and moisture regimes are assigned to soil map unit components as part of the National Cooperative Soil Survey program. Soil survey spatial and tabular data for the Sage-grouse Management Zones (Stiver et al. 2006) were obtained for each State within the zones at the Geospatial Data Gateway (http://datagateway.nrcs.usda.gov/). Gridded Soil Survey Geographic (gSSURGO) file geodatabases were used to display a 10-meter raster dataset. Multiple soil components made up a soil map unit, and soil moisture and temperature regimes were linked to individual soil map components. Soil components with the same soil moisture and temperature class regime were aggregated, and the dominant soil moisture and temperature regime within each soil map unit was used to characterize the temperature and moisture regime. Only temperature and moisture regimes applicable to sagebrush ecosystems were displayed.

Abbreviated definitions of each soil temperature and moisture regime class are listed below. Complete descriptions can be found in *Keys to Soil Taxonsomy, 11th edition*, available at ftp://ftp-fc.sc.egov.usda.gov/NSSC/Soil_Taxonomy/keys/2010_Keys_to_Soil_Taxonomy.pdf.

Soil temperature regimes	
Cryic (Cold)	Soils that have a mean annual soil temperature of <8 °C, and do not have permafrost, at a depth of 50 cm below the surface or at a restrictive feature, whichever is shallower.
Frigid (Cool)	Soils that have a mean annual soil temperature of <8 °C and the difference between mean summer and mean winter soil temperatures is >6 °C at a depth of 50 cm below the surface or at a restrictive feature, whichever is shallower.
Mesic (Warm)	Soils that have a mean annual soil temperature of 8-15 °C and the difference between mean summer and mean winter soil temperatures is >6 °C at a depth of 50 cm below the surface or at a restrictive feature, whichever is shallower.
Soil moisture regimes	
Ustic (summer precipitation)	Generally there is some plant-available moisture during the growing season, although significant periods of drought may occur. Summer precipitation allows presence of warm season plant species.
Xeric (Moist; generally mapped at >12 inches mean annual precipitation)	Characteristic of arid regions. The soil is dry for at least half the growing season and moist for less than 90 consecutive days.
Aridic (Dry; generally mapped at <12 inches mean annual precipitation)	Characteristic of arid regions. The soil is dry for at least half the growing season and moist for less than 90 consecutive days.

Note: Soil moisture regimes are further divided into moisture subclasses, which are often used to indicate soils that are transitional to another moisture regime. For example, a soil with an Aridic moisture regime and a Xeric moisture subclass may be described as “Aridic bordering on Xeric.” Understanding these gradients becomes increasingly important when making interpretations and decisions at the site scale where aspect, slope, and soils affect the actual moisture regime on that site. More information on taxonomic moisture subclasses is available at http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053576.

Appendix 4. Data Sources for the Maps in This Report

Dataset	Citation	Link
Geomac fire perimeters	Walters, S.P.; Schneider, N.J.; Guthrie, J.D. 2011. Geospatial Multi-Agency Coordination (GeoMAC) wildland fire perimeters, 2008. Data Series 612. Washington, DC: U.S. Department of the Interior, U.S. Geological Survey.6 p.	http://pubs.er.usgs.gov/publication/ds612
WFDSS fire perimeters	Butler, B. B.; Bailey, A. 2013. Disturbance history (Historical wildland fires). Updated 8/9/2013. Wildland Fire Decision Support System. Online: https://wfdss.usgs.gov/wfdss/WFDSS_Home.shtml [Accessed 5 March 2014].	https://wfdss.usgs.gov/wfdss/WFDSS_Home.shtml or https://wfdss.usgs.gov/wfdss/WFDSSData_Downloads.shtml
Piñon and juniper land cover	U.S. Geological Survery (USGS) National Gap Analysis Program. 2004. Provisional digital land cover map for the southwestern United States. Version 1.0. Logan, UT: Utah State University, College of Natural Resources, RS/GIS Laboratory.	http://earth.gis.usu.edu/swgap/landcover.html
Piñon and juniper land cover	U.S. Geological Survey (USGS). 2013: LANDFIRE 1.2.0 Existing Vegetation Type layer. Updated 3/13/2013. Washington, DC: U.S. Department of the Interior, Geological Survey. Online: http://landfire.cr.usgs.gov/viewer/. [Accessed 13 March 2014].	http://www.landfire.gov/NationalProductDescriptions21.php
Nevada invasive annual grass index	Peterson, E. B. 2006. A map of invasive annual grasses in Nevada derived from multitemporal Landsat 5 TM imagery. Carson City, NV: State of Nevada, Department of Conservation and Natural Resources, Nevada Natural Heritage Program.	http://heritage.nv.gov/node/167
Owhyee upland annual grass index	Peterson, E. B. 2007. A map of annual grasses in the Owyhee Uplands, Spring 2006, derived from multitemporal Landsat 5 TM imagery. Carson City, NV: State of Nevada, Department of Conservation and Natural Resources, Nevada Natural Heritage Program.	http://heritage.nv.gov/sites/default/files/library/anngrowy_text_print.pdf
Soil data (SSURGO)	Soil Survey Staff. 2014a. Soil Survey Geographic (SSURGO) Database. United States Department of Agriculture, Natural Resources Conservation Service. Online: http://sdmdataaccess.nrcs.usda.gov/. [Accessed 3 March 2014a].	http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_053627
Soil data (STATSGO)	Soil Survey Staff. 2014b. U.S. General Soil Map (STATSGO2) Database. United States Department of Agriculture, Natural Resources Conservation Service. Online: http://sdmdataaccess.nrcs.usda.gov/. [Accessed 3 March 2014b].	

Soil temperature and moisture regime data	Campbell, S. B. 2014. Soil temperature and moisture regime data for the range of greater sage-grouse. Data product. Portland, OR: USDA Natural Resources Conservation Service. Online: https://www.sciencebase.gov/catalog/folder/537f8be5e4b021317a872f1b?community=LC+MAP+-+Landscape+Conservation+Management+and+Analysis+Portal [Accessed 17 June 2014].	https://www.sciencebase.gov/catalog/folder/537f8be5e4b021317a872f1b?community=LC+MAP+-+Landscape+Conservation+Management+and+Analysis+Portal
Sage-grouse management zones	Stiver, S. J.; Apa, A. D.; Bohne, J. R.; Bunnell, S. D.; Deibert, P. A.; Gardner, S. C.; Hilliard, M. A.; McCarthy, C. W.; Schroeder, M. A. 2006. Greater Sage-grouse Comprehensive Conservation Strategy. Unpublished report on file at: Western Association of Fish and Wildlife Agencies, Cheyenne, WY.	
Breeding bird densities	Doherty, K. E.; Tack, J. D.; Evans, J. S.; Naugle, D. E. 2010. Mapping breeding densities of greater sage-grouse: A tool for range-wide conservation planning. BLM completion report: Agreement # L10PG00911.	http://scholar.google.com/scholar?q=doherty+2010+breeding+bird&hl=en&as_sdt=0&as_vis=1&oi=scholart&sa=X&ei=JqQbU7HUAqfD2QW8xYFY&ved=0CCUQgQMwAA
Sagebrush land cover	U.S. Geological Survey (USGS). 2013: LANDFIRE 1.2.0 Existing Vegetation Type layer. Updated 3/13/2013. Washington, DC: U.S. Department of the Interior, Geological Survey. Online: http://landfire.cr.usgs.gov/viewer/. [Accessed 13 March 2014].	http://www.landfire.gov/NationalProductDescriptions21.php

Appendix 5. State-and-transition models (STMs) for five generalized ecological types for big sagebrush (from Chambers et al. *in press*; Miller et al. 2014 a, b)

These STMs represent groupings of ecological sites that are characterized by Wyoming or mountain big sagebrush, span a range of soil moisture/temperature regimes (warm/dry to cold/moist), and characterize a large portion of Management Zones III (Southern Great Basin), IV (Snake River Plains), V (Northern Great Basin), and VI (Columbia Basin). Large boxes illustrate states that are comprised of community phases (smaller boxes). Transitions among states are shown with arrows starting with T; restoration pathways are shown with arrows starting with R. The "at risk" community phase is most vulnerable to transition to an alternative state. Precipitation Zone is designated as PZ.

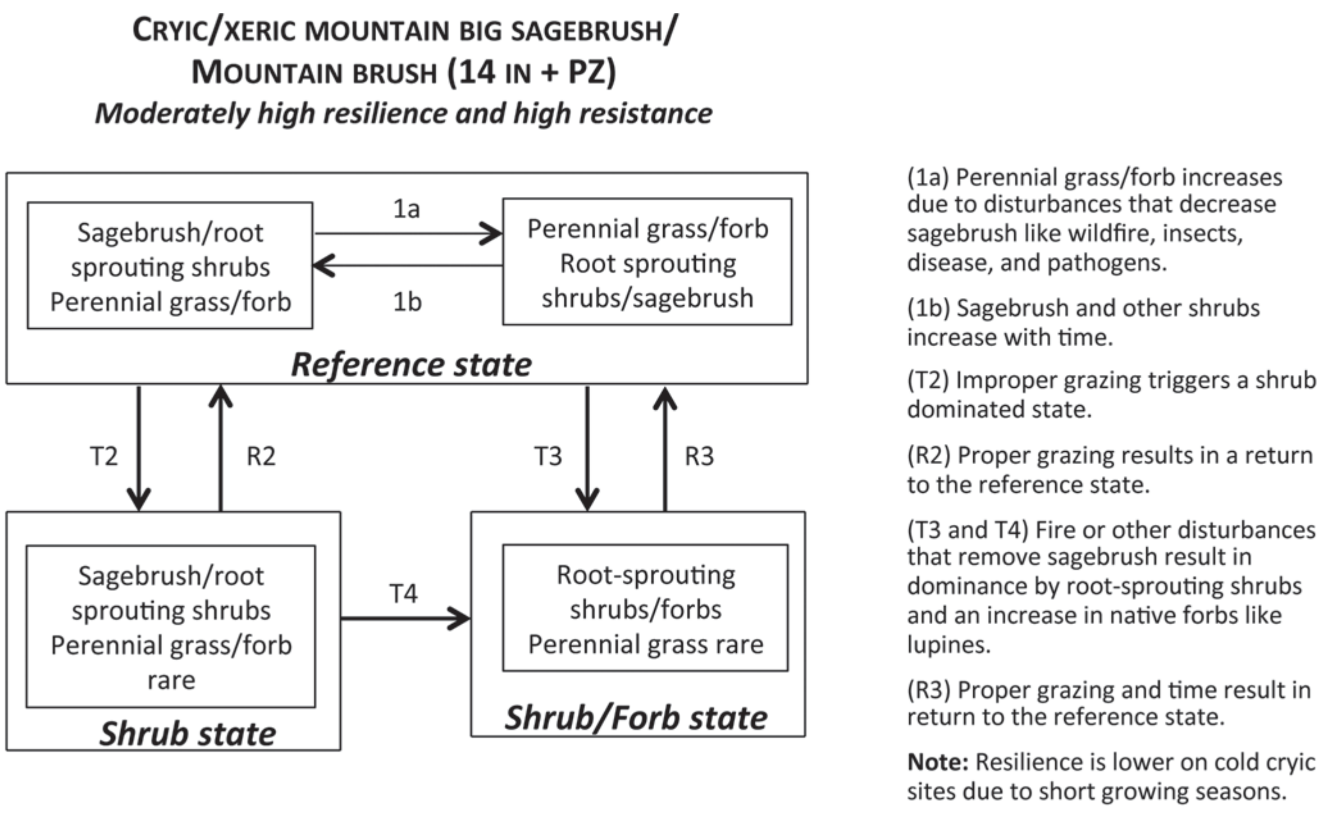
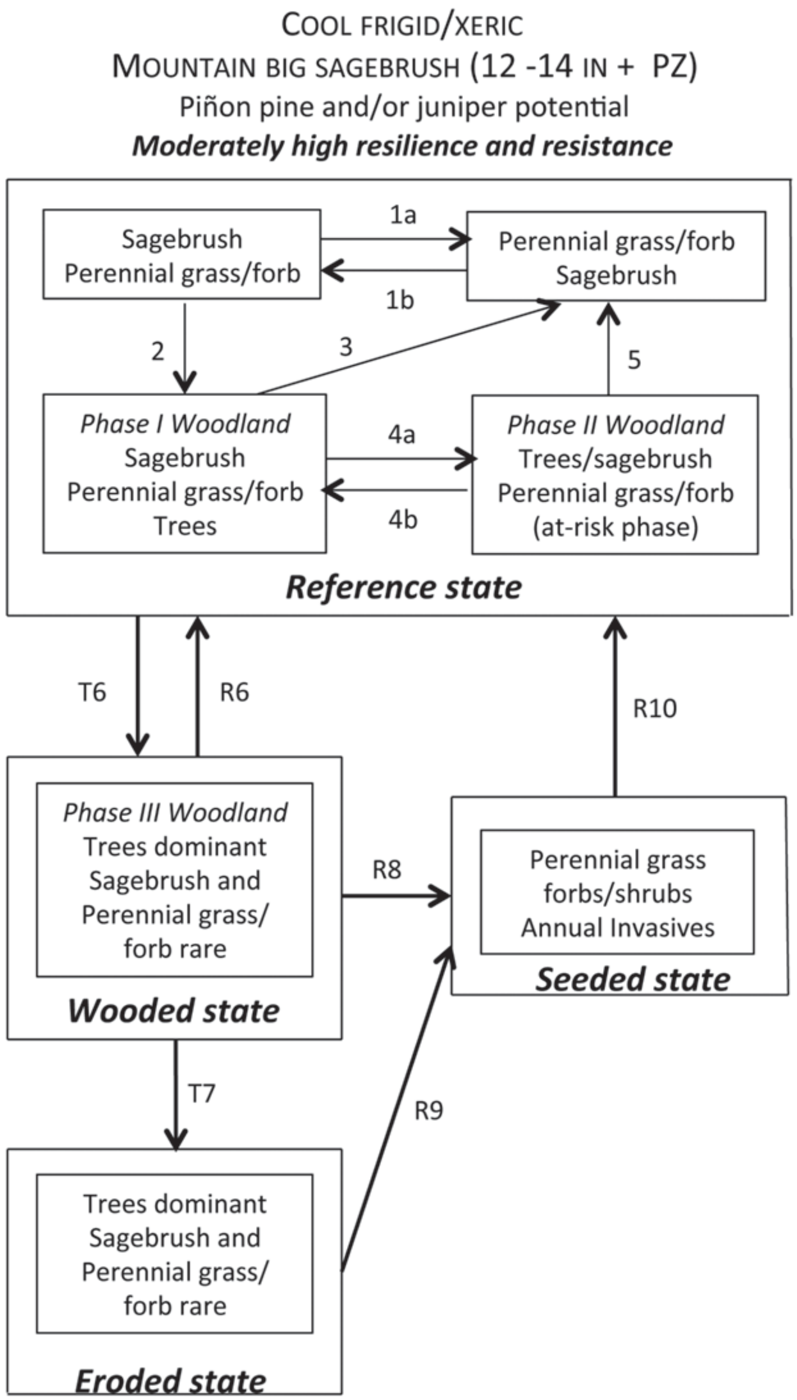


Figure A.5A. STM for a cryic/xeric mountain big sagebrush/mountain brush ecological type characterized by moderately high resilience and high resistance.



(1a) Disturbances such as wildfire, insects, disease, and pathogens result in less sagebrush and more perennial grass/forb.

(1b) Sagebrush increases with time .

(2) Time combined with seed sources for piñon and/or juniper trigger a Phase I Woodland.

(3 and 5) Fire and or fire surrogates (herbicides and/or mechanical treatments) that remove trees may restore perennial grass/forb and sagebrush dominance.

(4a) Increasing tree abundance results in a Phase II woodland with depleted perennial grass/forb and shrubs and an at-risk phase.

(4b) Fire surrogates (herbicides and/or mechanical treatments) that remove trees may restore perennial grass/forb and sagebrush dominance.

(T6) Infilling of trees and/or improper grazing can result in a biotic threshold crossing to a wooded state with increased risk of high severity crown fires .

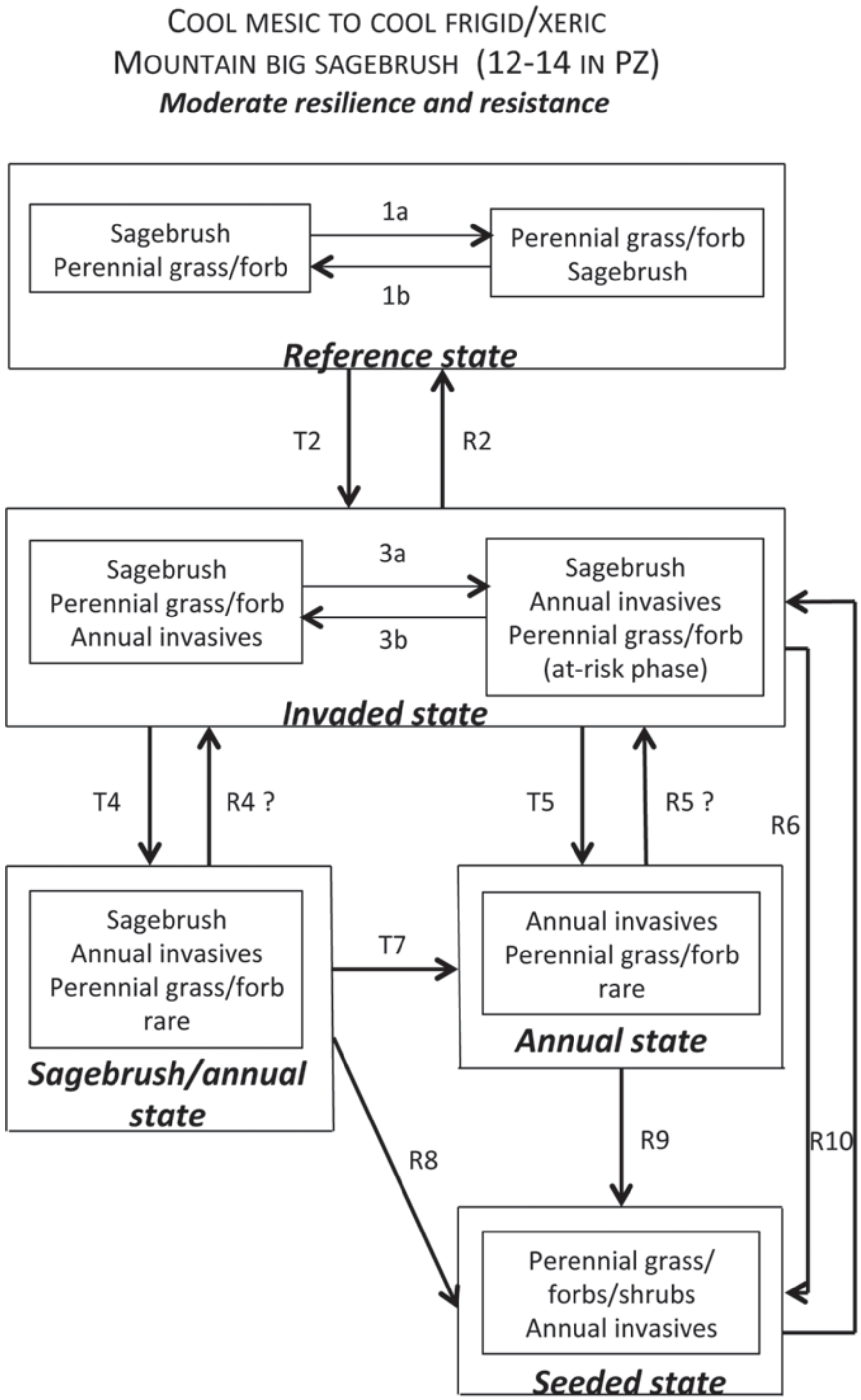
(R6) Fire, herbicides and/or mechanical treatments that remove trees may restore perennial grass/forb and sagebrush dominance.

(T7) An irreversible abiotic threshold crossing to an eroded state can occur depending on soils, slope, and understory species.

(R8 and R9) Seeding after fire may be required on sites with depleted perennial grass/forb, but seeding with aggressive introduced species can decrease native perennial grass/forb. Annual invasives are typically rare. Seeded eroded states may have lower productivity.

(R10) Depending on seed mix and grazing, return to the reference state may be possible if an irreversible threshold has not been crossed.

Figure A.5B. STM for a cool frigid/xeric mountain big sagebrush ecological type that has piñon pine and/or juniper potential and is characterized by moderately high resilience and resistance.



(1a) Perennial grass/forb increases due to disturbances that decrease sagebrush like wildfire, insects, disease, and pathogens.

(1b) Sagebrush increases with time .

(T2) An invasive seed source and/or improper grazing trigger an invaded state.

(R2) Proper grazing, fire, herbicides, and/or mechanical treatments may restore perennial grass/forb and sagebrush dominance with few invasives.

(3a) Perennial grass/forb decreases and sagebrush and invasives increase with improper grazing by livestock resulting in an at-risk phase. Decreases in sagebrush due to insects, disease or pathogens can further increase invasives.

(3b) Proper grazing, herbicides, or mechanical treatments that reduce sagebrush may increase perennial grass/forb and decrease invasives.

(T4) Improper grazing results in a sagebrush/annual state.

(R4) Proper grazing may facilitate return to the invaded state on cooler/wetter sites if sufficient grass/forb remains .

(T5 and T7) Fire or other disturbances that remove sagebrush result in an annual state. Perennial grass/forb are rare and recovery potential is reduced. Repeated fire can result in a biotic threshold crossing to annual dominance on warmer/drier sites, and root-sprouting shrubs may increase.

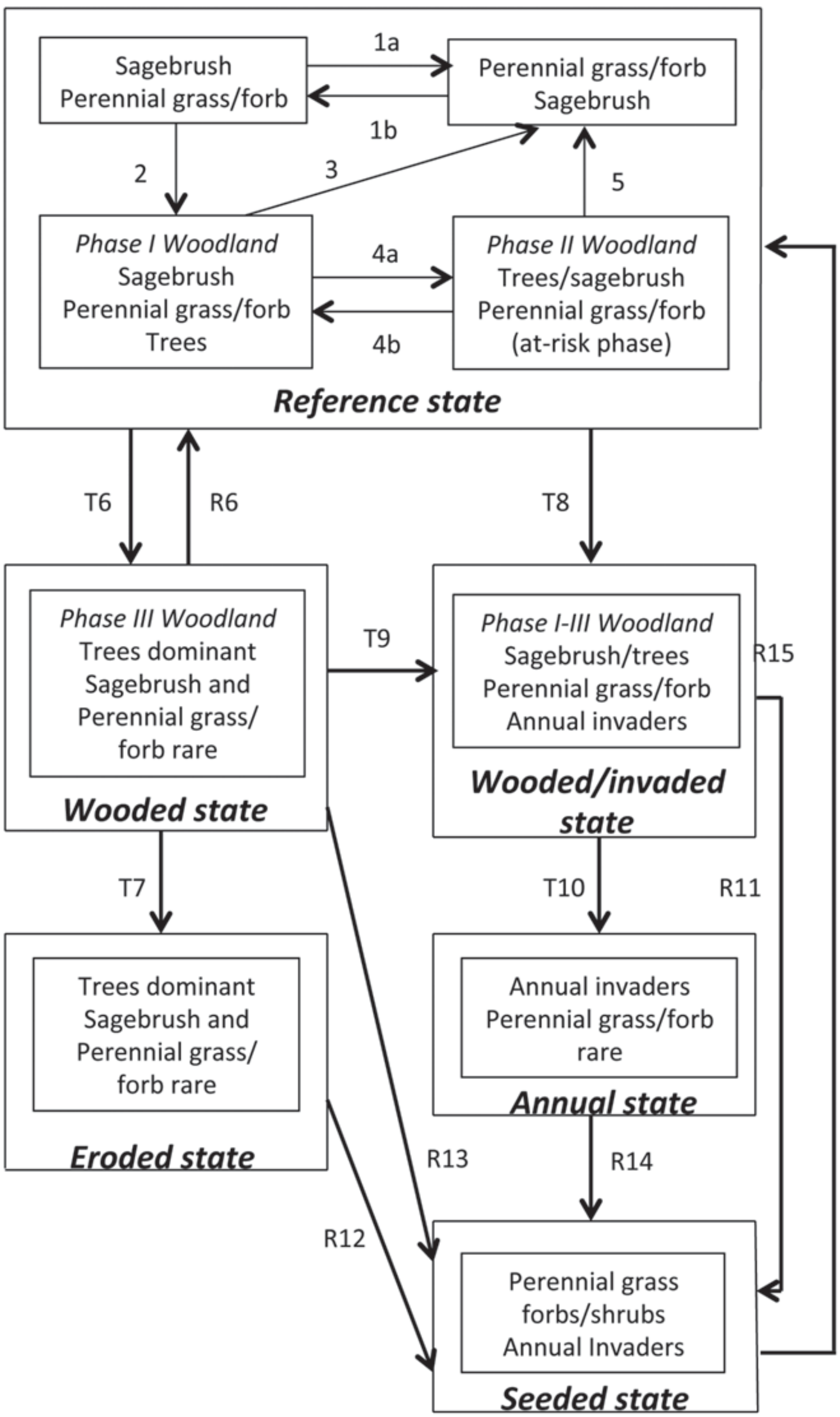
(R5) Cooler and wetter sites may return to the invaded or reference state with lack of fire, proper grazing, and favorable weather.

(R6, R8 and R9) Seeding following fire and/or invasive species control results in a seeded state. Sagebrush may recolonize depending on patch size, but annual invaders are still present.

(R10) Cooler and wetter sites may return to the invaded or possibly reference state depending on seeding mix, grazing and weather.

Figure A.5C. STM for a cool mesic to cool frigid/xeric mountain big sagebrush ecological type that is characterized by moderate resilience and resistance.

Cool mesic to warm frigid/xeric
Big sagebrush (12-14 in + PZ)
Piñon pine and/or juniper potential
Moderate resilience and moderately low resistance



(1a) Disturbances such as wildfire, insects, disease, and pathogens result in less sagebrush and more perennial grass/forb.

(1b) Sagebrush increases with time .

(2) Time combined with seed sources for piñon and/or juniper trigger a Phase I Woodland.

(3 and 5) Fire and or fire surrogates (herbicides and/or mechanical treatments) that remove trees may restore perennial grass/forb and sagebrush dominance on cooler/wetter sites. On warmer/drier sites with low perennial grass/forb abundance resistance to invasion is moderately low.

(4a) Increasing tree abundance results in a Phase II woodland with depleted perennial grass/forb and shrubs and an at-risk phase.

(4b) Fire surrogates (herbicides and/or mechanical treatments) that remove trees may restore sagebrush and perennial grass/forb dominance .

(T6) Infilling of trees and improper grazing can result in a biotic threshold crossing to a wooded state with increased risk of high severity crown fires.

(R6) Fire, herbicides and/or mechanical treatments that remove trees may restore perennial grass/forb and sagebrush dominance on cooler/wetter sites.

(T7) An irreversible abiotic threshold crossing to an eroded state can occur depending on soils, slope, and understory species.

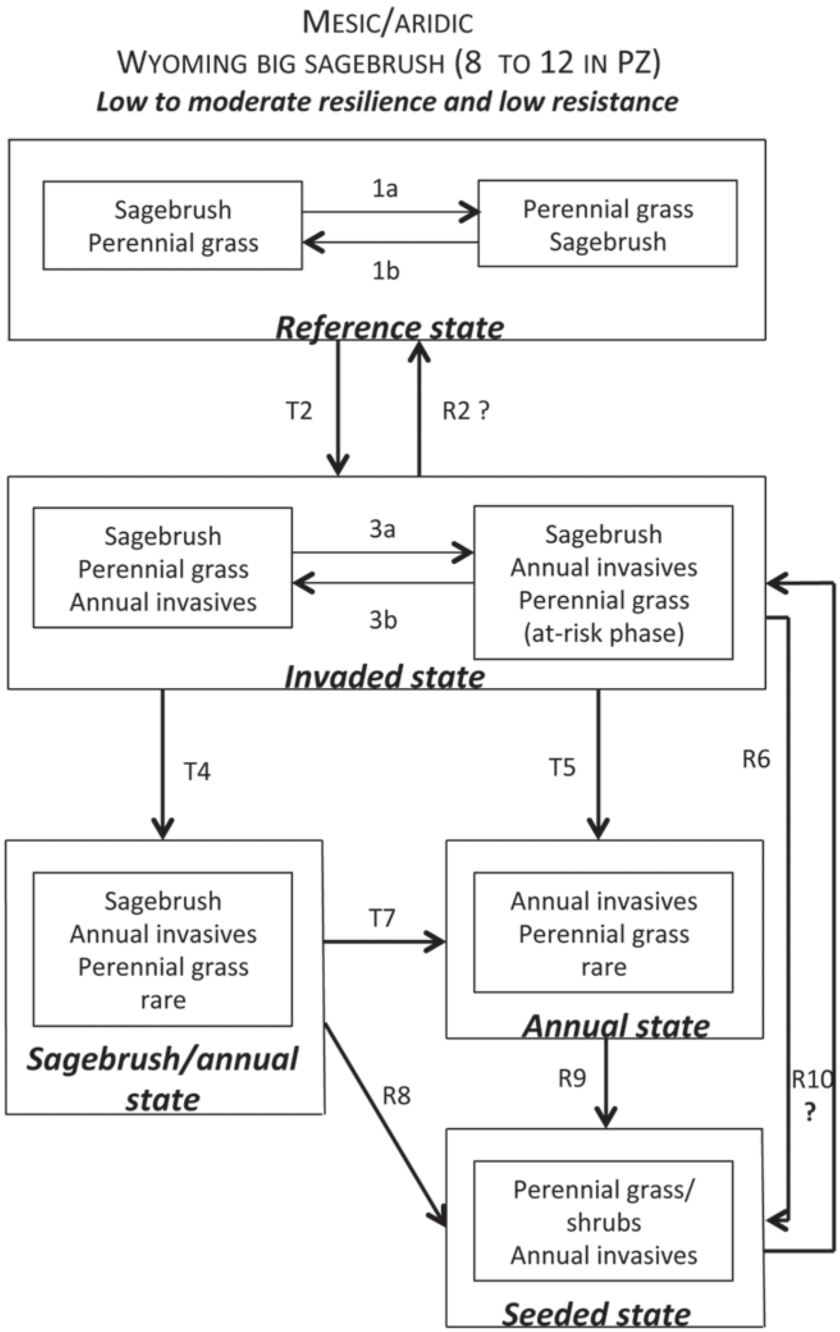
(T8 and T9) An invasive seed source and/or improper grazing can trigger a wooded/invaded state.

(T10) Fire or other disturbances that remove trees and sagebrush can result in a biotic threshold crossing to annual dominance on warmer/drier sites with low resilience.

(R11, R12, R13, and R14) Seeding after fire and/or invasive species control increases perennial grass/forb. Sagebrush may recolonize depending on seed sources, but annual invaders are still present. Seeded eroded states may have lower productivity.

(R15) Depending on seed mix , grazing, and level of erosion, return to the reference state may occur on cooler and wetter sites if an irreversible threshold has not been crossed.

Figure A.5D. STM for a cool mesic to warm frigid/xeric mountain big sagebrush ecological type type that has piñon pine and/or juniper potential and is characterized by moderate resilience and moderately low resistance.



(1a) Perennial grass increases due to disturbances that decrease sagebrush like wildfire, insects, disease, and pathogens.
(1b) Sagebrush increases with time.
(T2) An invasive seed source and/or improper grazing trigger an invaded state.
(R2) Proper grazing, fire, herbicides and/or mechanical treatments are unlikely to result in return to the reference state on all but the coolest and wettest sites.
(3a) Perennial grass decreases and both sagebrush and invasives increase with improper grazing resulting in an at-risk phase. Decreases in sagebrush due to insects, disease or pathogens can further increase invasives.
(3b) Proper grazing and herbicides or mechanical treatments that reduce sagebrush may restore perennial grass and decrease invaders on wetter sites (10-12"). Outcomes are less certain on drier sites (8-10") and/or low abundance of perennial grass.
(T4) Improper grazing triggers a largely irreversible threshold to a sagebrush/annual state.
(T 5 and T7) Fire or other disturbances that remove sagebrush result in an annual state. Perennial grass is rare and recovery potential is low due to low precipitation, mesic soil temperatures, and competition from annual invasives. Repeated fire can cause further degradation.
(R6, R8 and R9) Seeding following fire and/or invasive species control results in a seeded state. Sagebrush may recolonize depending on patch size, but annual invasives are still present.
(R10) Seeding effectiveness and return to the invaded state are related to site conditions, seeding mix, and post-treatment weather.

Figure A.5E. STM for a mesic/aridic Wyoming big sagebrush ecological type with low to moderate resilience and low resistance.

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Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer Expansion Assessment

June 2014

Suggested Citation:

Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer Expansion Assessment (Fire and Invasive Assessment Tool (FIAT)). June 2014. Prepared by Fire and Invasive Assessment Team (Appendix 5). 43 pages.

Introduction and Background

The purpose of this assessment is to identify priority habitat areas and management strategies to reduce the threats to Greater Sage-Grouse resulting from impacts of invasive annual grasses, wildfires, and conifer expansion. The Conservation Objectives Team (COT) report (USFWS 2013) and other scientific publications identify wildfire and conversion of sagebrush habitat to invasive annual grass dominated vegetative communities as two of the primary threats to the sustainability of Greater Sage-Grouse (*Centrocercus urophasianus*, hereafter sage-grouse) in the western portion of the species range. For the purposes of this assessment protocol, invasive species are limited to, and hereafter referred to, as **invasive annual grasses** (e.g., primarily cheatgrass [*Bromus tectorum*]). Conifer expansion (also called encroachment) is also addressed in this assessment.

The United States Fish and Wildlife Service (USFWS) will consider the amelioration of impacts, location and extent of treatments, degree of fire risk reduction, locations for suppression priorities, and other proactive measures to conserve sage-grouse in their 2015 listing decision. This determination will be made based in part upon information contained in the United States (US) Department of the Interior, Bureau of Land Management (BLM) resource management plan (RMP) amendments and Forest Service land resource management plan (LRMP) amendments, including this assessment.

This assessment is based in part on National Resources Conservation Service (NRCS) soil surveys that include geospatial information on soil temperature and moisture regimes associated with resistance and resiliency properties (see following section on *Soil Temperature and Moisture Regimes)*. While this assessment is applicable across the range of sage-grouse, the analysis is limited to Western Association of Fish and Wildlife Management Agencies' (WAFWA) Management Zones III, IV, and V (roughly the Great Basin region) because of the significant issues associated with invasive annual grasses and the high level of wildfires in this region. The utility of this assessment process is dependent on incorporating improved information and geospatial data as it becomes available. Although the resistance and resilience concepts have broad applications (e.g., infrastructure development), this assessment is limited to developing strategies to reduce threats to sage-grouse habitat (e.g., invasive annual grasses and wildfires).

Draft Greater Sage-Grouse Environmental Impact Statements (EISs) contain a suggested framework in the appendices ("Draft Greater Sage-Grouse Wildland Fire and Invasive Species Assessment") that provided a consistent approach to conduct these assessments. The current protocol was developed by the Fire and Invasive Species Team (FIAT), a team of wildland fire specialists and other resource specialists and managers, to specifically incorporate resistance to invasive annual grasses and resilience after disturbance principles into the assessment protocol. This protocol is also referred to as the Fire and Invasive Tool. In October 2013, the BLM, Forest Service, and USFWS agreed to incorporate this approach into the final EISs.

The cornerstone of the FIAT protocol is recent scientific research on resistance and resilience of Great Basin ecosystems (Chambers et al. 2014) and the USFWS-sponsored project with the Western Association of Fish and Wildlife Agencies (WAFWA) to assemble an interdisciplinary team to provide additional information on wildland fire and invasive plants and to develop strategies for addressing these issues. This interagency collaboration between rangeland scientists, fire specialists, and sage-grouse biologists resulted in the development of a strategic, multi-scale approach for employing ecosystem resilience and resistance concepts to manage threats to sage-grouse habitats from wildfire and invasive annual grasses (Chambers et al. 2014). This paper has been published as a Forest Service Rocky Mountain Research Station General Technical Report RMRS-GTR-326 and is posted online at http://www.fs.fed.us/rm/pubs/rmrs_gtr326.pdf. It serves as the reference and basis for the protocol described in this assessment.

The assessment process sets the stage for:

- Identifying important sage-grouse occupied habitats and baseline data layers important in defining and prioritizing sage-grouse habitats
- Assessing the resistance to invasive annual grasses and resilience after disturbance and prioritizing focal habitats for conservation and restoration
- Identifying geospatially explicit management strategies to conserve sage-grouse habitats

Management strategies are types of actions or treatments that managers typically implement to resolve resource issues. They can be divided into proactive approaches (e.g., fuels management and habitat recovery/restoration) and reactive approaches (e.g., fire operations and post-fire rehabilitation). Proactive management strategies can favorably modify wildfire behavior and restore or improve desirable habitat with greater resistance to invasive annual grasses and/or resilience after disturbances such as wildfires. Reactive management strategies are employed to reduce the loss of sage-grouse habitat from wildfires or stabilize soils and reduce impacts of invasive annual grasses in sage-grouse habitat after wildfires. Proactive management strategies will result in long-term sage-grouse habitat improvement and stability, while reactive management strategies are essential to reducing current impacts of wildfires on sage-grouse habitat, thus maintaining long-term habitat stability. Management strategies include:

Proactive Strategies-

1. **Fuels Management** includes projects that are designed to change vegetation composition and/or structure to modify fire behavior characteristics for the purpose of aiding in fire suppression and reducing fire extent.

2. **Habitat Restoration/Recovery**
    a. Recovery, referred to as passive restoration (Pyke 2011), is focused on changes in land use (e.g., improved livestock grazing practices) to achieve a desired outcome where the plant community has not crossed a biotic or physical threshold.
    b. Restoration is equivalent to active restoration (Pyke 2011) and is needed when desired species or structural groups are poorly represented in the community and reseeding, often preceded by removal of undesirable species, is required. Note: The Fuels Management program supports recovery/restoration projects through its objective to restore and maintain resilient landscapes.

Reactive Strategies-

3. **Fire Operations** includes preparedness, prevention, and suppression activities. When discussing specific components of fire operations, the terms fire preparedness, fire prevention and fire suppression are used.

4. **Post-Fire Rehabilitation** includes the BLM's Emergency Stabilization and Rehabilitation (ES&R) Program and the Forest Service's Burned Area Emergency Response (BAER) Program. Policy limits application of funds from 1 to 3 years, thus treatments to restore or enhance habitat after this period of time are considered habitat recovery/restoration.

The assessment process included two steps with sub-elements. First, important Priority Areas for Conservation (PACs) and focal habitats are identified (**Step 1a**). Second, potential management **strategies** (described above) are identified to conserve or restore focal habitats threatened by wildfires, invasive annual grasses, and conifer expansion (primarily pinyon pine and/or juniper species; **Step 1b**). Focal habitats are the portions of a PAC with important habitat characteristics, bird populations, and threats (e.g., wildfires, invasive annual grasses, and conifer expansion) where this assessment will be applied. Areas adjacent to or near the focal habitats can be considered for management treatments such as fire control and fuels management if these locations can reduce wildfire impacts to focal habitats. Soil temperature and moisture regimes are used to characterize capacity for resistance to invasive annual grasses and resilience after disturbance (primarily wildfires) within focal habitats to assist in identifying appropriate management strategies, especially in areas with good habitat characteristics that have low recovery potential following disturbance. Soil moisture and temperature regime relationships have not been quantified to the same degree as for conifer expansion; however, Chambers et al. 2014) discuss preliminary correlations between these two variables.

The results of Steps 1a and 1b, along with associated geospatial data files, are available to local management units to complete Step 2 of the assessment process. Step 2 is conducted by local management units to address wildfire, invasive annual grasses, and conifer expansion in or near focal habitat areas. First, local information and geospatial data are collected and evaluated to apply and improve on Step 1 focal habitat area geospatial data (**Step 2a**). Second, focal habitat activity and implementation plans are developed and include prioritized management **tactics and treatments** to implement effective, fuels management, habitat recovery/restoration, fire operations, and post-fire rehabilitation strategies (**Step 2b**). This assessment will work best if Step 2b is done across management units (internal and externally across BLM and Forest Service administrative units and with other entities). **Figure 1**, Assessment Flow Chart, contains an illustration of the steps in the assessment process.

This analysis does not necessarily address the full suite of actions needed to maintain the current distribution and connectivity of sage-grouse habitats across the Great Basin because resources available to the federal agencies are limited at this time. Future efforts designed to maintain and connect habitats across the range will be needed as current focal areas are addressed and additional resources become available.

Step 1 – Sage-Grouse Landscape Context

Wildfire/Invasive Annual Grass Threat

- Priority Areas for Conservation
- 75% Breeding Bird Density Areas
- Sagebrush Landscape Cover
- Resistance to invasive annual grasses and resilience to disturbance

Conifer Expansion Threat

- Priority Areas for Conservation
- 75% Breeding Bird Density Areas
- Sagebrush Landscape Cover
- Conifer Expansion Map

Step 1a - Select Priority Areas for Conservation and focal habitats

Priority Areas for Conservation: Figure 6, Tables 1 &2

Focal habitats: Figure 6 and Table 2

Emphasis areas are habitats where resistance to invasive annual grasses and resiliency after disturbance are low within and around focal habitats.

Priority Areas for Conservation: Figure 7, Tables 3&4

Focal habitats: Figure 7 and Table 4

Emphasis areas are conifer expansion in association with 75% Breeding Bird Density areas with landscape sagebrush cover greater tjam 25%

Step 1b. Potential Management Strategies and Examples

Management Strategies to Address Wildfires and Invasive Annual Grasses
- Habitat Recovery/Restoration
- Fuels Management
- Fire Operations
- Post-Fire Rehabilitation

Utilize Table 4 in Chambers et al. 2014 to develop management strategies for each Priority Area for Conservation.

Management Strategies to Address Conifer Expansion
- Habitat Recovery/Restoration
- Fuels Management
- Fire Operations
- Post-Fire Rehabilitation

Utilize Table 4 in Chambers et al. 2014 to develop management strategies for each Priority Area for Conservation.

Step 2 – Management Unit Applications for Invasive Annual Grasses and Conifer Expansion

Step 2a

1) Evaluate the accuracy and utility of Step 1 geospatial layers and incorporate relevant local information.
2) Develop framework for incorporating management strategies to initiate implementation/activity plans.

Step 2b

Develop collaborative implementation/activity plans to address threats to focal habitats in Priority Areas for Conservation.

Figure 1, Assessment Flow Chart

Step 1

The first component of the Wildfire and Invasive Annual Grasses Assessment describes the factors that collectively provide the sage-grouse landscape context. Step 1a provides this context by discussing PACs, breeding bird density (BBD), soil temperature and moisture regimes (indicators of resistance to annual grasses and resilience after disturbance), landscape sagebrush cover, and conifer expansion. See Chambers et al. 2014) for a detailed description of Invasive Annual Grass and Wildfire threats to sage-grouse habitat. Priority PACs and focal habitats are derived from the information provided in this sage-grouse landscape context section.

Step 1a- Sage-grouse landscape context

This component of the assessment identifies important PACs and associated focal habitats where wildfire, invasive annual grasses, and conifer expansion pose the most significant threats to sage-grouse.

The primary focus of this assessment is on sage-grouse populations across the WAFWA Management Zones III, IV, and V (**Figure 2**, Current PACs for WAFWA Management Zones III, IV, and V). Sage-grouse are considered a landscape species that require very large areas to meet their annual life history needs. Sage-grouse are highly clumped in their distribution (Doherty et al. 2010), and the amount of landscape cover in sagebrush is an important predictor of sage-grouse persistence in these population centers (Knick et al. 2013). States have used this information combined with local knowledge to identify PACs to help guide long-term conservation efforts. FIAT used data sets that were available across the three management zones as an initial step for prioritizing selected PACs and identifying focal habitats for fire and invasive annual grasses and conifer expansion assessments. These data sets (also described in Chambers et al. 2014) include:

Priority Areas for Conservation (PACs)

PACs have been identified by states as key areas that are necessary to maintain redundant, representative, and resilient sage-grouse populations (USFWS 2013; see Figure 2). A primary objective is to minimize threats within PACs (e.g., wildfire and invasive annual grasses impacts) to ensure the long-term viability of sage-grouse and its habitats. A secondary priority is to conserve sage-grouse habitats outside of PACs since they may also be important for habitat connectivity between PACs (genetic and habitat linkages), habitat restoration and population expansion opportunities, and flexibility for managing habitat changes that may result from climate change. PACs have also been identified by the USFWS as one of the reporting geographic areas that will be considered during listing determinations for sage-grouse.

The combination of PACs with BBD data (described below) assists us in identifying connectivity between populations. PAC boundaries may be modified in the future requiring adjustments in focal habitat areas and management strategy priorities.

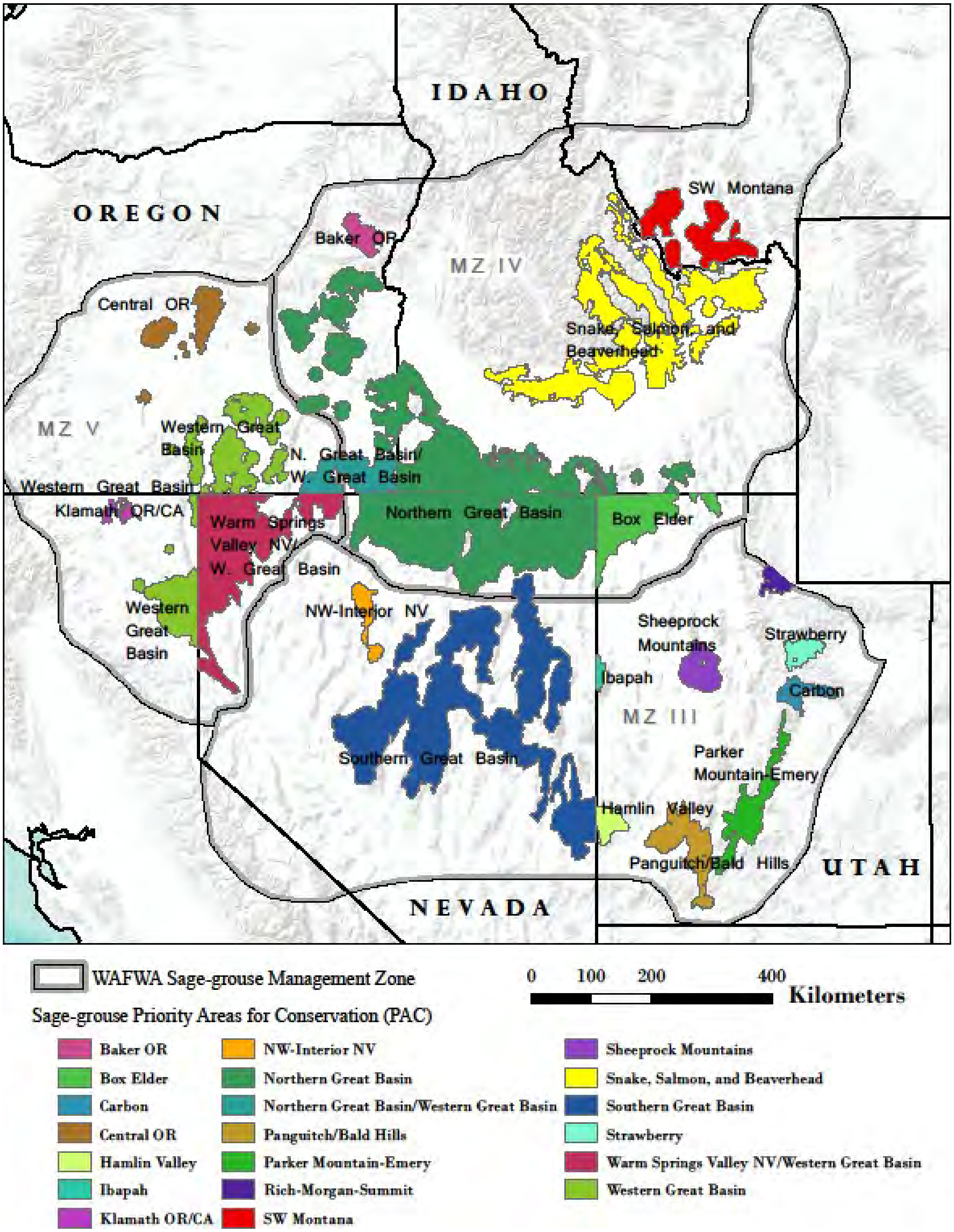

Figure 2, Current PACs for WAFWA Management Zones III, IV, and V. Bi-State sage-grouse populations were not included for this analysis and are being addressed in separate planning efforts.

Breeding Bird Density

Doherty et al. (2010) provided a useful framework for identifying population concentration centers in their range-wide BBD mapping. FIAT used maximum counts of males on leks (4,885 males) to delineate breeding bird density areas that contain 25, 50, 75, and 100 percent of the known breeding population. Leks were then mapped according to abundance values and buffered by 4 to 5.2 miles (6.4 to 8.5 kilometers) to delineate nesting areas. Findings showed that while sage-grouse occupy extremely large landscapes, their breeding distribution is highly aggregated in comparably smaller identifiable population centers; 25 percent of the known population occurs within 3.9 percent (7.2 million acres [2.92 million hectares]) of the species range, and 75 percent of birds are within 27 percent of the species range (50.5 million acres [20.4 million hectares]; Doherty et al. 2010). See **Figures 3**, Sage-Grouse Breeding Bird Density Thresholds.

This analysis places emphasis on breeding habitats because little broad/mid-scale data exists for associated brood-rearing (summer) and winter habitat use areas. Finer scale seasonal habitat use data should be incorporated (or, if not available studies, should be conducted) at local levels to ensure management actions encompass all seasonal habitat requirements. Federal administrative units should consult with state wildlife agencies for additional seasonal habitat information.

For this assessment, FIAT chose to use the 75 percent BBD as an indicator of high bird density areas that informed the approach used by state wildlife agencies to initially identify PACs. Range-wide BBD areas provide a means to further prioritize actions within relatively large PACs to maintain bird distribution and abundance. FIAT used state level BBD data from Doherty et al. (2010) instead of range-wide model results to ensure important breeding areas in Management Zones III, IV, and V were not underweighted due to relatively higher bird densities in the eastern portion of the range. BBD areas of 75 to 100 percent are included in Appendix 1 to provide context for local management units when making decisions concerning connectivity between populations and PACs.

Note that breeding density areas were identified using best available information in 2009, so this range-wide data does not reflect the most current lek count information and changes in conditions since the original analysis. Subsequent analysis should use the most current information available. Also, BBD areas should not be viewed as rigid boundaries but rather as a means to regionally prioritize landscapes where step down assessments and actions should be implemented quickly to conserve the most birds.

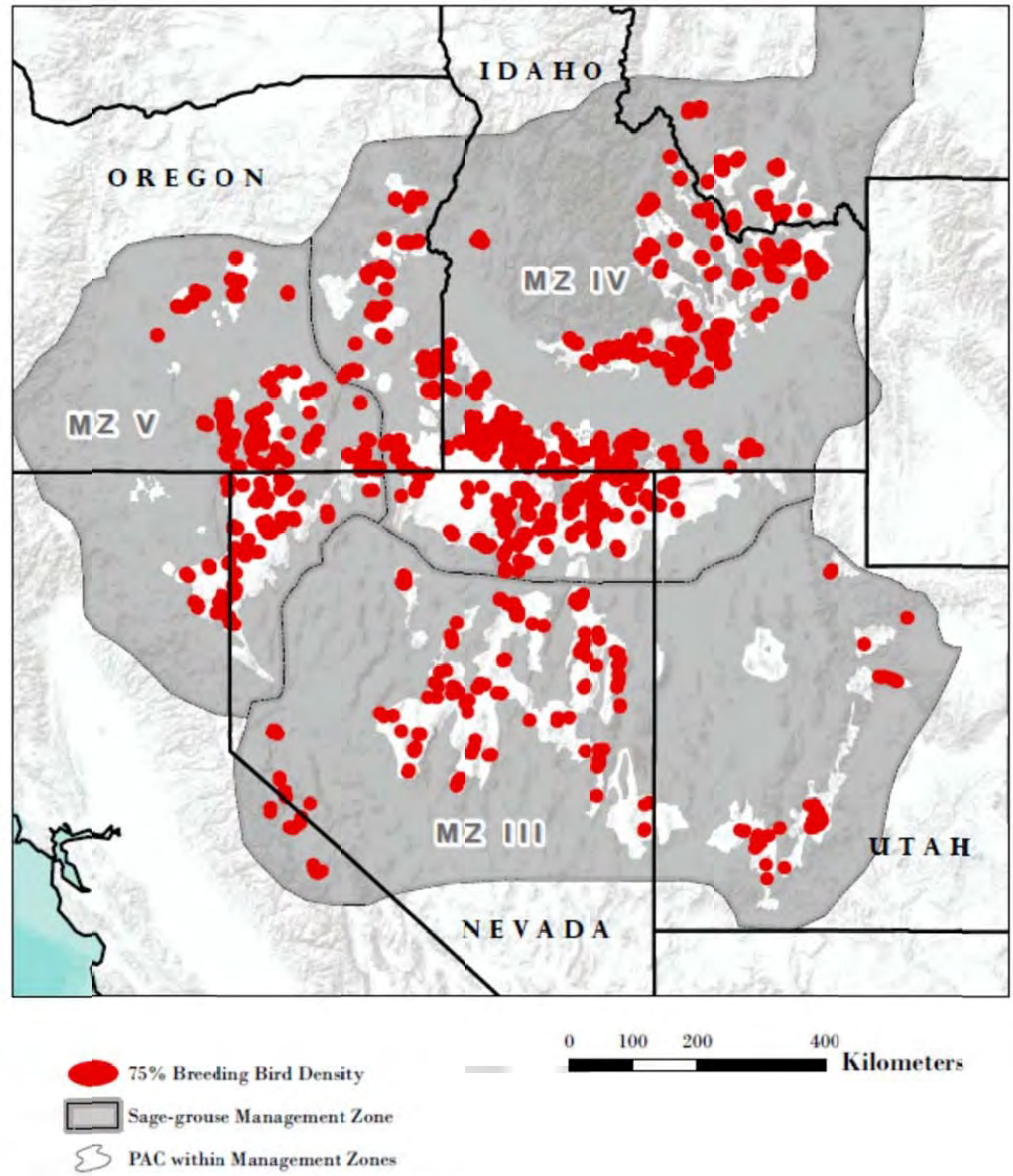

Figure 3, Sage-Grouse Breeding Bird Density Thresholds for 75% of the breeding birds, Management Zones, and PACs. Breeding bird density of 75 to 100% is shown in Appendix 1 to provide context for local management units when making decisions concerning connectivity between populations and PACs.

Soil Temperature and Moisture Regimes

Invasive annual grasses and wildfires can be tied to management strategies through an understanding of resistance and resilience concepts. Invasive annual grasses has significantly reduced sage-grouse habitat throughout large portions of its range (Miller et al. 2011). While abandoned leks were linked to increased nonnative annual grass presence, active leks were associated with less annual grassland cover than in the surrounding landscape (Knick et al. 2013). Invasive annual grasses also increases fire frequency, which directly threatens sage-grouse habitat and further promotes the establishment of invasive annual grasses (Balch et al. 2013). This nonnative annual grass and fire feedback loop can result in conversion from sagebrush shrublands to annual grasslands (Davies 2011).

In cold desert shrublands, vegetation community resistance to invasive annual grasses and resilience following disturbance is strongly influenced by soil temperature and moisture regimes (Chambers et al. 2007; Meyer et al. 2001). Generally, colder soil temperature regimes and moister soil moisture regimes are associated with more resilient and resistant vegetation communities. While vegetation productivity and ability to compete and recover from disturbance increase along a moisture gradient, cooler temperatures limit invasive annual grass growth and reproduction (Chambers et al. 2007; Chambers et al. 2014). Conversely, warm and dry soil temperature and moisture regimes and to a lesser degree cool and dry soil temperature and moisture regimes, are linked to less resistant and resilient communities (see Figure 9 in Chambers et al. 2014). A continuum in resistance and resilience exists between the warm and dry and cool and dry soil temperature and moisture regimes that will need to be considered in Step 2 in developing implementation or activity plans. These relationships can be used to prioritize management actions within sage-grouse habitat using broadly available data.

To capture relative resistance and resilience to disturbance and invasive annual grasses across the landscape, soil temperature and moisture regime information (described in greater detail in Chambers et al. 2014) were obtained from the Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) data. Where gaps in this coverage existed, the NRCS US General Soil Map (STATSGO2) data was used (Soil Survey Staff 2014; see Appendix 1). The STATSGO2 database includes soils mapped at a 1:250,000-scale; the SSURGO database includes soils mapped at the 1:20,000 scale. Interpretations made from soil temperature and moisture regimes from the STATSGO2 database will not have the same level of accuracy as those made from the SSURGO database.

Areas characterized by warm and dry soil temperature and moisture regimes (low relative resistance and resilience) were intersected with sage-grouse breeding habitat and sagebrush landscape cover to identify candidate areas (emphasis areas) for potential management actions that mitigate threats from invasive annual grasses and wildfire (**Figure 4**, Soil Moisture and Temperature Regimes for Management Zones III, IV, and V, and **Figure 5**, Intersection of High Density (75% BBD) Populations). These data layers provide the baseline information considered important in prioritizing areas where conservation and management actions could be developed to address invasive annual grasses in a scientifically defensible manner (see Table 4 in Chambers et al. 2014).

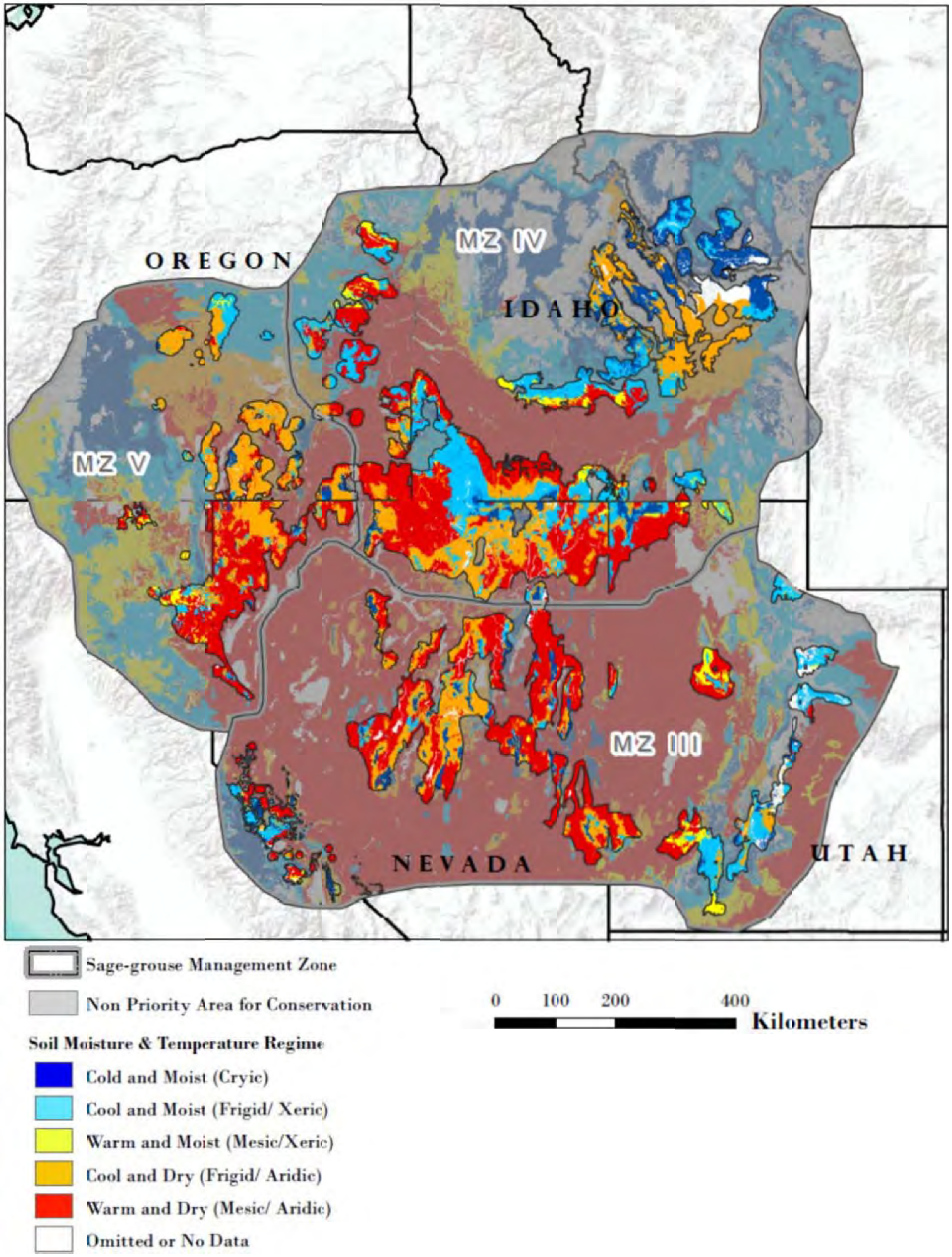

Figure 4, Soil Moistur and Temperature Regimes for Management Zones III, IV, and V

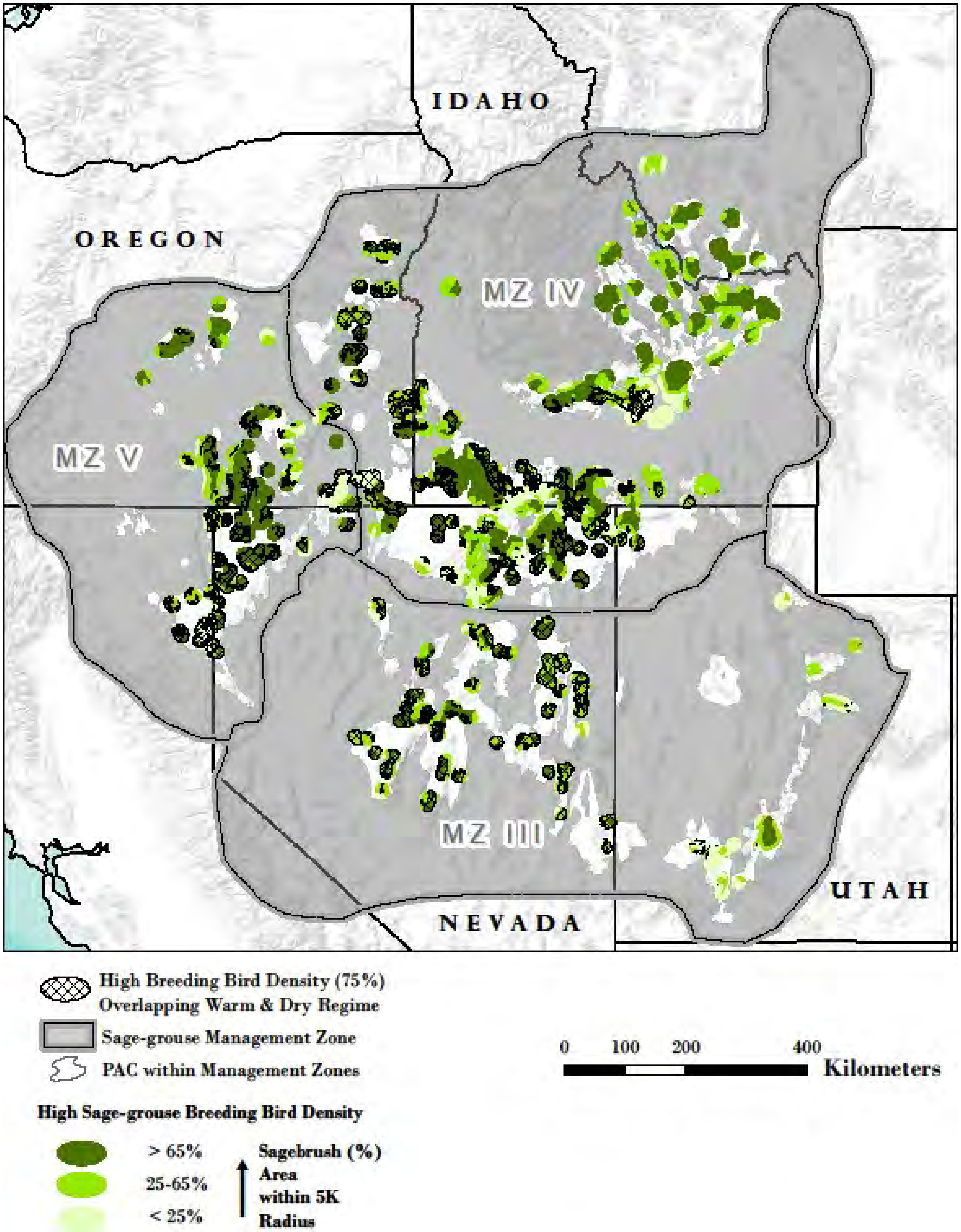

Figure 5, Intersection of High Density (75% BBD) Populations. The warm and dry sites and the proportion of these habitats in the three sagebrush landscape cover classes by management zone, and PACs within the Great Basin.

Sagebrush Landscape Cover

The amount of the landscape in sagebrush cover is closely related to the probability of maintaining active sage-grouse leks, and is used as one of the primary indicators of sage-grouse habitat potential at landscape scales (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). For purposes of prioritizing landscapes for sage-grouse habitat management, FIAT used less than or equal to 25 percent sagebrush landscape cover as a level below which there is a low probability of maintaining sage-grouse leks, and greater than or equal to 65 percent as the level above which there is a high probability of sustaining sage-grouse populations with further increases of landscape cover of sagebrush (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). Increases in landscape cover of sagebrush have a constant positive relationship with sage-grouse lek probability at between about 25 percent and 65 percent landscape sagebrush cover (Knick et al. 2013). It is important to note that these data and interpretations relate only to persistence (i.e., whether or not a lek remains active), and it is likely that higher proportions of sagebrush cover may be required for population growth.

For the purposes of delineating sagebrush habitat relative to sage-grouse requirements for landscape cover of sagebrush, FIAT calculated the percentage of landscape sagebrush cover (Landfire 2013) within a 3-mile (5-kilometer) radius of each 98-foot by 98-foot (30 meter by 30 meter) pixel in Management Zones III, IV, and V (see Appendix 2 in Chambers et al. 2014) for how landscape sagebrush cover was calculated). FIAT then grouped the percentage of landscape sagebrush cover into each of the selected categories (0 to 25 percent, 25 to 65 percent, 65 to 100 percent; **Figure 6**, Sagebrush Landscape Cover and Fire Perimeters for the Analysis Area). Landfire data was based on 2000 satellite imagery so wildfire perimeters after that date were incorporated into this layer to better reflect landscape sagebrush cover. Burned areas were assumed to fall into the 0 to 25 percent landscape cover class.

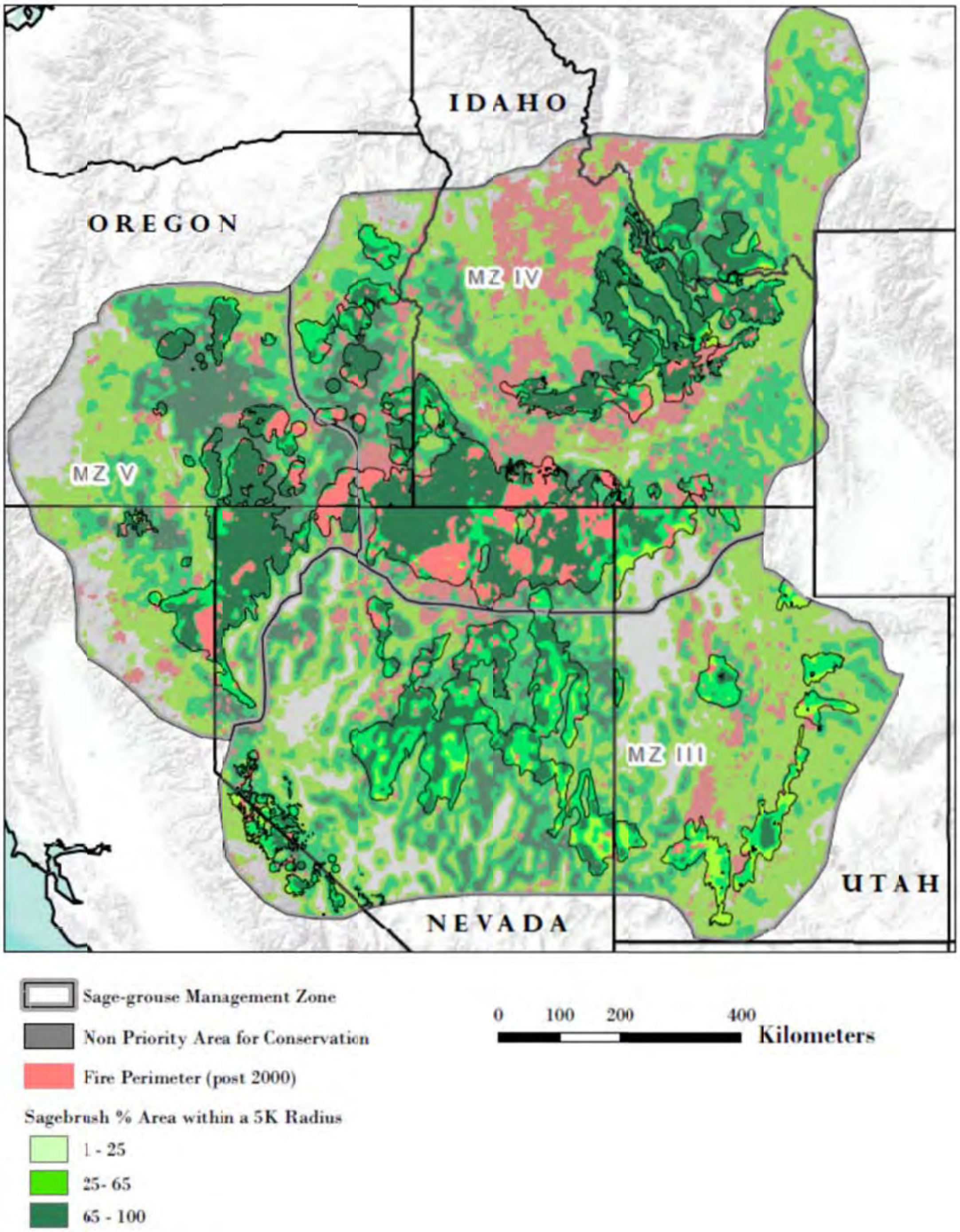

Figure 6, Sagebrush Landscape Cover and Fire Perimeters (post-2000) for the Analysis Area

Conifer Expansion

Conifer expansion into sagebrush landscapes also directly reduces sage-grouse habitat by displacing shrubs and herbaceous understory as well as by providing perches for avian predators. Conifer expansion also leads to larger, more severe fires in sagebrush systems by increasing woody fuel loads (Miller 2013). Sage-grouse populations have been shown to be impacted by even low levels of conifer expansion (Baruch-Mordo et al. 2013). Active sage-grouse leks persist in regions of relatively low conifer woodland and are threatened by conifer expansion (Baruch-Mordo et al. 2013; Knick et al. 2013).

To estimate where sage-grouse breeding habitat faces the largest threat of conifer expansion, FIAT used a risk model developed by Manier et al. (2013) that locates regions where sagebrush landscapes occur within 250 meters of conifer woodland (**Figure 7**, Modeled Conifer Expansion for PACs with Greater Than 25% Sagebrush Landscape Cover In and Around 75% BBD). Although the model is coarse, it is available for the entirety of the three sage-grouse management zones analyzed. FIAT encourages using more accurate conifer expansion data in Step 2.

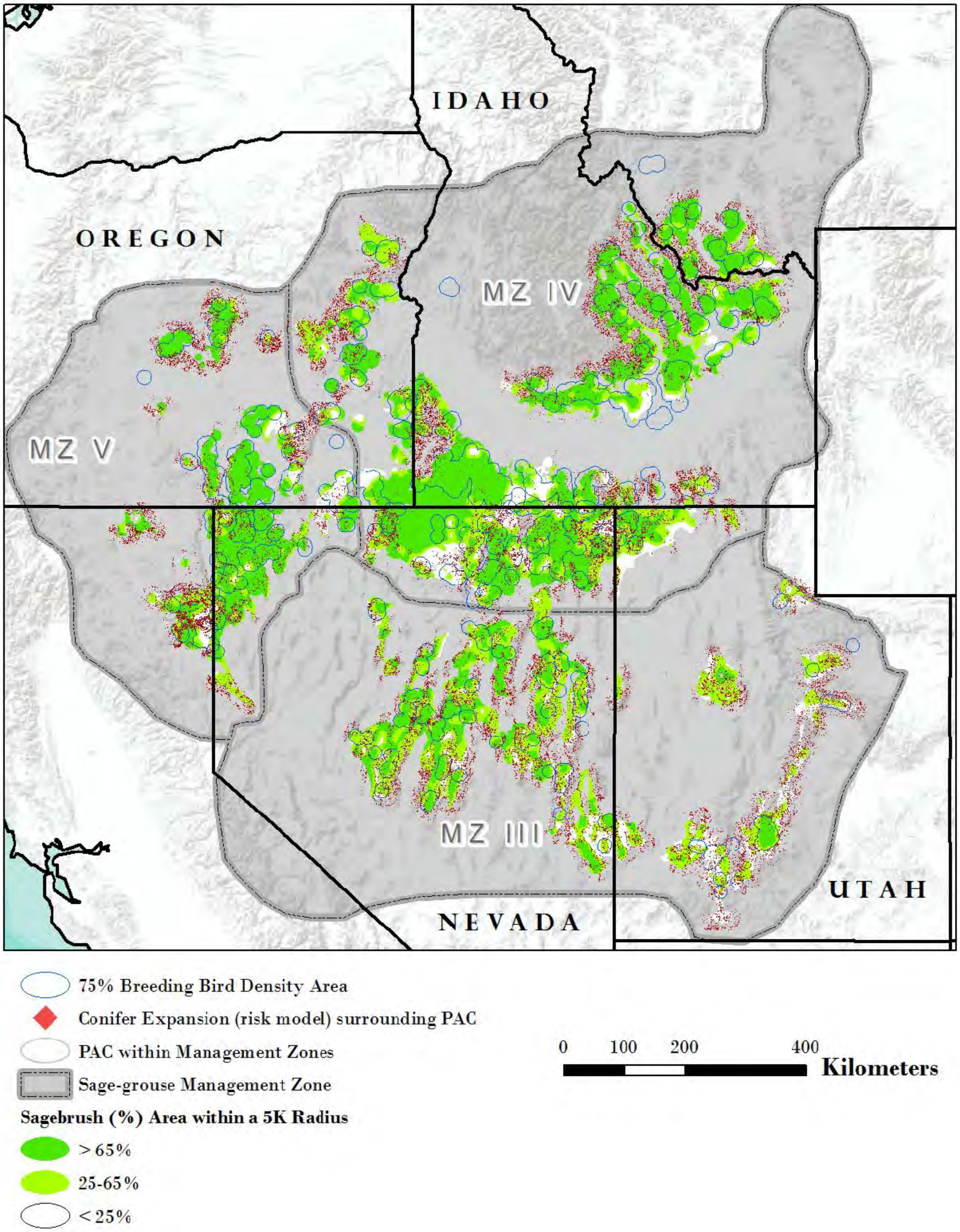

Figure 7, Modeled Conifer Expansion for PACs with Greater Than 25% Sagebrush Landscape Cover In and Around 75% BBD

Step 1a. Identifying PACs and focal habitats

A primary goal for the conservation of sage-grouse populations is the identification of important habitats needed to ensure the persistence and recovery of the species. Loss of habitat, and by inference populations, in these habitats would likely imperil the species in the Great Basin. The first objective is to protect and restore those habitats that provide assurances for retaining large well connected populations.

PACs and the 75 percent BBD maps were used to provide a first-tier stratification (e.g., focal habitats) for prioritizing areas where conservation actions could be especially important for sage-grouse populations. Although these areas are a subset of the larger sage-grouse habitats, they are readily identifiable and include habitats (e.g., breeding and nesting habitats that are considered critical for survival; Connelly et al. 2000; Holloran et al. 2005; Connelly et al. 2011) and necessary for the recovery of the species across its range.

The prioritization of habitats for conservation purposes was based on the several primary threats to remaining sage-grouse populations in the Great Basin including the loss of sagebrush habitats to wildfire and invasive annual grasses, and conifer expansion. The first, and probably the most urgent threat for sage-grouse, is the loss of sagebrush habitat due to wildfire and invasive annual species (e.g., cheatgrass; See Figure 11 in Chambers et al. 2014). Areas of highest concern are those with low resistance to cheatgrass and low resilience after disturbance (warm/dry and some cool/dry temperature and moisture regimes sites) that are either **within or in close proximity** to remaining high density populations of sage-grouse (Figure 5). Sagebrush habitats (greater than 25 percent sagebrush landscape cover) prone to conifer expansion, particularly pinyon pine and/or juniper, are also a management concern when within or adjacent to high density sage-grouse populations (Figure 7).

Because these two threats occur primarily at different points along an elevational gradient and are associated with different soil temperature and moisture regimes, separate approaches are used to select PACs and focal habitats for each.

High Density Populations at Highest Risk from <u>Wildfire and Invasive Annual Grasses</u>
PACs in Management Zones III, IV, and V. were evaluated on the basis of high density (75 percent) BBDs, sagebrush landscape cover, and soil temperature and moisture regimes to identify initial PACs that are a priority for assessments and associated focal habitats. **Figure 8**, High Priority PACs with High Density Sage-Grouse Populations (75% BBD), displays the results of the analysis focusing on the intersection of high density (75 percent BBD) populations, the warm and dry sites, and the proportion of these habitats in the three sagebrush landscape cover classes by management zone, and PACs within the Great Basin. **Table 1**, Relative Ranking of PACs Based on High Density (75% BBD) Populations, Warm/ Dry Sites, and Percentage of Habitat in Sagebrush Landscape Cover Classes, displays quantitative outputs of this analysis. The table allows a comparison of these data, and assists in selecting five PACs that provide the greatest contribution to high density sage-grouse populations, and the amounts (acres and proportion) within those PACs of sagebrush cover classes associated with warm and dry soil temperature and moisture regimes.

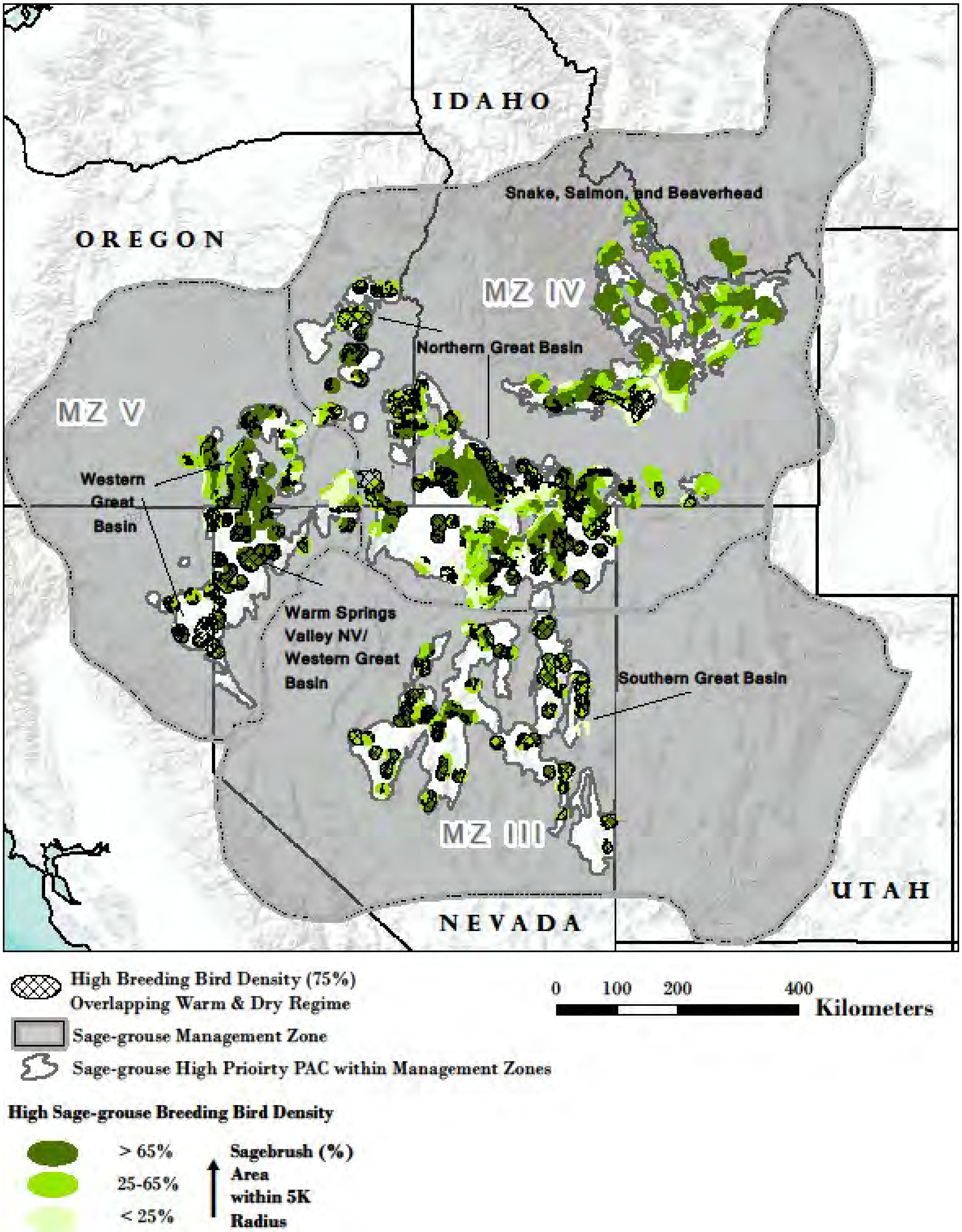

Figure 8, High Priority PACs with High Density Sage-Grouse Populations (75% BBD) sagebrush landscape cover classes, and areas with low resistance and resilience relative to wildfires and invasive annual species.

Table 1, Relative Ranking of PACs Based on High Density (75% BBD) Populations, Warm/ Dry Sites, and Percentage of Habitat in Sagebrush Landscape Cover Classes

Sage-grouse Management Zone	Sage-grouse Priority Area for Conservation (PAC) Name	Total PAC Acres	Breeding Bird Density (75%) Acres	Percent of Breeding Bird Density (75%) Area within PAC	Warm and Dry Soil Moisture & Temperature Regime within Breeding Bird Density (75%) Acres*		
					0-25% Sagebrush Landscape Cover	25%-65% Sagebrush Landscape Cover	65%+ Sagebrush Landscape Cover
4	Northern Great Basin	13045515	7383442	57%	179551 (2%)	674554 (9%)	1745163 (24%)
3	Southern Great Basin	9461355	3146056	33%	42596 (1%)	792780 (25%)	1062091 (34%)
4	Snake, Salmon, and Beaverhead	5477014	2823205	52%	68107 (2%)	89146 (3%)	95970 (3%)
5	Western Great Basin	3177253	2084626	66%	149399 (7%)	140141 (7%)	202767 (10%)
5	Warm Springs Valley NV/Western Great Basin	3520937	1558166	44%	31458 (2%)	207365 (13%)	741353 (48%)
4	SW Montana	1369076	659475	48%	0 (0%)	0 (0%)	0 (0%)
4	Northern Great Basin/Western Great Basin	1065124	624581	59%	114222 (18%)	85258 (14%)	116513 (19%)
5	Central OR	813699	451755	56%	0 (0%)	6211 (1%)	16463 (4%)
3	Panguitch/Bald Hills	1135785	352258	31%	6883 (2%)	5821 (2%)	0 (0%)
3	Parker Mountain-Emery	1122491	308845	28%	0 (0%)	127 (0%)	0 (0%)
4	Box Elder	1519454	292658	19%	22 (0%)	43325 (15%)	23913 (8%)
4	Baker OR	336540	184813	55%	0 (0%)	46459 (25%)	36214 (20%)
3	NW-Interior NV	371557	108256	29%	576 (1%)	17117 (16%)	25173 (23%)
3	Carbon	355723	97734	27%	255 (0%)	180 (0%)	0 (0%)
3	Strawberry	323219	52635	16%	0 (0%)	0 (0%)	0 (0%)
3	Rich-Morgan-Summit	217033	37005	17%	0 (0%)	0 (0%)	0 (0%)
3	Hamlin Valley	341270	3244	1%	0 (0%)	139 (4%)	3105 (96%)
3	Ibapah	98574	0	0%	0 (NA)	0 (NA)	0 (NA)
3	Sheeprock Mountains	611374	0	0%	0 (NA)	0 (NA)	0 (NA)
5	Klamath OR/CA	162667	0	0%	0 (NA)	0 (NA)	0 (NA)

* Numbers in parenthesis indicate the percent of acres relative to total acres of breeding bird density (75%)

These five PACs comprise 90 percent and 95 percent of remaining PAC sagebrush landscape cover in the 25 to 65 percent and greater than or equal to 65 percent sagebrush landscape cover classes, respectively, of the 75 percent BBD associated with low resistance/resilience habitats. The 75 percent BBD habitats in the Northern, Southern Great Basin, and Warm Spring PACs appear particularly important for two reasons. They represent a significant part of the remaining habitats for the Great Basin metapopulation, and they have the greatest amount of low resiliency habitat remaining that still functions as sage-grouse habitat.

An examination of the 5 selected PACs shows that the sum of the 75 percent BBD within these PACs is 16,995,496 acres (**Table 2**, PACs with the Highest Acres and Proportions of 75% BBD acres, and Acres and Proportions of 75% BBD Acres within the Warm/Dry Soil Temperature and Moisture Class). These are the **focal habitats**. These five PACs constitute 84 percent of the 75 percent BBD low resiliency habitats for all Management Zones III, IV, and V PACs. Within and immediately around these focal habitats, 5,751,293 acres are in high BBD areas with landscape sagebrush cover in the 25-65 percent and ≥ 65 percent classes and in the warm and dry soil temperature and moisture regimes. These are the habitats in the most danger to loss due to their low resistance to invasive annual grasses and low resilience following wildfire. Within the focal habitats in the high priority PACs, low resistance and resilience areas (cross-hatched areas in Figure 8) are a high priority (emphasis area) for implementing management strategies. Applying management strategies outside the emphasis areas are appropriate if the application of fire operations and fuels management activities will be more effective in addressing wildfire threats.

Table 2, PACs with the Highest Acres and Proportions of 75% BBD acres, and Acres and Proportions of 75% BBD Acres within the Warm/Dry Soil Temperature and Moisture Class (see Figure 8)

PAC	PAC Acres	Acres of 75% BBD in PAC (**focal habitat**)	Proportion of 75% BBD within PACs	Warm & Dry Soils within 75% BBD by Sagebrush Landscape Cover Classes Greater Than 25%*	
				25-65%	>65%
Northern Great Basin	13,045,515	7,383,442	0.57	674,517(9%)	1,745,163(24%)
Southern Great Basin	9,461,355	3,146,056	0.33	792,780(25%)	1,062,091(34%)
Snake, Salmon, and Beaverhead	5,477,014	2,823,205	0.52	89,146(3%)	95,970(3%)
Warm Springs Valley NV/Western Great Basin	3,520,937	1,558,166	0.44	207,365(13%)	741,353(48%)
Western Great Basin	3,177,253	2,084,626	0.66	140,141(7%)	202,767(10%)
Total for 5 PACS	**34,682,074**	**16,995,496**	**0.49**	**1,903,949**	**3,847,344**

***** This category represents the emphasis areas for applying appropriate management strategies in or near the focal habitats due to the lower probability of recovery after disturbance and higher probability of invasive annual grasses and existing wildfire threats.

High Density Sage-Grouse Habitats at Risk from Conifer Expansion

PACs, sagebrush landscape cover, and the 75 percent BBD data were also used in conjunction with the conifer expansion data (Mainer et al. 2013) to provide an initial stratification to determine PACs where conifer removal would benefit important sagebrush habitats. Conifer expansion threats are primarily western juniper in the northern Great Basin and pinyon pine/Utah juniper in the southern Great Basin.

Figure 7 displays results of the analysis focusing on the intersection of the 75 percent BBD, and modeled conifer expansion areas within two sagebrush landscape cover classes by management zone and PACs within the Great Basin. To identify high density sage-grouse areas affected by conifer expansion, the amount and proportion of acres estimated to be affected were calculated by sagebrush cover class to assist in the identification of the focal habitats (**Table 3)**. **Table 4**, displays quantitative outputs of this analysis using the 25 to 65 percent and greater than 65 percent landscape sagebrush cover classes for the PACs. Thus, **focal habitats** for addressing conifer expansion are the areas within and near conifer expansion in sagebrush landscape cover classes of 25 to 65 percent and greater than 65 percent. Conifer expansion in these two sagebrush landscape cover classes in the 75 percent BBD areas constitutes an emphasis area for treatments to address conifer expansion. Landscapes with less than 25 percent sagebrush cover may require significant additional management actions to restore sagebrush on those landscapes and therefore were considered a lower priority for this analysis. Focal habitats are identified in Table 4 and displayed in **Figure 9**.

Table 3 assists in identifying those PACs that provide the greatest contribution to high density sage-grouse populations, and the amounts (acres and proportion) within those PACs of sagebrush cover classes associated with modelled conifer expansion areas. Although there are uncertainties associated with the model, the results help managers identify specific geographic areas where treatments in conifer (pinyon and/or juniper) could benefit existing important sage-grouse populations.

The results of the screening revealed 5 PACs that contribute substantially to the 75 percent BBD habitats and are currently impacted most by conifer expansion (primarily pinyon pine and/or juniper; Table 4 and Figure 9). Four of the five PACs identified as high priority for conifer expansion treatments were also high priorities for wildfires and invasive annual grass threats. This is likely due to the size of the PACs and the relative importance of these PACs for maintaining the Great Basin sage-grouse meta-populations. As expected, the locations of high density sage-grouse habitats affected by conifer expansion differ spatially from those associated with low resilience habitats within and among the PACs, primarily due to differences in the biophysical settings (e.g., elevation and rainfall) that contribute to threats from invasive annual grasses and wildfires.

Three PACs (Snake/Salmon/Beaverhead, Southwest Montana, and Northern Great Basin/Western Great Basin) ranked high due to their relatively large proportion of high density breeding habitats (Table 3), but were not selected since the threat of conifer expansion was relatively low. One PAC, (Snake/Salmon/Beaverhead, was identified as a potential high priority area but was dismissed because results of the conifer expansion model likely overestimated impacts due to the adjacent conifer forests in this region. The COT Report also identified conifers as a “threat present but localized” in these areas, whereas, the top five PACs prioritized all have conifers identified as a widespread priority threat to address (USFWS 2013).

Table 3, Relative Ranking of PACs Based on High Density (75% BBD) Populations, Modeled Conifer Expansion, and Percentage of Habitats in Sagebrush Landscape Cover Classes

Sage-grouse Management Zone	Sage-grouse Priority Area for Conservation (PAC) Name	PAC acres	Breeding Bird Density (75%) Acres	Relative Proportion of Breeding Bird Density Area within PAC	Conifer Expansion (Modeled) Acres*		
					0-25% Sagebrush Landscape Cover	25%-65% Sagebrush Landscape Cover	65%+ Sagebrush Landscape Cover
4	Northern Great Basin	13045515	7383442	0.57	188502 (1%)	512949 (4%)	442480 (3%)
3	Southern Great Basin	9461355	3146056	0.33	108657 (1%)	738624 (8%)	237828 (3%)
4	Snake, Salmon, and Beaverhead	5477014	2823205	0.52	4209 (0%)	92173 (2%)	216803 (4%)
5	Western Great Basin	3177253	2084626	0.66	87963 (3%)	184613 (6%)	126177 (4%)
5	Warm Springs Valley NV/Western Great I	3520937	1558166	0.44	37148 (1%)	107025 (3%)	217101 (6%)
4	SW Montana	1369076	659475	0.48	1428 (0%)	34765 (3%)	39215 (3%)
4	Northern Great Basin/Western Great Bas	1065124	624581	0.59	12101 (1%)	2247 (0%)	6161 (1%)
5	Central OR	813699	451755	0.56	3191 (0%)	44937 (6%)	59624 (7%)
3	Panguitch/Bald Hills	1135785	352258	0.31	89141 (8%)	75157 (7%)	2563 (0%)
3	Parker Mountain-Emery	1122491	308845	0.28	84719 (8%)	83441 (7%)	7469 (1%)
4	Box Elder	1519454	292658	0.19	8531 (1%)	114375 (8%)	57645 (4%)
4	Baker OR	336540	184813	0.55	945 (0%)	15263 (5%)	195 (0%)
3	NW-Interior NV	371557	108256	0.29	7929 (2%)	29440 (8%)	11813 (3%)
3	Carbon	355723	97734	0.27	15968 (4%)	34446 (10%)	283 (0%)
3	Strawberry	323219	52635	0.16	7916 (2%)	27340 (8%)	1075 (0%)
3	Rich-Morgan-Summit	217033	37005	0.17	11685 (5%)	14280 (7%)	238 (0%)
3	Hamlin Valley	341270	3244	0.01	11321 (3%)	29960 (9%)	6243 (2%)
3	Ibapah	98574	0	0.00	195 (0%)	6770 (7%)	1039 (1%)
5	Klamath OR/CA	162667	0	0.00	1 (0%)	1533 (1%)	15302 (9%)
3	Sheeprock Mountains	611374	0	0.00	16744 (3%)	78580 (13%)	11878 (2%)

* Numbers in parenthesis indicate the proportion of acres relative to total PAC acres

Table 4, PACS with the Highest Acres and Proportions of 75% BBD acres and Estimated Conifer Expansion within Sagebrush Landscape Cover Classes (25-65 percent and ≥65 percent; see Figure 9)

PAC	PAC Acres	Acres 75% BBD in PAC	Prop. 75% BBD within PACs	Conifer Expansion by Landscape Sagebrush Cover Classes 25-65% and ≥65%* Focal Habitat	
				25-65%	≥65%
Northern Great Basin	13,045,515	7,383,442	0.57	512,949 (4%)	442,480 (3%)
Southern Great Basin	9,461,355	3,146,056	0.33	738,624 (8%)	237,828 (3%)
Warm Springs Valley NV/Western Great Basin	3,520,937	1,558,166	0.44	107,025 (3%)	217,101 (6%)
Western Great Basin	3,177,253	2,084,626	0.66	184,618 (6%)	126,177 (4%)
Central Oregon	813,699	451,755	0.56	44,937 (6%)	59,624 (7%)
Total for 5 PACS	**30,018,759**	**14,624,045**	**0.49**	**1,588,153 (5%)**	**1,083,210 (4%)**

*Numbers in parenthesis represent the percent of total PAC acres for each class.

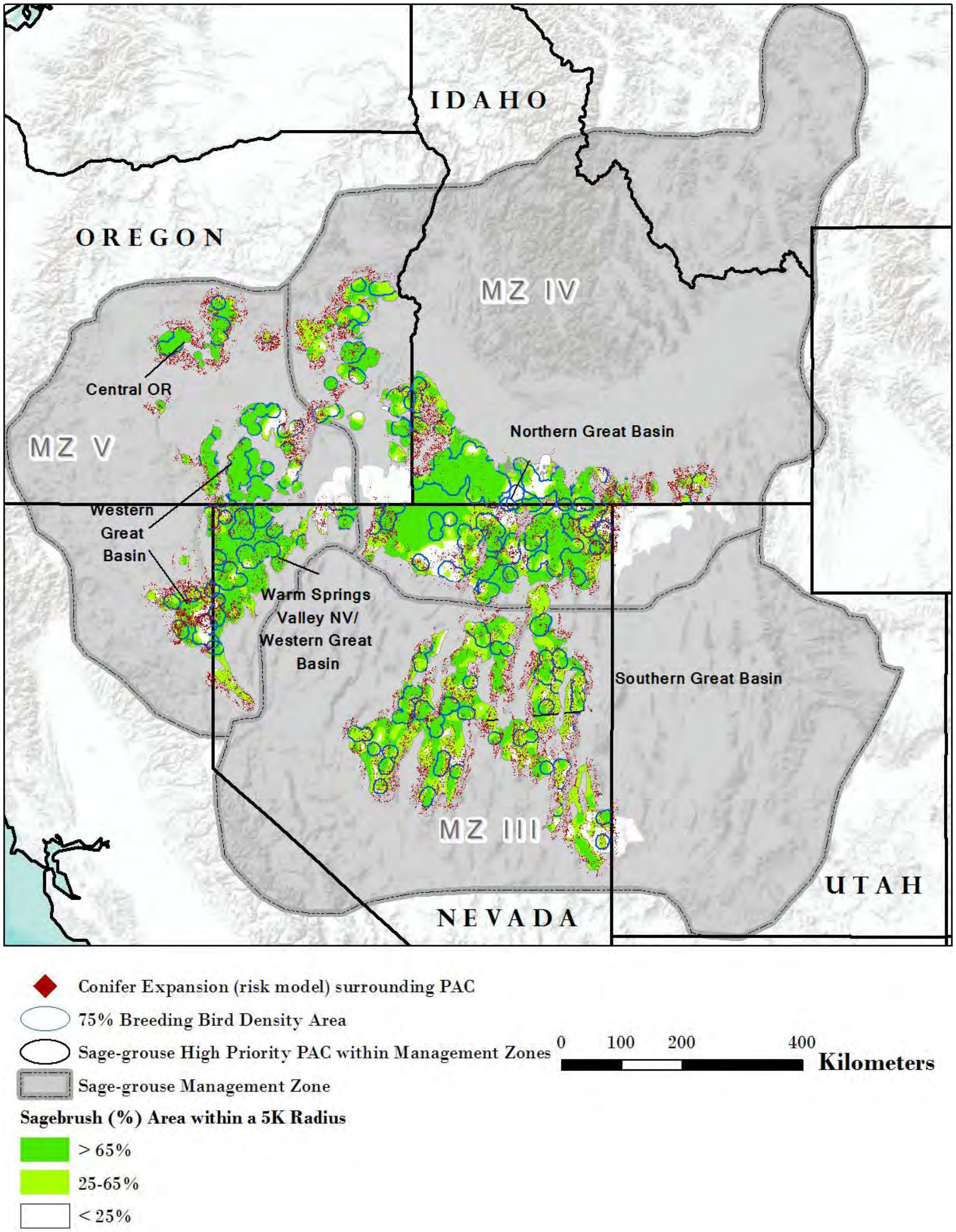

Figure 9, Five PACs Significantly Impacted by Conifer Expansion that contribute substantially to the 75% BBD and that have sagebrush landscape cover greater than 25%.

While the coarse-scale conifer expansion data used in this analysis likely over estimates the extent of the pinyon pine and/or juniper threat, results suggest that far fewer acres are currently affected by conifers than might be at risk from fire and invasive annual grasses impacts. Conifer expansion into sage-grouse habitats occurs at a slower rate, allowing more time for treatment, but early action may be needed to prevent population level impacts on sage-grouse (Baruch-Mordo et al. 2013). Furthermore, conifer expansion is primarily occurring on cooler and moister sites that are more resilient and where restoration is more likely to be effective (Miller et al. 2011), providing managers the opportunity to potentially offset at least some habitat loss expected to continue in less resilient ecosystems. While the available data set used to estimate conifer expansion provides only a coarse assessment of the problem, considerable efforts are currently underway to map conifers across sage-grouse range. These maps are expected to be available in the near future and should be used by land managers to better target project level conifer removal.

FIAT cautions against using the plotted locations of estimated conifer expansion for local management decisions due to the coarse-scale nature of this range-wide data set. Conifer expansion estimates are primarily provided here to aid in judging the relative scope of the threat in each PAC.

Step 1b. Potential Management Strategies

Potential management **strategies** (e.g., fuels management, habitat recovery/restoration, fire operations, post-fire rehabilitation) to conserve or restore Step 1 focal habitats are described below to assist local management units to initiate Step 2. These examples are illustrative and do not contain the full range of management strategies that may be required to address wildfires, invasive annual grasses, and conifer expansion within PACs and associated focal habitats. In general, the priority for applying management strategies is to first maintain or conserve intact habitat and second to strategically restore habitat (after a wildfire or proactively to reconnect habitat). Management strategies will differ when applying the protocol to:

Wildfire and Invasive Annual Grass. (See PACs identified in Table 2 and focal habitats shown in Figure 8). Focal habitats, as they relate to wildfires and invasive annual grasses, are defined as sage-grouse habitat in priority PACs within 75 percent BBD. Within these focal habitats, sagebrush communities with low resilience to disturbance and resistance to invasive annual grasses (warm and dry soil temperature and moisture regimes) are an emphasis area for management actions. Appendix 5 (A) in Chambers et al. 2014) includes a generalized state and transition model with an invasive annual grass component and warm and dry soil temperature and moisture regime associated with 8 to 12 inches of annual precipitation. This state and transition models is useful in developing management strategies to deal with annual grass issues as it contains useful restoration pathways.

Burn Probability is another tool that can be used to assist managers to identify the relative likelihood of large fire occurrence across the landscape within PACs and focal habitats. Burn probability raster data were generated by the Missoula Fire Lab using the large fire simulator - FSim - developed for use in the national Interagency **Fire Program Analysis (FPA)** project. FSim uses historical weather data and LANDFIRE fuel model data to simulate fires burning. Using these simulated fires, an overall burn probability is returned by FSim for each 270m pixel. The burn probability data was overlaid spatially with PACs, soil data, and shrub cover data. The majority of the high and very high burn probability acres lie within the top 5 PACs and are within areas with >25% sagebrush cover. Several of the other PACs have a greater overall percentage of the warm/dry soil regime with high/very high burn probability (northern great basin, baker, and NW interior NV) but the total acres are relatively few. Areas identified with high and very high burn probability are most likely to experience large fires given fire history, fuels, weather and topography. Results are displayed in the table 5 and Figure 10.

Table 5, Percentages of sage-grouse PAC areas with high and very high burn probability, 75% BBD within PAC, 75% BBD and warm dry/temperature regime, and 75% BBD and warm dry/temperature and warm dry/temperature with high and very high burn probability.

Sage Grouse Mangement Zone	*Sage-grouse Priority Area for Conservation (PAC) Name*	*Total PAC Acres*	*High, very high burn probability (percent of PAC acres)*	*75% BBD within PAC (percent PAC acres)*	*75% BBD and warm and dry soil/temperature regime ~~acres~~ (percent PAC acres)*	*75% BBD and warm and dry soil/temperature regime with high, very high burn probability (percent PAC acres)*
4	*Northern Great basin*	*13,045,415*	*86%*	*57%*	*19%*	*17%*
3	*Southern Great Basin*	*9,461,355*	*48%*	*33%*	*20%*	*9%*
4	*Snake, Salmon, and Beaverhead*	*5,477,014*	*68%*	*52%*	*5%*	*4%*
5	*Western Great Basin*	*3,177,253*	*61%*	*66%*	*15%*	*12%*
5	*Warm Springs Valley /Western Great Basin*	*3,520,937*	*30%*	*44%*	*28%*	*9%*
4	*SW Montana*	*1,369,076*	*1%*	*48%*	*0%*	*0%*
4	*Northern Great Basin/Western Great Basin*	*1,065,124*	*82%*	*59%*	*30%*	*22%*
5	*Central Oregon*	*813,699*	*71%*	*56%*	*3%*	*2%*
3	*Panguitch/Bald Hills*	*1,135,785*	*70%*	*31%*	*1%*	*1%*
3	*Parker Mountain-Emery*	*1,122,491*	*28%*	*28%*	*0%*	*0%*
4	*Box Elder*	*1,519,454*	*61%*	*19%*	*4%*	*2%*
4	*Baker Oregon*	*336,540*	*74%*	*55%*	*25%*	*21%*
3	*NW-Interior NV*	*371,557*	*99%*	*29%*	*12%*	*11%*
3	*Carbon*	*355,723*	*22%*	*27%*	*0%*	*0%*
3	*Strawberry*	*323,219*	*26%*	*16%*	*0%*	*0%*
3	*Rich-Morgan-Summit*	*217,033*	*79%*	*17%*	*0%*	*0%*
3	*Hamlin Valley*	*341,270*	*60%*	*1%*	*1%*	*0%*
3	*Ibapah*	*98,574*	*0%*	*0%*	*0%*	*0%*
3	*Sheeprock Mountains*	*611,374*	*98%*	*0%*	*0%*	*0%*
5	*Klamath OR/CA*	*162,667*	*98%*	*0%*	*0%*	*0%*

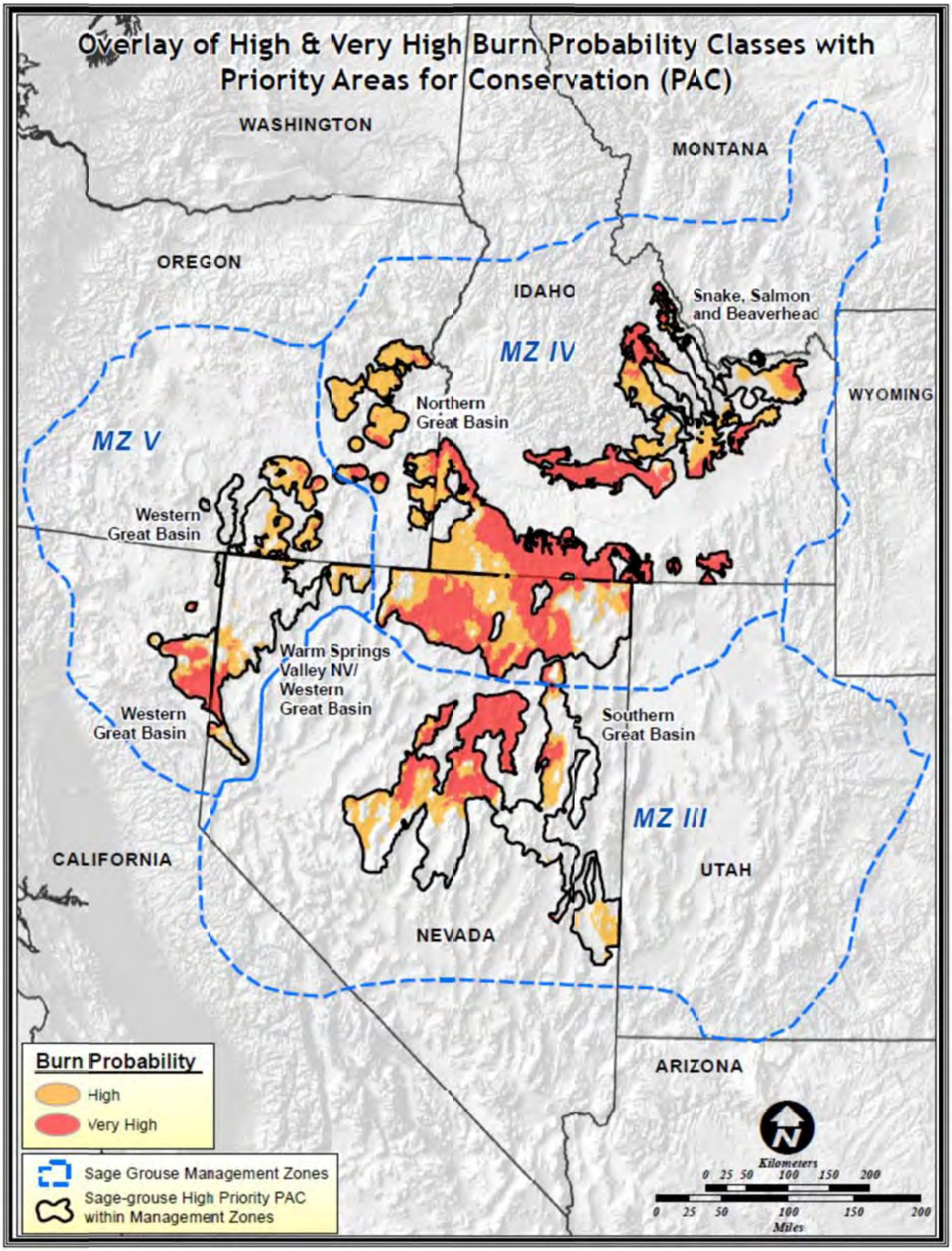

Figure 10, Burn Probability (high and very high) in priority invasive annual grass and wildfire PACs. .

Conifer Expansion. (See priority PACs for assessment identified in Table 4 and focal habitats shown in Figure 9). Focal habitats, as they relate to conifer expansion, are defined as sage-grouse habitat in a priority PAC with sagebrush landscape cover between 25 and 100 percent that is either near or in a conifer expansion area. The relationship between conifer expansion and resilience to disturbance and resistance to expansion is not documented to the same degree as with invasive annual grasses. However, Appendix 5 (D. and E.) in Chambers et al. 2014) includes two generalized state and transition models for conifer expansion with warm to cool and soil temperature regimes associated with precipitation ranges from 12 to 14 or more inches of annual precipitation. These state and transition models are useful in developing management strategies to deal with conifer expansion as they contain useful restoration pathways.

Chambers et al. 2014) is recommended for review at this point for information on applying resistance and resilience concepts along with sage-grouse habitat characteristics to develop management strategies to address wildfires, invasive annual grasses, and conifer expansion. The following tables are recommended for use in developing management strategies in or near focal habitats:

Table 1. Soil temperature and moisture regimes relationship to vegetation types and resistance and resilience.
Table 2. Sage-grouse habitat matrix showing the relationship between landscape sagebrush cover and resistance and resilience.
Table 3. Potential management strategies based on sage-grouse habitat requirements and resistance and resilience.
Table 4. Management strategies (fire suppression, fuels management, post-fire rehabilitation, and habitat restoration) associated with each cell in the sage-grouse habitat matrix (Table 2).

The "Putting it all together" section of the Chambers et al. 2014) also contains a case study from Northeast Nevada illustrating applications of management strategies to address the conservation, protection, and restoration of sage-grouse habitat.

To further assist in understanding Step 1b, examples of general priorities for management strategies are provided below and illustrated in Appendix 3 and 4:

1. Fuels Management: Projects that are designed to change vegetation composition and/or structure to modify potential fire behavior for the purpose of improving fire suppression effectiveness and limiting fire spread and intensity.
    a. Identify priorities and potential measures to reduce the threats to sage-grouse habitat resulting from changes in invasive annual grasses (primary focus on exotic annual grasses and conifer encroachment) and wildland fires. Place high priority on areas dominated by invasive annual grasses that are near or adjacent to low resistance and resilience habitats that are still intact.
    b. Areas on or near perimeter of successful post-fire rehabilitation and habitat restoration projects where threats of subsequent fire are present are important for consideration.

   c. Fuels management can be a high priority in large tracts of intact sagebrush if impacts on sage-grouse populations are minimal and outweighed by the potential benefits of reduced wildfire impacts in area being protected.

2. Habitat Recovery/Restoration Recovery (passive restoration) is a high priority in intact sagebrush stands to improve resistance and resilience before a disturbance. For example, where understory perennial herbaceous species are limited, improved livestock grazing practices can increase the abundance of these species and promote increased resistance to annual grasses.
   a. Habitat restoration is important where habitat connectivity issues are present within focal habitats.
   b. Pinyon pine and/or juniper removal in Phase I and II stands adjacent to large, contiguous areas of sagebrush (greater than 25 percent sagebrush landscape cover) is a priority.

3. Fire Operations (includes preparedness, prevention and suppression activities).
   a. Higher priority should be placed on areas with greater than 65 percent cover than on areas with 25 to 65 percent cover, followed by 0 to 25 percent cover (these categories are continuums not discrete thresholds).
   b. Higher priority should be placed on lower resistance/resilience habitats compared with higher resistance/resilience habitats.
   c. Fire operations in areas restored or post-fire rehabilitation treatment where subsequent wildfires can have detrimental effect on investment and recovery of habitat are important for consideration.
   d. Fire operations (suppression) are especially important in low elevation winter sagebrush habitat with low resistance and resiliency.
4. Post-Fire Rehabilitation
   a. High priority should be placed on supporting short-term natural recovery and long-term persistence in higher resistance and resiliency habitats (with appropriate management applied).
   b. High priority should be placed on reseeding in moderate to low resistance and resiliency habitats, but only if competition from invasive annual grasses, if present, can be controlled prior to seeding.

Step 2

Step 2 is carried out by local management units using the Step 1 geospatial data, focal habitats, and the associated management strategies. Step 2 includes evaluating the availability and accuracy of local information and geospatial data used to develop local management strategies in or near focal habitats (Step 2a).

It also involves developing focal habitat activity/implementation plans that include prioritized management tactics and treatments to implement effective fuels management, habitat recovery/restoration, fire operations, and post-fire rehabilitation (Step 2b). These activity/implementation plans will serve as the basis for NEPA analysis of site-specific projects.

Step 2a- Review of Step 1 Data and Incorporation of Local Information

Evaluate the accuracy and utility of Step 1 geospatial layers for focal habitats by incorporating more accurate or locally relevant:

- Vegetation maps (especially sagebrush cover)
- Updated or higher resolution conifer expansion layers (if applicable)
- Soil survey and ecological site descriptions
- Weather station, including Remote Automatic Weather Stations, data
- PACs, focal habitats, winter habitats, sage-grouse population distributions (i.e., more recent BBD surveys)
- Maps of cheatgrass and other invasive annual grasses that degrade sage-grouse habitat
- Wildfire polygons including perimeters and unburned islands within burn polygons
- Treatment locations and success (consult US Geological Survey Land Treatment Digital Library at http://ltdl.wr.usgs.gov/). The Land Treatment Digital Library allows the user to search on treatment results on an ecological site basis.
- Models and tools to help inform management strategies. For example, data which characterizes wildfire potential can help identify risk to focal habitats and help plan fire suppression and fuels management strategies to address these risks.
- Rapid Ecoregional Assessments
- Land Use Plans
- Appropriate monitoring or inventory information
- Any other geospatial data or models that could improve the accuracy of the assessment process

It is essential that subregional or local information and geospatial data be subjected to a quality control assessment to ensure that it is appropriate to use in developing Step 2b activity and implementation plans. Since PACs and focal habitats usually transcend multiple administrative boundaries, a collaborative approach is highly recommended for Step 2a.

A series of questions tied to the management strategies described in the Introduction section follows to assist managers in developing the framework to complete Step 2b (development of activity/implementation plans). The questions that follow apply to the focal habitats (and buffer areas around focal areas where management strategies may be more effectively applied) and will help in developing coordinated implementation/activity plans. These questions should not limit the scope of the assessment and additional questions relative to local situations are encouraged. These questions portray the minimum degree of specificity for focal habitats in order for offices to complete Step 2a.

Fuels Management

1. Where are the priority fuels management areas (spatially defined treatment opportunity areas that consider fire risk, fuels conditions, and focal habitats [including areas adjacent to focal habitats])?
2. Based on fire risk to focal habitats, what types of fuels treatments should be implemented to reduce this threat (for example, linear features that can be used as anchors during suppression operations)?
3. Considering resistance/resilience concepts and the landscape context from Step 1, where should treatments be applied in and around focal habitats to:
    a. Constrain fire spread?
    b. Reduce the extent of conifer expansion?
    c. Augment future suppression efforts by creating fuel breaks or anchors for suppression?
4. Based on opportunities for fire to improve/restore focal habitats, what types of fuels treatments should be implemented to compliment managed wildfire by modifying fire behavior and effects?
5. Are there opportunities to utilize a coordinated fuels management approach across jurisdictional boundaries?
6. What fuel reduction techniques will be most effective that are within acceptable impact ranges of local sage-grouse populations, including but not limited to grazing, prescribed fire, chemical, and biological and mechanical treatments? Will combinations of these techniques improve effectiveness (e.g., using livestock to graze fine fuels in a mowed fuel break in sagebrush)?

Habitat Recovery/Restoration

1. Are there opportunities for habitat restoration treatments to protect, enhance or maintain sage-grouse focal habitat especially to restore connectivity of focal area habitat?
2. Considering the resistance and resilience GIS data layer (Figure 4) and the Sage-Grouse Habitat Matrix (Chambers et al. 2014; Table 2), where and why would passive or active restoration treatments be used?
3. What are the risks and opportunities of restoring habitat with low resistance and resilience including the warm/dry and cool/dry soil moisture/temperature regime areas?
4. Are there opportunities to utilize a coordinated approach across jurisdictional boundaries to effectively complete habitat restoration in focal habitats?

Fire Operations

1. Where are priority fire management areas (spatially defined polygons having the highest need for preparedness and suppression action)?

2. Where are the greatest wildfire risks to focal habitats considering trends in fire occurrence and fuel conditions (see Figure 10)?
3. Where do opportunities exist that could enhance or improve suppression capability in and around focal habitats?
    a) For example, increased water availability through installation of helicopter refill wells or water storage tanks.
    b) Decreased response time through pre-positioned resources or staffing remote stations.
4. Should wildfire be managed (per land use plan objectives) for improving focal habitat (e.g., reducing conifer expansion), and if so where, and under what conditions?
5. How can fire management be coordinated across jurisdictional boundaries to reduce risk or to improve focal habitats?

Post-fire Rehabilitation

1. Where are areas that are a high priority for post-fire rehabilitation to improve habitat connectivity if a wildfire occurs?
2. Which areas are more conducive (higher resistance and/or resilience) to recovery and may not need reseeding after a wildfire?
3. What opportunities to build in fire resistant fuel breaks to reduce the likelihood of future wildfires impacts on seeded or recovering areas?
4. Are there opportunities to utilize a coordinated approach across jurisdictional boundaries to implement rehabilitation practices?

The outcome of Step 2a is the assembly of the pertinent information and GIS layers to assist managers in developing implementation or activity plans to address wildfires, invasive annual grasses, and conifer expansion in focal habitats. Activity plans generally refer to plans where management of a resource is changed (livestock grazing plans) whereas implementation plans are generally associated with treatments.

Step 2b- Preparation of Activity/Implementation Plans

Activity/implementation plans are prepared to implement the appropriate management strategies within and adjacent to focal habitats. Since focal habitats cross jurisdictional boundaries, it is especially important that a collaborative approach be used to develop implementation/activity plans. The process of identifying partners and creating collaborative teams to develop these plans is a function of state, regional, and local managers and is not addressed as part of this step.

Implementation/activity plans are required to:

1. Address issues in and around focal habitats related to wildfires, invasive annual grasses, and conifer expansion

2. Use resistance to invasive annual grasses and resilience after disturbance (where appropriate) as part of the selection process for implementing management strategies
3. Emphasize application of management strategies within or near focal habitats with low resistance and resilience (warm/dry and cool/dry soil moisture/temperature regimes) invasive annual grasses and wildfires
4. Use the best available local information to inform the assessment process
5. Encourage collaboration and coordination with focal habitats across jurisdictional boundaries
6. Be adaptive to changing conditions, disturbances, and modifications of PAC boundaries

FIAT recommends considering other factors, such as adaptive management for climate change, local sagebrush mortality due to aroga moth or other pests, and cheatgrass die-off areas in developing activity/implementation plans. The latter two factors could influence where and what kind of management strategies may be needed to address the loss of habitat or changes in fuel characteristics (e.g., load and flammability) associated with these mortality events.

The following recommendations are provided to assist in the preparation of activity/implementation plans:

Fuels Management

1. Spatially delineate priority areas for fuel management treatments per Step 2a information considering:
    a. Linear fuel breaks along roads
    b. Other linear fuel breaks to create anchor points
    c. Prescribed burning which would meet objectives identified in the Fish and Wildlife Service's Conservation Objectives Team (COT) report
    d. Mechanical (e.g., treatment of conifer expansion into sagebrush communities)
    e. Other mechanical, biological, or chemical treatments
    f. If they exist, spatially delineated areas where fuel treatments would increase the ability to use fire to improve/enhance focal habitats.
2. Identify coordination needed between renewable resource, fire management, and fuels management staff to facilitate planning and implementation of fuels treatments.
3. Quantify a projected level of treatment within or near focal habitats.
    a. Identify treatments (projects) to be planned within or near focal habitats.
    b. Include a priority and proposed work plan for proposed treatments.

Habitat Recovery/Restoration

1. Spatially delineate priority areas for restoration, using criteria established in Step 2a. Priority areas for restoration should be delineated by treatment methods:
    a. Seeding priority areas
    b. Invasive annual grasses priority treatment areas (herbicide, mechanical, biological, combination)

   c. Priority areas requiring combinations of treatments (e.g., herbicide followed by seeding).
   d. Include tables, maps or appropriate info.
2. Identify coordination needed between renewable resource, fire management, and fuels management staff to facilitate planning and implementation of restoration treatments.
3. Include a priority or implementation schedule for proposed restoration treatment

Fire Operations

1. Spatially delineate priority areas for fire suppression, based upon criteria established in Step 2a. Priority areas for fire operations should be delineated by type, such as:
   a. Initial attack priority areas
   b. Resource pre-positioning and staging priority areas
2. Spatially delineate areas where opportunities exist to enhance or improve suppression capability.
3. Spatially delineate areas where wildfire can be managed to achieve land use plan and COT objectives.

Post-Fire Rehabilitation

1. Spatially delineate priority areas for post-fire rehabilitation using criteria in Step 2a.
2. Priority areas for post-fire rehabilitation should be based on resistance and resiliency and pre-fire landscape sagebrush cover and include consideration of:
   a. Seeding priority areas
   b. Invasive annual grasses priority treatment areas (herbicide, mechanical, biological (herbivory or seeding),
   c. Priority areas requiring combinations of treatments (e.g., herbicide followed by seeding)
3. Identify coordination needed between renewable resource, fire management, and fuels management staff to facilitate planning and implementation of post-fire rehabilitation treatments.

This completes the assessment process and sets the stage for more detailed project planning and NEPA associated with implementing on-the-ground treatments and management changes.

Members of the FIAT Development and Review teams are listed in Appendix 5.

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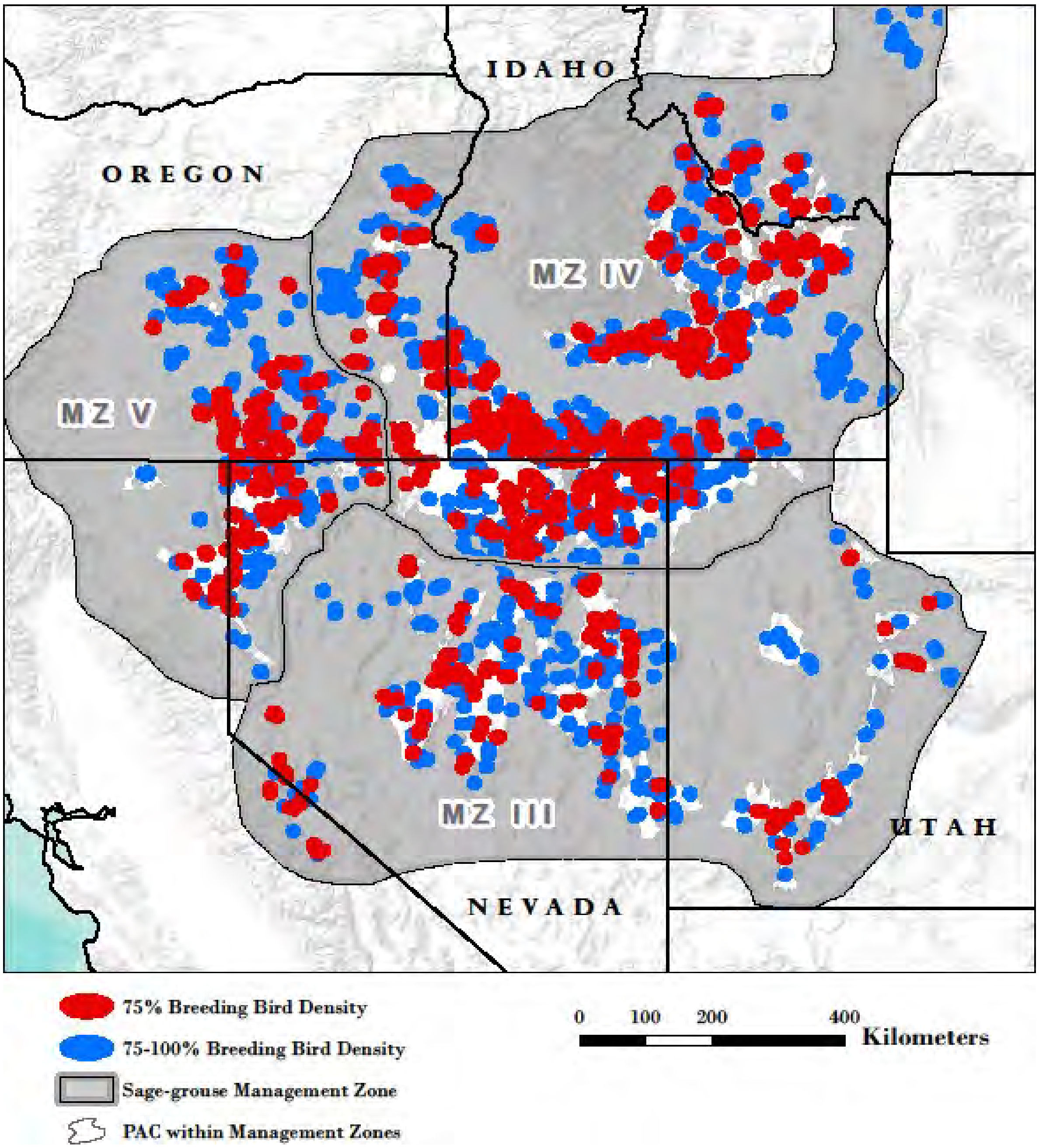
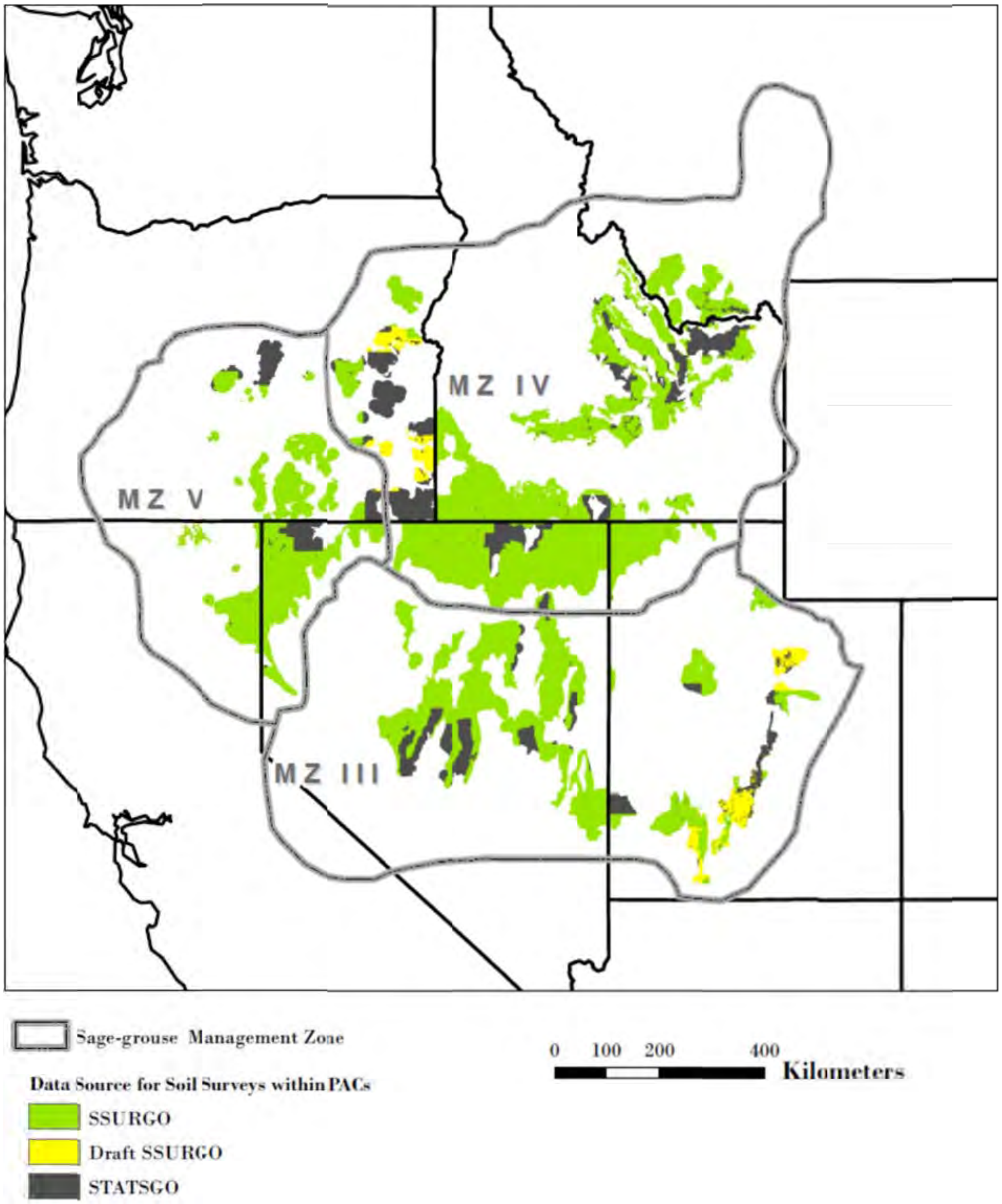
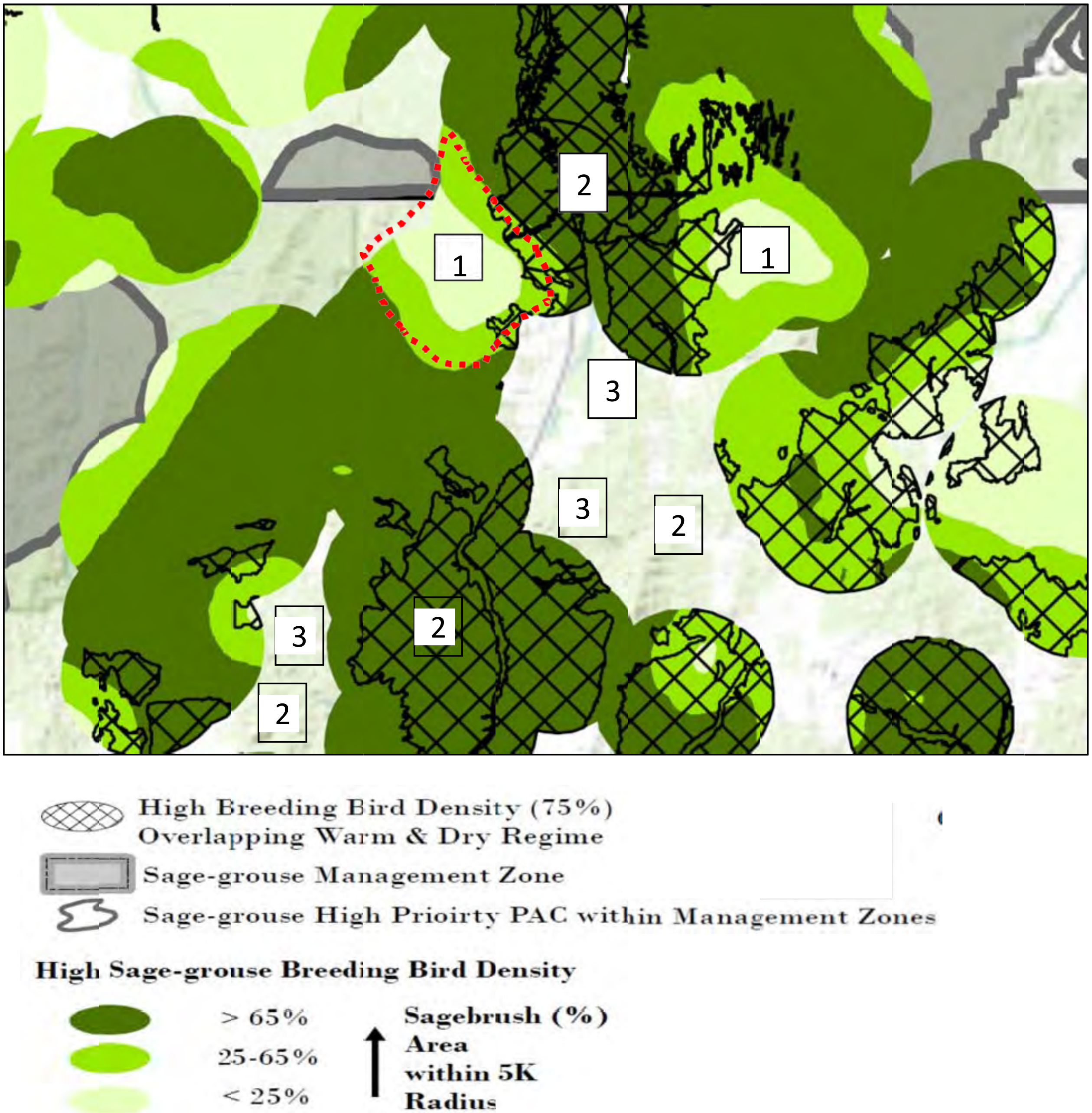
Appendix 1. Sage-grouse breeding bird density thresholds for 75% and 100% of the breeding birds, Management Zones, and PACs. Breeding bird density of 75 to 100% is included in this figure to provide context for local management units when making decisions concerning connectivity between populations and PACs.



Appendix 2. Gaps in SSURGO soil survey data in Management Zones III, IV, and V. STATSGO2 soil survey data used to fill these gaps.



Appendix 3. Example of potential management strategies applied to Wildfire/Invasive Annual Grass Scenario.

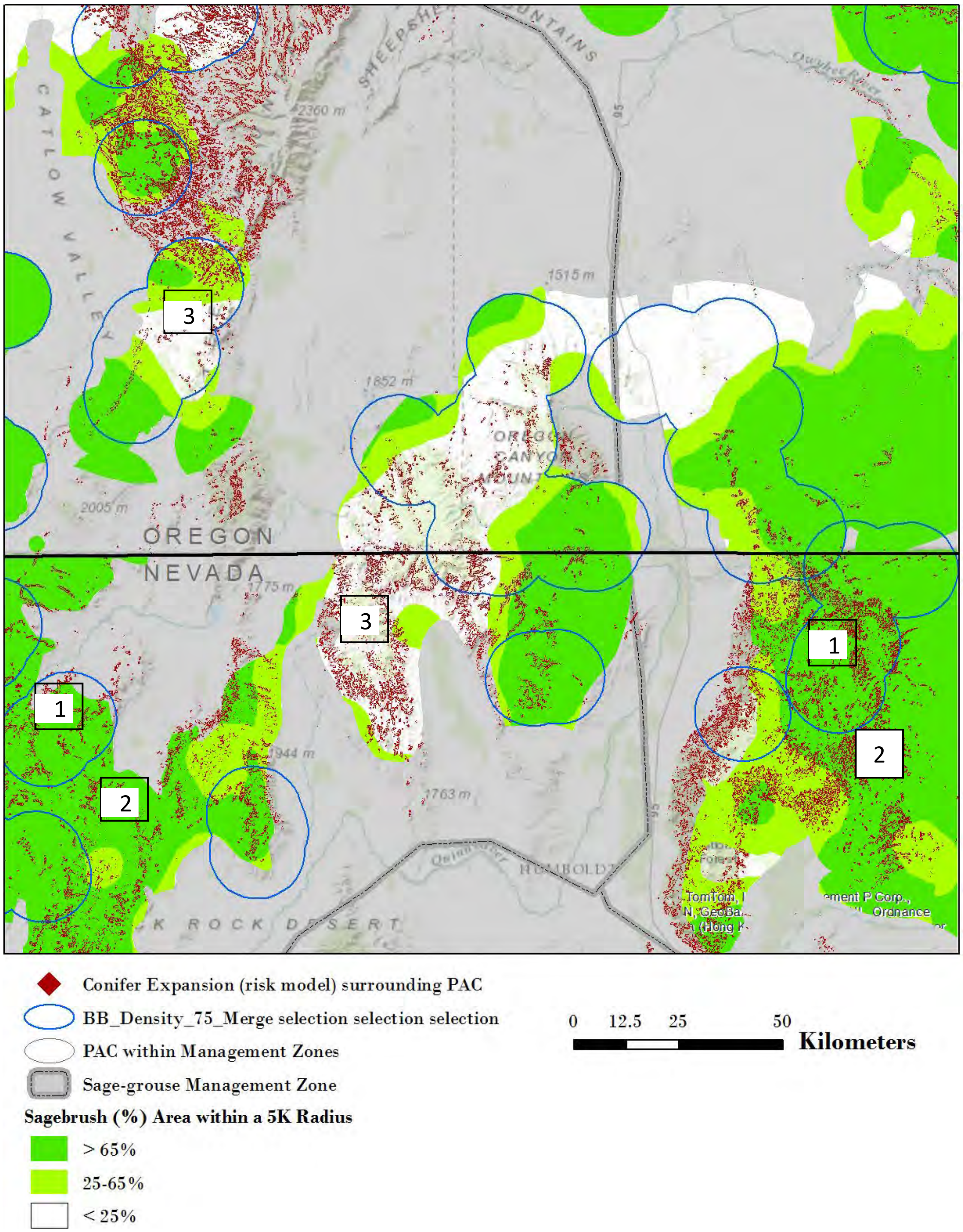


1 High priority for habitat restoration and post-fire rehabilitation to restore connectivity.

2 High priority for fire suppression within and around area given >65% sagebrush landscape cover and low resistance/resilience.

3 **High priority for fuels management to reduce likelihood of wildfires in low resistance/resilience habitat** with >65% landscape cover.

Appendix 4. Management strategy example for Western Juniper expansion.



1	High priority (emphasis area) for juniper control (>25% landscape sagebrush cover & 75% BBD)
2	Moderate priority (emphasis area) for juniper control (>25% landscape sagebrush cover)
3	Very low priority (<25% landscape sagebrush cover)

Appendix 5. Members of FIAT Development and Review Team

Development Team

Name	Affiliation
Mike Pellant*	BLM, Team Lead, Boise, Idaho
Dave Pyke*	US Geological Survey, Scientist, Corvallis, Oregon
Jeanne Chambers*	RMRS, Scientist, Reno, Nevada
Jeremy Maestas*	NRCS, Wildlife Biologist
Chad Boyd*	ARS, Scientist, Burns, Oregon
Lou Ballard	USFWS, NIFC, Boise, Idaho
Randy Sharp	Forest Service Management (retired)
Doug Havlina	BLM, NIFC, NIFC Fire Ecologist
Tim Metzger	Forest Service Fire Management Specialist
Todd Hopkins	USFWS, Great Basin LCC, Reno, Nevada
Tom Rinkes	BLM (retired biologist), Boise, Idaho
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Joe Tague	BLM Management Liaison, Reno, Nevada
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* Indicates member of the WAWFA Resistance and Resilience team.

Review Team

Name	Affiliation
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Ken Collum	BLM, Eagle Lake Field Office Manager, Susanville, California
Chuck Mark	Forest Service Supervisor, Salmon-Challis Forest
Dave Repass	BLM, ES&R Coordinator, Washington Office
Peggy Olwell	BLM Native Plant Initiative, Washington Office
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Don Kemmer	Idaho Fish & Game, Boise, Idaho

Appendix G
Cumulative Effects Supporting Information

Appendix G. Cumulative Effects Supporting Information

G.1 Rangewide Impacts from Past, Present, and Reasonably Foreseeable Actions

Table 1 represents the past, present, and reasonably foreseeable actions across the entire range for Greater Sage-Grouse, which are separated by state. When assessing the cumulative impact of the DSEIS on Greater Sage-Grouse and its habitat, there are multiple geographic scales that the BLM has considered, including the appropriate WAFWA MZ. WAFWA MZs have biological significance to Greater Sage-Grouse. Established and delineated in 2004 in the *Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats* (Connelly et al. 2004), the WAFWA MZs are based on floristic provinces that reflect ecological and biological issues and similarities, not political boundaries.

Table 1
Rangewide Impacts from Past, Present, and Reasonably Foreseeable Actions

Action	Type	Effects
Great Basin		
Habitat Restoration Programmatic EIS	Great Basin-wide programmatic habitat restoration project	Programmatic document effects will be realized when the field implements projects. This action will provide opportunities to improve and enhance habitat through vegetation treatments.
Fuel Breaks Programmatic EIS	Great Basin-wide programmatic habitat fuel break project	Programmatic document effects will be realized when the field implements projects. This action will help to reduce the loss of habitat due to catastrophic fires.
Forest Service Greater Sage-Grouse Plan Amendments	Programmatic LUP amendments for Greater Sage-Grouse on Forest Service Lands in ID, UT, NV, CO, and WY	Programmatic document effects will be realized when the field undertakes projects to implement the LUP amendment. The FS is resolving protests. They have not made a decision.
Northwest Colorado		
Integrated program of work	Habitat restoration and improvement projects	Potential localized, short-term, adverse impacts on Greater Sage-Grouse habitat, with beneficial long-term impacts. Actions are consistent with those foreseen in the 2015 Final EIS and are therefore within the range of cumulative effects analyzed in the 2015 Final EIS.
Travel management	White River Field Office: Area-wide travel designations being considered through an ongoing plan amendment Little Snake Field Office: Travel Management plan, identifying route designations consistent with criteria in the 2015 LUPA	These actions represent implementation of objectives from 2015 ARMPA to prioritize travel management in Greater Sage-Grouse habitat. Impacts are covered in the cumulative impacts of the 2015 Final EIS as reasonably foreseeable.

Action	Type	Effects
Continued oil and gas development (60 parcels sold, but under review, September 2019; Deferral of 6 parcels December 2019 lease sale; Deferral of 39 parcels in March 2020 lease sale; Potential lease of 1 parcel September 2020; Potential lease of 18 parcels December 2020).	Disturbance and fragmentation	Development is consistent with the reasonably foreseeable development scenarios analyzed as part of the 2015 Final EIS and the associated field office RMPs. Additional impacts are expected to be within the range analyzed in 2015 Final EIS cumulative impacts analysis.
Plans		
Northwest Colorado Programmatic Vegetation Treatment Environmental Assessment (DOI-BLM-CO-N000-2017-0001-EA) decision	Programmatic NEPA document for streamlining habitat treatments in sagebrush	-
Idaho		
Wildland fires 2015–2017	BLM: Past acres burned on BLM-administered land	534,744 acres of HMA burned since the ROD was signed in 2015. Post-fire rehabilitation was implemented. Too soon to determine the effectiveness of rehabilitation.
Habitat treatments 2015–2017	BLM: Past habitat improvement projects	431,295 acres treated to restore or improve potential Greater Sage-Grouse habitat. Too soon to determine the effectiveness of treatment.
ROWs issued 2015–2017	BLM: Past ROWs issued on BLM-administered land	97 ROWs were issued in the planning area but fewer than 10 were in Greater Sage-Grouse habitat and resulted in new habitat loss. The effects were mitigated, using the mitigation hierarchy.
Soda Fire restoration	BLM: Present habitat restoration and fuel break construction	Restoration of previously burned Greater Sage-Grouse habitat. Results in a net benefit to Greater Sage-Grouse habitat.
Twin Falls Vegetation Project	BLM: Present habitat treatment project that improves Greater Sage-Grouse habitat district-wide	Restoration of Greater Sage-Grouse habitat and improved rangeland conditions. Results in a net benefit to Greater Sage-Grouse habitat.
Idaho Falls Vegetation Project	BLM: Present habitat treatment project that improves Greater Sage-Grouse habitat district-wide	Restoration of Greater Sage-Grouse habitat and improved rangeland conditions. Results in a net benefit to Greater Sage-Grouse habitat.
Natural gas-producing well near Weiser, Idaho	Private: Present active gas well on private land	Well is not in Greater Sage-Grouse habitat.
Conifer removal	NRCS: Present (2018) 1,862 acres of conifer removal on private land to improve Greater Sage-Grouse habitat	Conifer removal would improve Greater Sage-Grouse habitat and open areas to Greater Sage-Grouse that were previously unavailable because of juniper encroachment.

Action	Type	Effects
Weed treatments	NRCS: Present (2018) 95 acres of weed treatments on private land to reduce noxious weeds in Greater Sage-Grouse habitat	Weed treatments allow the native vegetation to outcompete weeds on treated acres.
Water development	NRCS: Present (2018) 21,308 feet of pipeline and 40 watering tanks installed on private land	Water development to move livestock out of natural springs and wet meadows.
Pending ROWs 2015–2017	BLM: Future ROW under analysis on BLM-administered land. For example, ROWs include existing distribution lines, gravel pits, roads, canal diversions, etc.	123 ROW applications have been submitted and are pending review and analysis.
Boise District Vegetation Project	BLM: Future habitat treatment project that improves Greater Sage-Grouse habitat district-wide	Restoration of Greater Sage-Grouse habitat and improved rangeland conditions result in a net benefit to Greater Sage-Grouse habitat.
Tristate Fuel Breaks Project	BLM: Future Greater Sage-Grouse habitat protection	Fuel breaks would protect habitat from wildfires. Some sagebrush may be lost during fuel break construction. Results in a net benefit to Greater Sage-Grouse habitat.
Bruneau-Owyhee Sage-Grouse Habitat Project	BLM: Ongoing removal of juniper encroaching into Greater Sage-Grouse habitat	Bruneau-Owyhee Sage-Grouse Habitat Project would remove encroaching juniper from Greater Sage-Grouse habitat and render the habitat usable for Greater Sage-Grouse. Results in a net benefit to Greater Sage-Grouse habitat.
Conifer removal	NRCS: Future (2019–2023) 5,541 acres of conifer removal on private land to improve Greater Sage-Grouse habitat	Conifer removal would improve Greater Sage-Grouse habitat and open areas to Greater Sage-Grouse that were previously unavailable because of juniper encroachment.
Weed treatments	NRCS: Future (2019–2023) 357 acres of weed treatments on private land to reduce noxious weeds in Greater Sage-Grouse habitat	Weed treatments allow the native vegetation to outcompete weeds on treated acres.
Water development	NRCS: Present (2019–2023) 82,502 feet of pipeline and 46 watering tanks installed on private land	Water development to move livestock out of natural springs and wet meadows.
Nevada and Northeast California		
Wildland Fires 2015-2017	BLM: Past – Acres burned on BLM administered land	Approximately 1.3 million acres of HMA burned between 2015-2017. Post-fire restoration is being implemented as described below.
Fire Restoration (Emergency Stabilization and Rehabilitation)	BLM: Past and Present – Habitat restoration following wildland fires	1.8 million acres of habitat are either currently being treated or scheduled to be treated according to specific prescriptions outlined in Emergency Stabilization and Burned Area Rehabilitation plans following wildfire.

Action	Type	Effects
Habitat Treatments	BLM: Past – Habitat improvement projects	Over 176,000 acres of Greater Sage-Grouse habitat was treated between 2015-2017 to maintain or improve conditions for Greater Sage-Grouse. Treatments included conifer removal, fuel breaks, invasive species removal and habitat protection/restoration.
Land Use and Realty (issued and pending) 2015-2017	BLM: Past ROWs issued on BLM land	227 ROWs were issued in the planning area between 2015-2017. This includes amendments and reauthorizations, which may not have resulted in new disturbance. For ROWs occurring in Greater Sage-Grouse habitat, effects were offset using the mitigation hierarchy.
	BLM: Future pending	90 ROW applications are pending review and analysis. New ROWs would be held to the compensatory mitigation process described in this Proposed RMPA/Final EIS. However, no additional impacts from those described in the Draft EIS and 2015 Final EIS are expected. In addition, BLM Nevada is also currently evaluating a proposed withdrawal for expansion of the Fallon Naval Air Station, Fallon Range Training Complex for defense purposes.
Oil and Gas	BLM: Past	BLM has offered for lease 425,711 acres in HMAs; 407,478 of that total was leased. Lease stipulations apply as described in the leases according to HMA category.
	BLM: Past and Future	BLM's scheduled lease sale on June 12, 2018 included offering a total 110,556 acres of HMAs for lease. After the sale, 30,591 acres in HMA were sold. On September 11, 2018, BLM held another lease sale, where 13,163 acres in HMA were sold. The final lease sale of 2018 for BLM Nevada is scheduled for December 11, 2018 and this sale will not include any parcels within HMA for lease. 165 parcels have been moved from the November 12, 2019 O&G lease sale, New sale date TBD. These parcels are all located in the Ely District. 220 parcels within Greater Sage-Grouse habitat have been moved to April 2020 lease sale.

Action	Type	Effects
Geothermal	BLM: Past and Present	Between 2015 and 2017, the BLM has offered for lease 24,468 acres within HMAs. Lease stipulations apply as described in the leases as analyzed in the 2015 Final EIS. Six geothermal development permits have been approved and drilled on existing pads on existing leases. McGinness Hills Phase 3 Environmental Assessment authorized up to 42 acres of disturbance on existing leases, which will be offset according to the mitigation hierarchy. Juniper Geothermal Project: Proposed activity – still waiting for baseline data to begin the EA. Analysis has not yet started but EA will analyze the 2015 and 2019 habitat types under separate alternatives. North Valley (San Emidio II) Geothermal Development Project. Analysis has not yet started but EA will analyze the 2015 and 2019 habitat types under separate alternatives. Baltazor Geothermal Project Pre NEPA. Analysis has not yet started but EA will analyze the 2015 and 2019 habitat types under separate alternatives. North Valley (San Emidio II) Geothermal Development Project
Geothermal	Forest Service: Future Pending	6,901 acres of HMA pending Forest Service concurrence to lease, no pending geothermal development permits. If in HMAs, stipulations would be as described in 2015.
Locatable Mineral Projects	BLM: Past and Present	Between 2015 and 2017, the BLM has approved 18 new mines and/or expansions in the planning area, which is within the reasonably foreseeable development scenario outlined in the 2015 Final EIS (Section 5.1.16).
	BLM: Future Pending	The BLM is currently reviewing 20 plans of development for new mines or expansions, which is within the reasonably foreseeable development scenario outlined in the 2015 Final EIS (Section 5.1.16).
Fuel Breaks Programmatic EIS	BLM: Future – Great Basin-wide programmatic habitat fuel break project	Programmatic document effects will be realized when the field implements projects.

Action	Type	Effects
Greater Sage-Grouse Conservation	Forest Service- Future	Forest Service has indicated they will also be amending their land use plans. Specific details of their proposed changes are not yet known, but it is anticipated they propose alignment with state management plans and strategies.
Tri-State-Calico Complex Wild Horse and Burro Gather	BLM: Future	Removing wild horses will protect the rangelands from overgrazing and provide better habitat conditions for sage-grouse.
Thomas Creek Range Improvement Project (CA)	BLM: Future	Vegetation improvement project to improve the range for sage-grouse and other sage obligate species.
Juniper and Fuel Break Maintenance (CA)	BLM: Future	Juniper removal and fuelbreak project to remove encroaching juniper and protect the treatments with from wildfire.
Twin Peaks Horse Gather (CA)	BLM: Future	Removing wild horses will protect the rangelands from overgrazing and provide better habitat conditions for sage-grouse.
Oregon		
Emergency Stabilization and Rehabilitation in South Bull Ridge RNA	Aerial herbicide application	Preliminary results indicate success in treating annual grasses (2017).
Emergency Stabilization and Rehabilitation in South Ridge Bully Creek RNA	Aerial herbicide application	Preliminary results indicate success in treating annual grasses (2015).
Emergency Stabilization and Rehabilitation in North Ridge Bully Creek RNA	Aerial herbicide application	Preliminary results indicate success in treating annual grasses (2015).
Trout Creek Mountain	Grazing permit renewal	Grazing permit renewal allotment includes the East Fork Trout Creek Research Natural Area (2016).
Louse Creek Canyon Grazing Permit EIS	Grazing permit on 550,000 acres	Notice of Intent to prepare an EIS on grazing permit for 550,000 acres in Vale District (NOI September 2019)
Southeastern OR RMP Amendment	Wilderness, Wilderness characteristics	Draft EIS released for public review May 2019.
Lakeview RMP Amendment	Wilderness, Wilderness characteristics	Draft EIS anticipated August 2020.
Tristate Fuel Breaks Project	See Idaho description.	OR ROD to be completed/signed after Southeastern OR RMP amendment is completed.
Lakeview Resource Area Vegetation Management EA	Comprehensive vegetation management plan for the Lakeview Resource Area.	In development.

Action	Type	Effects
Utah		
Fire and Fuels		
Wildland Fires 2015-2017	Acres burned on BLM administered land	Approximately 181,159 acres of PHMA/GHMA burned between 2015-2019. Post-fire restoration is being implemented across all population areas that are affected. Effects: Potential loss of habitat value due to the removal of vegetation by fire.
Fire Restoration (Emergency Stabilization and Rehabilitation)	Acres of habitat restoration following wildland fires	Approximately 380,704 acres of HMA were treated/restored between 2015-2019. All of these acres are being restored in according to specific prescriptions outlined in Emergency Stabilization and Burned Area Rehabilitation plans following wildfire across all population areas that are affected. Effect: Potentially improve or increase habitat due to vegetative restoration activities.
Vegetation		
Habitat Treatments	Acres of habitat improvement projects	Past: Over 270,000 acres of Greater Sage-Grouse habitat was treated between 2015-2019 to maintain or improve conditions for Greater Sage-Grouse across all populations. Treatments included conifer removal, fuel breaks, invasive species removal and habitat protection/restoration. Effect: Potentially improve or increase habitat due to vegetative restoration activities. Future: Over 524,702 acres of Greater Sage-Grouse habitat is being proposed for treatment over the next 5 years. Treatments will include conifer removal, fuel breaks, invasive species removal and habitat protection/restoration across all populations. Effect: Potentially improve or increase habitat due to vegetative restoration activities.

Action	Type	Effects
Lands and Realty		
Land Use and Realty (issued and pending) 2015-2019	ROWs issued or pending on BLM land	Past: Throughout the planning area (all BLM field offices in Utah except Saint George and Monticello) regardless of Greater Sage-Grouse habitat, 1,092 ROWs were issued between 2015 and 2019. However, only 109 of these were within PHMA. Effect: These numbers include amendments and reauthorizations, which would likely not have resulted in any new disturbance. For ROWs occurring in Greater Sage-Grouse habitat, effects were offset using the mitigation hierarchy. Future: Throughout the entire planning area, 225 ROW applications are pending review and analysis. Of these, only 30 are within PHMA. Effect: New ROWs would be held to the compensatory mitigation process described in this Proposed RMPA/Final EIS. However, no additional impacts from those described in the Draft EIS and 2015 Final EIS are expected.
Zephyr Transmission Line	500 kV transmission line	Application received – could impact the Bald Hills, Uintah, Carbon, Strawberry, Emery, and Sheeprocks populations. Effects: May remove vegetation due to construction activities. Towers may provide perching opportunities for avian predators. However, most of these impacts should be removed by management standards identified in the selected alternative.
Enefit Utility Project	Five rights-of-way across public lands for infrastructure (a road, 3 pipelines, and 2 powerlines) to support development of a mine on private lands. Estimated 1,037 acres of disturbance for the rights-of-way (7,000-9,000 acre mine and 320-acre processing plant).	ROD issued in September 2018. Issuance and constructions of ROWs still pending – could impact a portion of the Uintah population (Dead Man Bench GHMA). Effects: May remove vegetation due to construction activities. Increased maintenance activities could lead to an increase in collision mortalities. Any associated tall structures may provide perching opportunities for avian predators. However, most of these impacts should be removed by management standards identified in the selected alternative.

Action	Type	Effects
Congressionally Directed Land Tenure Adjustments	Land Tenure Adjustments from the BLM to the State of Utah	Table 1-2 in Chapter 1 shows the acres of public land with mapped PHMA and GHMA, establishing the summary of all past lands actions. In the National Defense Authorization Act for Fiscal Year 2017 Congress directed a land exchange between the BLM and State Institution and Trust Lands Administration (SITLA). This includes, approximately 2,400 acres of GHMA in the Sheeprocks area being studied for transfer to the State of Utah. In March 2019 Congress provided for land transfers in the John D. Dingell, Jr. Conservation, Management, and Recreation Act. This could include the BLM acquiring 2,065 acres of PHMA and 1,360 acres of GHMA in the Uinta population. It could also include the transfer of SITLA land in Congressional designations outside of Greater Sage-Grouse habitat for BLM lands throughout the state. While the list of involved lands has not been finalized, preliminary potential parcels include approximately 51,400 acres of PHMA and 1,870 acres of GHMA in the Rich, Carbon, Emery, Uinta, and Sheeprocks populations. Effects: Since compliance with the state's 2019 sage-grouse plan and the Governor's Executive Order on sage-grouse is voluntary for SITLA, transfers of PHMA from BLM would decrease the level of certainty for sage-grouse protection. However, since the lands involved in these Congressionally directed transfers has not been finalized at this time, the specific lands involved and, if transferred, their potential future uses are not known. It would be speculative to analyze beyond the above statement.

Action	Type	Effects
Leasable Minerals (Oil and Gas, Non-energy Leasable Minerals, Coal, and Oil Shale and Tar Sands)		
Oil and Gas Leases	Acres of BLM land leased for Oil and Gas development	Past: There are approximately 411,000 acres of PHMA and GHMA currently leased for fluid minerals. Approximately 195,000 acres of those leases are held by production. Effects: The act of leasing would have no direct effect, as no specific disturbance is taken as a result of purchasing a lease. Future: The BLM is required to conduct quarterly lease sales which could include parcels in HMA. Effect: The act of leasing would have no direct effect, as no specific disturbance is taken as a result of purchasing a lease. Leasing could occur in any of the populations, but would be most likely to impact the Uintah, Carbon, Emery, and Rich populations due to mineral potential.
Oil and Gas Wells	Oil and Gas exploration and development	Based upon the reasonable and foreseeable development assumptions in **Chapter 4**, it is anticipated that 2,968 oil and gas wells will be drilled within occupied Greater Sage-Grouse habitat within the population areas, of which 2,289 wells are anticipated to be producing wells. Exploration wells expected in all populations. Development wells anticipated in Uintah, Carbon, Emery, and Rich populations. This estimate would be inclusive of all related mineral development activities, including leasing, full-field development analyses, and APD analyses. Development associated with such actions is the actualization of the reasonably foreseeable development scenario estimate. Effect: The development of wells within these areas could lead to fragmentation and loss of habitat due to construction activities. Increased noise levels associated with traffic and compressors may impact lek attendance. Increased traffic associated with day-to-day operations may also increase the potential for collision mortality. However, most of these impacts should be removed by management standards identified in the selected alternative.

Action	Type	Effects
Asphalt Ridge Tar Sands Development	Lease approximately 6,000 acres of Tar Sands Lands described in the Asphalt Ridge Tract, which is directly adjacent to existing approximately 16,000 acres of State leases	Still in planning and NEPA stages – could impact a small portion of the Halfway Hollow portion of the Uintah population near Vernal and Highway 40. Effect: As a largely underground operation on BLM-administered lands, this would disturb a small amount of land associated with ancillary features. On the portions of the mine that would be mined through surface means, habitat would be lost and noise, dust, and light would affect adjacent areas.
Flat Canyon Coal Lease by application	The Flat Canyon Coal Lease Tract is approximately 2, 692 acres of federal coal reserves	Forest Service completed the consent to BLM. Approximately 23 acres out of the 2,692 acres are within the Emery Population Area. Effect: The act of leasing would have no direct effect. However, the activities associated with development of the lease could result in loss of habitat and vehicle mortality due to increased traffic. Most of these impacts should be removed by management standards identified in the selected alternative.
Alton Coal Tract Lease-by-Application	Add 3,576 acres of federal surface or mineral estate to existing 300-acre mine on private land.	ROD issued in August 2018. The lease sale and issuance was completed in February 2019, and as such was developed to be in conformance with the 2015 Utah Greater Sage-Grouse ARMPA. As described in the July 2018 Alton Final EIS, development of the mine could impact a part of the southern habitat in the Panguitch population. Effect: Activities associated with development of the lease could result in loss of habitat and vehicle mortality due to increased traffic. Most of these impacts should be removed by management standards identified in the selected alternative, or offset by habitat improvements.
Williams Draw Coal Lease by Application	The proposed action includes 4,200 acres of federal surface and mineral estate; the proposal may have several vents, drilling exploration holes on the surface and underground, and load-out facilities	Still in planning and NEPA stages; could impact the Carbon population. Effect: The act of leasing would have no direct effect. However, the activities associated with development of the lease could result in loss of habitat and vehicle mortality due to increased traffic. Most of these impacts should be removed by management standards identified in the selected alternative.

Action	Type	Effects
Greens Hollow Coal Lease by Application	Proposal includes 6,700 acres; a vent is proposed off site; minimal surface disturbances with the exception for exploration drilling	The area has been leased, but development is on hold due to litigation. Would affect the Emery population. Effect: This is an expansion of an existing underground mine. Activities associated with development of the lease could result in the loss of a small amount of habitat from development of ancillary features (vent fan). Most mining activity (portal, truck traffic, etc.) occurs down the cliff face, far removed from the habitat. Most of these impacts would be removed by management standards identified in the selected alternative.
Flat Canyon Coal Lease by Application	Lease by Application 3,792 acres; and Exploration License, 595 acres	Leased and under production in the Carbon population. Effect: The act of leasing would have no direct effect. However, the activities associated with development of the lease could result in loss of habitat and vehicle mortality due to increased traffic. Most of these impacts should be removed by management standards identified in the selected alternative.
Gilsonite Leasing	16,810 acres that are currently under prospecting permit application; the permits would either be issued or a Known Gilsonite Leasing Area would be established, thus allowing competitive leasing	The prospecting permit applications have been in place since the late 1980s; Known Gilsonite Leasing Area report ongoing, after which NEPA will begin to address backlogs for these areas in the Uintah population. Effect: Activities associated with development or prospecting of the permit / lease could result in loss of habitat and vehicle mortality due to increased traffic. Most of these impacts should be removed by management standards identified in the selected alternative.

Action	Type	Effects
Phosphate Fringe Acreage Lease	1,627 acres of fringe acreage lease on BLM-administered lands	NEPA has started and awaiting a Development Scenario to complete the NEPA for this expansion of an existing phosphate mine in the Diamond Mountain portion of PHMA in the Uintah population. Effect: The act of leasing would have no direct effect. However, the activities associated with development of the lease could result in loss of habitat and vehicle mortality due to increased traffic. Most of these impacts should be removed by management standards identified in the selected alternative.
Phosphate Competitive Lease Application	1,186 acres on National Forest System lands	NEPA has started and awaiting a Development Scenario to complete the NEPA for this area in the Uintah population. Effect: Activities associated with development of the lease could result in loss of habitat and vehicle mortality due to increased traffic. Most of these impacts should be removed by management standards identified in the selected alternative.
Other Items		
Hard Rock Prospecting Permits being considered on Bankhead Jones	Hard rock exploration permits	Pending consideration for this area in the Sheeprocks population. Effect: Activities associated with development of the lease could result in loss of habitat, vehicle mortality due to increased traffic and disruption of seasonal use areas. Most of these impacts should be removed by management standards identified in the selected alternative.
Gooseberry Narrows Reservoir	Bureau of Reclamation project on Forest Service and private land; project is approximately 1,200 acres	EIS is complete, pending EPA review and approval for this portion of the Carbon population. Effect: Activities associated with construction and operation of the reservoir would result in loss of habitat within the project area and a potential increase for vehicle mortality due to increased traffic. However, the habitat lost within the project area may be supplemented by improving the quality and seasonal functionality of the adjacent habitat. Most of the impacts should be removed by management standards identified in the selected alternative.

Action	Type	Effects
Uinta Basin Railway	Development of a railway that begins in the Uinta Basin, and terminates at a location that connects to the national rail system.	The project is in the early stages of consideration. Scoping was conducted by the Surface Transportation Board in June-August, 2019. The EIS is currently being developed. There is not a preferred alternative, but based on the early alternatives, one alternative alignment could affect GHMA in the Uinta Population, and others could affect PHMA in the Emma Park portion of the Carbon Population. Effect: Construction of the railway could result in a direct loss of habitat. Use of the railway could result in noise that would displace birds from preferred habitats. The occurrence and magnitude of these impacts would vary based on alternative alignment and mitigation measures applied.
Motorized Travel Plan Implementation	Implementation of motorized route designation plans across the planning region	Implementation actions underway statewide, with travel planning reasonably foreseeable in the Sheeprocks, Uintah, Carbon and Panguitch populations. Effect: The development of a motorized travel plan would potential help to reduce fragmentation of habitat and centralizing disturbance into areas of lesser importance.
Forest Service Greater Sage-Grouse Planning	Forest Service and Utah Division of Wildlife Resources	Forest Service is in the process of amending their land use plans. Their proposed changes are similar with those considered in this EIS, and would increase alignment with state management plans and strategies. Applicable to all Greater Sage-Grouse populations with National Forest System Lands. Effect: This effort will help to align the Forest Service's plan to be more consistent with the State of Utah's plan and provide the adequate management actions necessary to protect and conserve the Greater Sage-Grouse.

Action	Type	Effects
State of Utah Greater Sage-Grouse Management	Update of the State's Conservation Plan for Greater Sage-Grouse in Utah, as well as implementation of the State's compensatory mitigation rule	Past: The State updated their Greater Sage-Grouse plan in January 2019, incorporating the compensatory mitigation rule that provides a process to develop a banking system to apply the state's 4:1 mitigation ratio that is designed to improve habitat for Greater Sage-Grouse. Effect: This new plan refines and identifies areas to improve management actions and allow for the incorporation of new and local science to better balance Greater Sage-Grouse management across the state. It provides management to maintain and improve Greater Sage-Grouse populations, as well as a framework for managing habitat on state and private land. It also provides an opportunity for economic development to occur while offsetting the impacts to habitat quality.
Wyoming		
Wildland Fires 2015-2020	BLM: Past – Acres burned on BLM administered land	Approximately 301,000 acres of HMA burned between 2015 and 2020. Post-fire restoration and habitat treatments are being implemented, as described below, to diminish impacts of habitat lost to wildland fire.
Fire Restoration (Emergency Stabilization and Rehabilitation)	BLM: Past and Present – Habitat restoration following wildland fires	Approximately 5,443 acres of BLM-administered habitat are either currently being treated or scheduled to be treated according to specific prescriptions outlined in Emergency Stabilization and Burned Area Rehabilitation plans following wildfire.
Habitat Treatments	BLM: Past – Habitat improvement projects	More than 96,000 acres of Greater Sage-Grouse habitat were treated between 2015 and 2020 to maintain or improve conditions for Greater Sage-Grouse. Treatments included conifer removal, fuel breaks, invasive species removal and habitat protection/ restoration.

Action	Type	Effects
Land Use and Realty (issued and pending) 2015-2020	BLM: Past ROWs issued on BLM land	BLM Wyoming issued approximately 3,720 ROWs in the planning area between 2015-2020. This includes amendments and reauthorizations, which may not have resulted in new disturbance. For ROWs occurring in Greater Sage-Grouse habitat, effects were offset by the management prescriptions in the RMPs and ARMPA.
	BLM: Future pending	There are approximately 653 ROW applications pending review and analysis. New ROWs under the 2018 Proposed Plan would align with the management prescriptions of the Core Area Strategy and State of Wyoming Mitigation Framework. No additional cumulative impacts are anticipated, beyond those described. Miller Mountain Land Exchange would resolve public access issues and improve landscape scale management of resources by consolidating BLM lands in the area. Chokecherry and Sierra Madre Wind Energy Development Project, Phase II Turbine Development (EA3)
Oil and Gas	BLM: Past	BLM Wyoming has offered for lease 5,052,795.01 acres; 2,621,838.82 acres of that total was leased. Leases followed management prescriptions in the RMPs and ARMPA and stipulations apply as described in the leases according to HMA category.
	BLM: Future pending	BLM Wyoming has a scheduled lease sale in September 2020 that will offer 351,680.945 acres for lease. The actions in the 2018 Proposed Plan do not propose to change stipulations analyzed in the 2014 and 2015 plans.

Action	Type	Effects
Locatable Mineral Projects	BLM: Past and Present	Between 2015-2020[1], the BLM has approved 24 new mines and/or expansions within the planning area (including non-habitat). The 2018 Proposed Plan does not propose changes to any decisions associated with locatable minerals, which were sufficiently analyzed on the existing plans. [1] *This covers all authorized operations through first quarter 2020, it does not include the pending operations that are currently under review.*
	BLM: Future pending	The BLM is currently reviewing 4 plans of operation for new mines, mine expansions and 5 notice-level activities. This number does not include the 10 pending mine patents, which are in the process of being patented into private ownership. The 2018 Proposed Plan does not propose changes to any decisions associated with locatable minerals, and future impacts would be analyzed in future EISs, adhering to existing requirements of the RMPs and ARMPA.
Leasable Mineral Projects (Coal)	BLM: Past and Present	Two coal lease modifications were issued in 2018, totaling 1,306.61 acres. For lease modifications occurring in Greater Sage-Grouse habitat, effects were offset by the management prescriptions in the RMPs and ARMPA.
	BLM: Future pending	BLM Wyoming is currently reviewing 3 coal lease applications/modifications totaling 10,344.21 acres, however these applications are currently on hold. No management decisions for leasable minerals are proposed for change under the 2018 Proposed Plan.

Action	Type	Effects
Other items		
Buffalo RMP Coal Supplemental EIS and Amendment	BLM: Past - Planning	Final EIS published November 4, 2019. Record of Decision signed November 22, 2019 The Buffalo Field Office addressed deficiencies through the preparation of a Draft Supplemental EIS that considered climate change and downstream combustion, and analyzed alternatives that reduce the amount of coal available for leasing. Effect: Since no alternative proposed different management for Greater Sage-Grouse from the sage-grouse planning process, there are no cumulative effects not already address in the impact analysis above.
Alkali Creek Reservoir Project EIS	BLM: Past - The Wyoming Water Development Commission (WWDC) proposed to construct a 294-acre reservoir on Alkali Creek and ancillary facilities across public and private land near Hyattville, Wyoming. The reservoir will impound approximately 7,994 acre-feet of water under normal conditions, and 9,872 acre-feet when under flood conditions.	Final EIS published May 2019. Record of Decision issued on November 18, 2019. The reservoir will provide late-season irrigation water for portions of the Nowood River Watershed. The irrigation pool (currently modeled at 5,996 acre-feet) will be available either directly or through exchange for irrigation water. Effect: Since no alternative proposed different management for Greater Sage-Grouse from the sage-grouse planning process, there will be no cumulative effects not already address in the impact analysis above.
Leavitt Reservoir Expansion Project EIS	BLM: Past - The WWDC proposed to expand the existing Leavitt Reservoir near Shell, Wyoming, from a pool of 643 acre-feet to 6,404 acre-feet.	The purpose of the project is to provide late season irrigation for agriculture in the Shell Valley. Effect: Since no alternative proposed different management for Greater Sage-Grouse from the sage-grouse planning process, there will be no cumulative effects not already address in the impact analysis above.

Action	Type	Effects
Rock Springs RMP Revision EIS	BLM: Future pending - Development of a resource management plan revision	The planning area includes lands within the Rock Springs Field Office administrative boundary in Sweetwater, Lincoln, Uinta, Sublette, and Fremont counties in southwestern Wyoming. The decision area consists of 3.6 million acres of BLM-administered surface and 3.7 million acres of federal mineral estate. The revised RMP will replace the 1997 Green River RMP. A Comprehensive Travel and Transportation Plan for the entire field office, as well as an additional socioeconomic modeling effort coordinated with cooperating agencies are being incorporated into the RMP Revision. Effect: Since no alternative proposes different management for Greater Sage-Grouse from the sage-grouse planning process, there will be no cumulative effects not already address in the impact analysis above.
Wild Horse Management for the BLM Rock Springs and Rawlins Field Offices Plan Amendment EIS	BLM: Future pending - Development of a resource management plan amendment	In April 2013, the Department of the Interior, the BLM and the Rock Springs Grazing Association signed a consent decree requiring the BLM to initiate NEPA analysis to consider the environmental effects of modifying management levels of wild horses in specified herd management areas. An NOI was issued, initiating public scoping to amend the 2008 Rawlins RMP in conjunction with the Rock Springs RMP revision. Prior to Spring 2019, the wild horse management decisions were being evaluated through the ongoing Rock Springs Resource Management Plan revision, with included amendment to the Rawlins RMP for the Adobe Town HMA. However, due to delays in the ongoing RMP revision related to expansion of energy development opportunities, the decision was made to expedite a separate EIS document specific to wild horse management actions. Effect: Since no alternative proposes different management for Greater Sage-Grouse from the sage-grouse planning process, there will be no cumulative effects not already address in the impact analysis above.

Action	Type	Effects
Converse County Oil and Gas Project EIS	BLM: Future pending – Proposed action includes development of 5,000 new oil and gas wells on 1,500 well pads.	The project area encompasses roughly 1.5 million acres of split estate mixed surface ownership lands. The operators propose to develop the wells over 10 years, with the life of the project anticipated to be 20 to 30 years. Effect: Since no alternative proposes different management for Greater Sage-Grouse from the sage-grouse planning process, there will be no cumulative effects not already address in the impact analysis above.
Moneta Divide Natural Gas and Oil Development Project EIS	BLM: Future pending – Proposed action includes development of 4,250 natural gas wells and associated infrastructure.	The project area is located in Fremont and Natrona counties and encompasses approximately 265,000 acres of land. The life of the proposed project is estimated to be 40 years. Additional potential development, which would require additional NEPA analysis, include pipelines to transport treated, produced water from the production areas west to Boysen Reservoir and a pipeline transporting natural gas from the production areas to Wamsutter, Wyoming, in the Rawlins Field Office. Effect: Since no alternative proposes different management for Greater Sage-Grouse from the sage-grouse planning process, there will be no cumulative effects not already address in the impact analysis above.

Action	Type	Effects
Wyoming Pipeline Corridor Initiative (WPCI)	BLM: Future pending - The Wyoming Pipeline Corridor Initiative is a proposal from the State of Wyoming to designate almost 2,000 miles of pipeline corridors across private, state and BLM-managed lands in Wyoming. Approximately 1,150 miles of the proposed corridors are located on BLM managed lands.	The project would designate a statewide pipeline corridor network for future development of pipelines associated with carbon capture, utilization and storage, as well as pipelines and facilities associated with enhanced oil recovery. The project will not authorize any new pipelines or construction but will amend several BLM Resource Management Plans across the state to make future analysis of project specific proposals more efficient. One of the primary purposes of the pipeline corridor network is to connect existing oil fields suitable for enhanced oil recovery (EOR) with anthropogenic and natural carbon dioxide (CO2) sources. The CO2 will be injected into existing, often "played-out" oil fields, thereby increasing oil production beyond conventional recovery methods with little additional surface disturbance. Effect: Since no alternative proposes different management for Greater Sage-Grouse from the sage-grouse planning process, there will be no cumulative effects not already address in the impact analysis above.
Greater Sage-Grouse Conservation	Forest Service: Future	Forest Service has indicated they will also be amending their land use plans. Specific details of their proposed changes are not yet known, but it is anticipated they will propose alignment with state management plans and strategies.

G.2 Cumulative Effects Analysis – Habitat and Allocation Decision Summaries for the No Action & Management Alignment Alternatives by Management Zone

Data representing the final plan allocation decisions and habitat delineations collected by the BLM upon the completion of the 2015 planning process has been updated or corrected relative to the final allocation decisions from the 2015 plans to reflect maintenance related changes, adaptive management responses, or refined source data. The BLM used these data to represent the No Action alternative for the current plan analysis. The BLM then identified 2015 data which are not subject to change in any alternatives associated with the 2018 planning process. These data were carried forward as the alternative allocation decision data. The BLM was also able to provide allocation decision data representing changes included in the 2018 Draft EIS alternatives, which were then used in the comparative analysis. Decision data are summarized by habitat type within each Management Zone (see Figure 1) and are presented in this Appendix in both approximate acreage of BLM managed lands within each habitat designation as well as percent of BLM lands within a habitat designation to which an allocation decision applies. For programs where allocation decisions change, information is presented separately. In cases where no change has occurred, both alternatives are presented together. BLM Montana is currently not undergoing a plan amendment process, however data were included in this cumulative effects summary. A summary of data submitted for this analysis can be found in **Table 1**, detailing which areas did not provide data for analysis. In these cases, summaries reflect submitted data only. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Table 2
Data Submission Summary for Cumulative Effects Analysis. Y = Data submitted, N = No data submitted, followed by which area within the State that did not provide data.

Program Area	Colorado	Idaho	Montana & The Dakotas	Nevada/NE California	Oregon	Utah	Wyoming
Geothermal Energy	Y	Y	N – Miles City, Lewistown, Billings, UMRBNM	Y	Y	Y	N – Bighorn Basin
Land Tenure	Y	Y	Y	Y	Y	Y	Y
Livestock Grazing	Y	Y	Y	Y	Y	Y	Y
Locatable Minerals	Y	Y	Y	Y	Y	Y	Y
Non-Energy Leasable Minerals	Y	Y	N – Miles City, Billings	Y	Y	Y	N – Bighorn Basin, Buffalo, Wyoming (9-Plan)
Fluid Mineral Leasing (Oil & Gas)	Y	Y	N - Lewistown	Y	Y	Y	Y
Rights-of-Ways	Y	Y	Y	Y	Y	Y	Y
Salable-Mineral Materials Disposals	Y	Y	Y	Y	Y	Y	Y
Solar Energy	Y	Y	Y	Y	Y	Y	N – Bighorn Basin, Buffalo, Lander, Wyoming (9-Plan)
Trails and Travel Management	Y	Y	Y	Y	Y	Y	Y
Wind Energy	Y	Y	Y	Y	Y	Y	Y

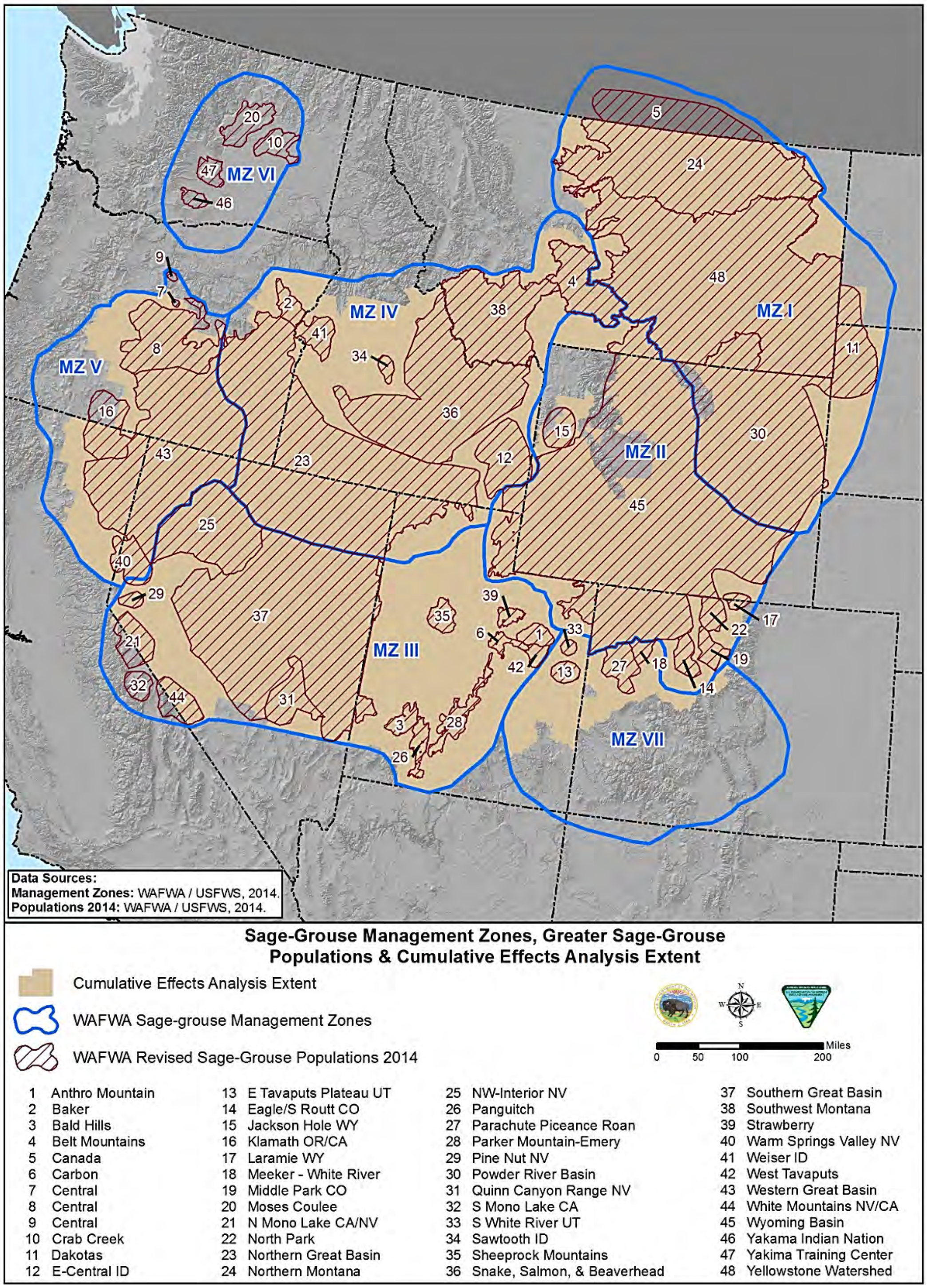


Figure 1 – Cumulative Effects Analysis Extent, Sage-Grouse Management Zones and Populations

G.2.1 Management Zone I – WY, MT, ND, SD

I. Habitat Management

Table 3 – Habitat Management Areas within MZ I

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of HMA in MZ I							
No Action				Management Alignment			
PHMA	GHMA	RHMA[1]	Non-HMA	PHMA	GHMA	RHMA	Non-HMA
12,122,000	28,339,000	437,000	33,467,000	12,122,000	28,339,000	437,000	33,467,000

Approximate Percent of MZ I that is HMA							
No Action				Management Alignment			
PHMA	GHMA	RHMA	Non-HMA	PHMA	GHMA	RHMA	Non-HMA
16%	38%	1%	45%	16%	38%	1%	45%

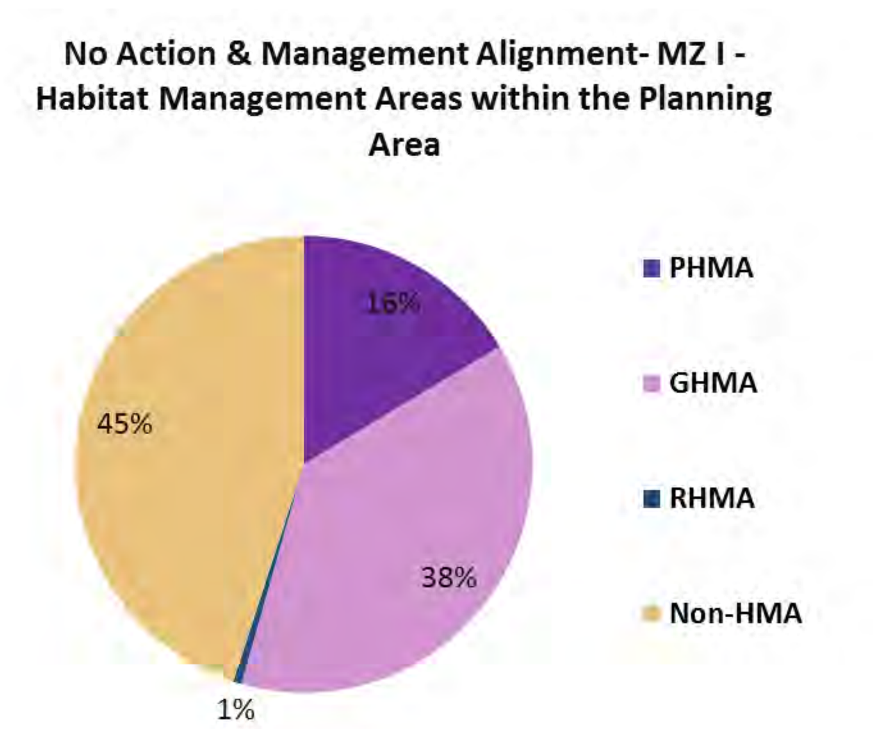


Figure 2 - Habitat Management Areas within MZ I

Percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

[1] Restoration Habitat Management Area (RHMA)

II. Geothermal Energy

Table 4 – Geothermal Energy Decisions within MZ I

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding.
[1] Data not available for portions of MT and WY. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Geothermal Decisions[1] in MZ I by Habitat Management Area Type					
Geothermal Energy	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	86,000	0	NA	86,000	**172,000**
Open NSO	1,988,000	130,000	NA	230,000	**2,349,000**
Open CSU/TL	0	443,000	NA	1,071,000	**1,514,000**
Open Standard Stipulations	0	141,000	NA	372,000	**514,000**
Total	**2,074,000**	**714,000**	**NA**	**1,760,000**	**4,548,000**

Approximate % of Habitat Management Area by Geothermal Decision[1] within Habitat in MZ I					
Geothermal Energy	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	4%	0%	NA	5%	**4%**
Open NSO	96%	18%	NA	13%	**52%**
Open CSU/TL	0%	62%	NA	61%	**33%**
Open Standard Stipulations	0%	20%	NA	21%	**11%**
Total	**100%**	**100%**	**NA**	**100%**	**100%**

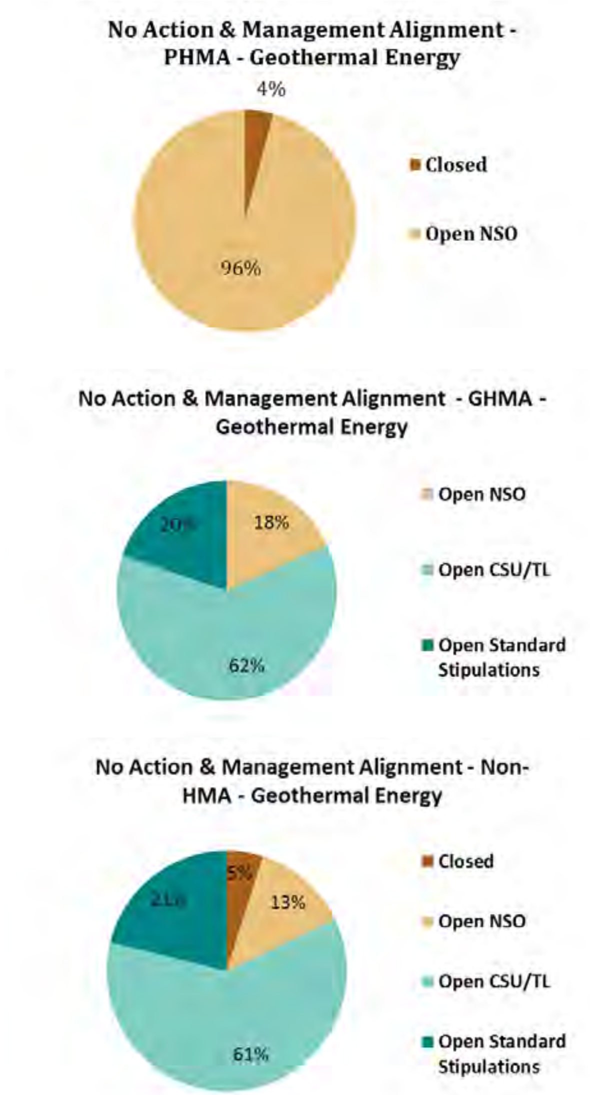


Figure 3 – Geothermal Energy Decisions within MZ I

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. [1] Data not available for portions of MT and WY. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

III. Land Tenure

Table 5 – Land Tenure Decisions within MZ I

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Land Tenure Decisions in MZ I by Habitat Management Area Type					
Land Tenure	No Action & Management Alignment				
	PHMA	GHMA	RHMA	Non-HMA	Total
Disposal	49,000	167,000	0	143,000	**359,000**
Retention	3,259,000	2,997,000	159,000	1,538,000	**7,953,000**
Total	**3,308,000**	**3,164,000**	**159,000**	**1,681,000**	**8,312,000**

Approximate % of Habitat Management Area by Land Tenure Decision within Habitat in MZ I					
Land Tenure	No Action & Management Alignment				
	PHMA	GHMA	RHMA	Non-HMA	Total
Disposal	1%	5%	0%	9%	**4%**
Retention	99%	95%	100%	91%	**96%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

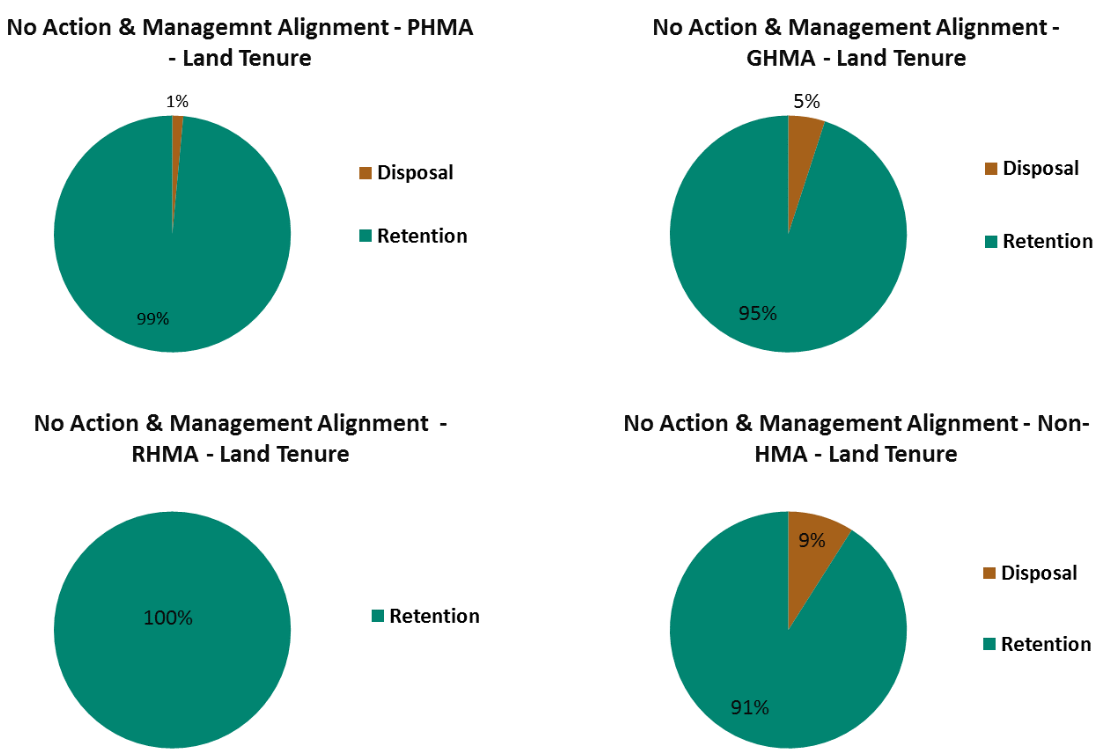


Figure 4 – Land Tenure Decisions within MZ I

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

IV. Livestock Grazing

Table 6 – Livestock Grazing Decisions within MZ I

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Livestock Grazing Decisions in MZ I by Habitat Management Area Type					
Livestock Grazing	No Action & Management Alignment				
	PHMA	GHMA	RHMA	Non-HMA	Total
Unavailable	3,000	8,000	0	12,000	**23,000**
Available	3,303,000	3,186,000	158,000	1,632,000	**8,279,000**
Total	**3,306,000**	**3,194,000**	**158,000**	**1,644,000**	**8,302,000**

Approximate % of Habitat Management Area by Livestock Grazing Decision within Habitat in MZ I					
Livestock Grazing	No Action & Management Alignment				
	PHMA	GHMA	RHMA	Non-HMA	Total
Unavailable	<1%	<1%	0%	<1%	**<1%**
Available	100%	100%	100%	100%	**100%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

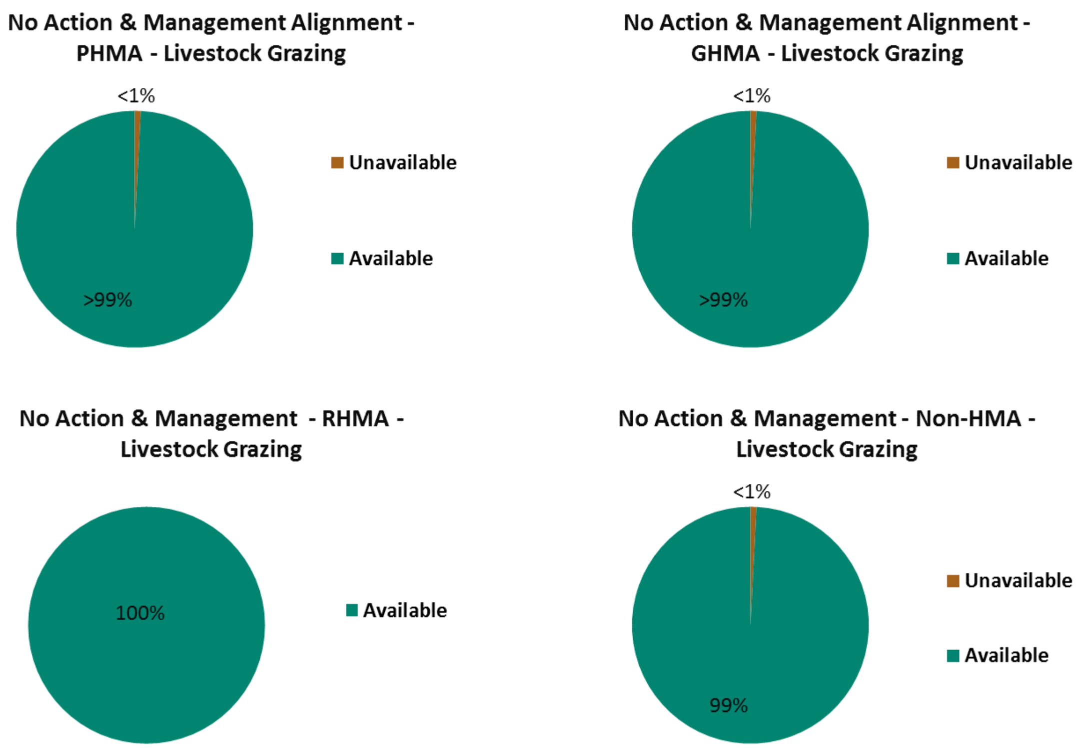


Figure 5 – Livestock Grazing Decisions within MZ I

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

V. Locatable Minerals

Table 7 – Locatable Minerals Decisions within MZ I

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages. [2] MT Recommended Withdrawals Decisions in PHMA will be removed via plan maintenance.

Approximate Acres of Locatable Minerals Decisions[2] in MZ I by Habitat Management Area Type					
Locatable Minerals	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	22,000	203,000	0	240,000	**465,000**
Recommended Withdrawals	1,094,000	166,000	0	46,000	**1,306,000**
Open	4,053,000	7,132,000	164,000	2,688,000	**14,037,000**
Total	**5,169,000**	**7,501,000**	**165,000**	**2,974,000**	**15,808,000**

Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in MZ I					
Locatable Minerals	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	<1%	3%	<1%	8%	**3%**
Recommended Withdrawals	21%	2%	0%	2%	**8%**
Open	79%	95%	100%	90%	**89%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

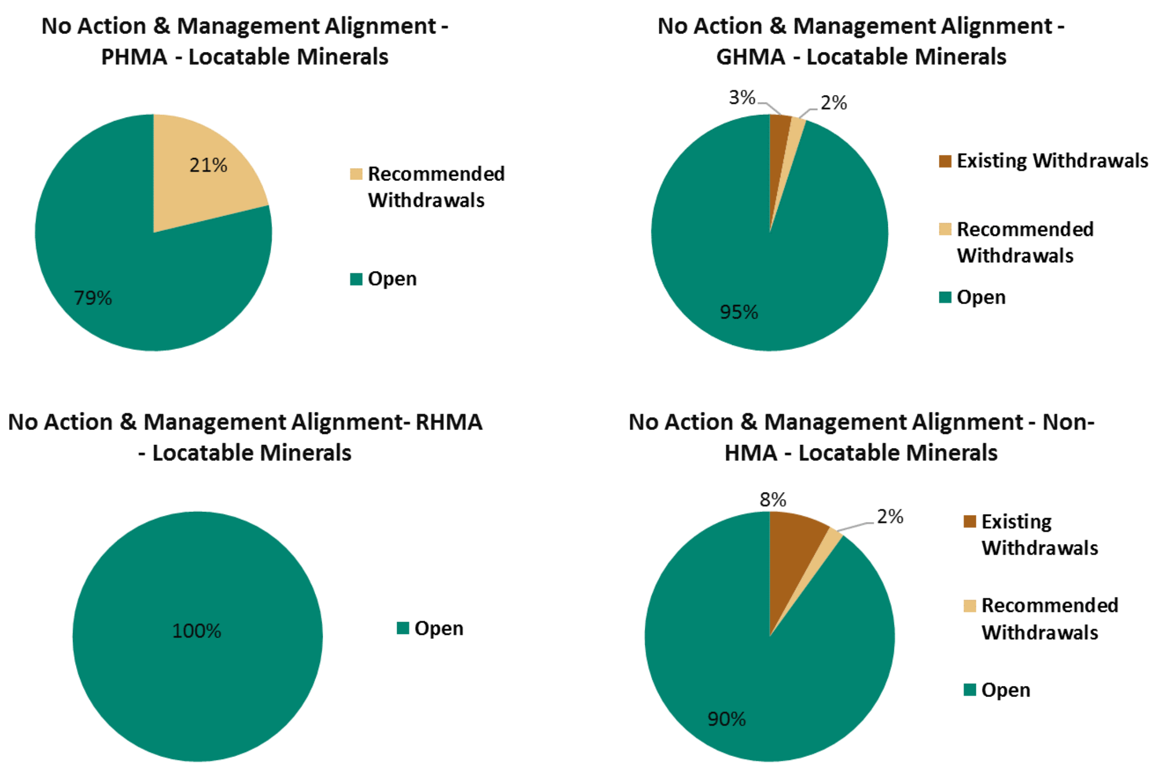


Figure 6 – Locatable Mineral Decisions within MZ I

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages. [2] MT Recommended Withdrawals Decisions in PHMA will be removed via plan maintenance.

VI. Non-Energy Leasable Minerals

Table 8 – Non-Energy Leasable Minerals Decisions within MZ I

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. [3] Data not available for portions of MT and WY. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Non-Energy Leasable Minerals[3] Decisions in MZ I by Habitat Management Area Type					
Non-Energy Leasable Minerals	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	2,432,000	296,000	NA	355,000	**3,083,000**
Open	1,900,000	6,205,000	NA	2,463,000	**10,568,000**
Total	**4,332,000**	**6,501,000**	NA	**2,818,000**	**13,651,000**

Approximate % of Habitat Management Area by Non-Energy Leasable Minerals[3] Decision within Habitat in MZ I					
Non-Energy Leasable Minerals	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	56%	5%	NA	13%	**23%**
Open	44%	95%	NA	87%	**77%**
Total	**100%**	**100%**	**NA**	**100%**	**100%**

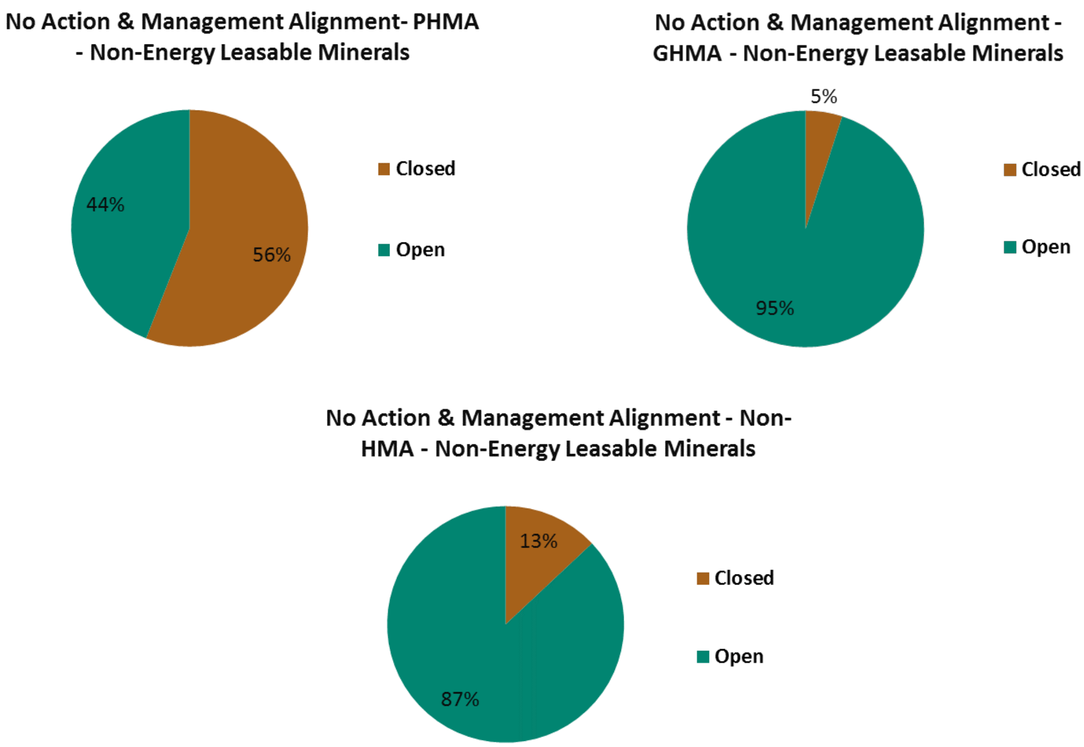


Figure 7 – Non-Energy Leasable Minerals Decisions within MZ I

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. [3] Data not available for portions of MT and WY. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

VII. Fluid Minerals (Oil & Gas)

Table 9 – Fluid Minerals (Oil & Gas) Decisions within MZ I

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. [4]Data not available for portions of MT. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Fluid Minerals (Oil a& Gas) Decisions[4] in MZ I by Habitat Management Area Type					
Fluid Minerals (Oil and Gas)	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	196,000	328,000	0	346,000	**870,000**
Open NSO	3,730,000	1,485,000	228,000	406,000	**5,849,000**
Open CSU/TL	1,582,000	5,280,000	64,000	2,155,000	**9,082,000**
Open Standard Stipulations	0	2,223,000	0	744,000	**2,967,000**
Total	**5,508,000**	**9,316,000**	**292,000**	**3,651,000**	**18,768,000**

Approximate % of Habitat Management Area by Fluid Minerals (Oil a& Gas) Decision[4] within Habitat in MZ I					
Fluid Minerals (Oil and Gas)	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	3%	4%	0%	9%	**5%**
Open NSO	68%	16%	78%	11%	**31%**
Open CSU/TL	29%	57%	22%	59%	**48%**
Open Standard Stipulations	0%	24%	0%	20%	**16%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

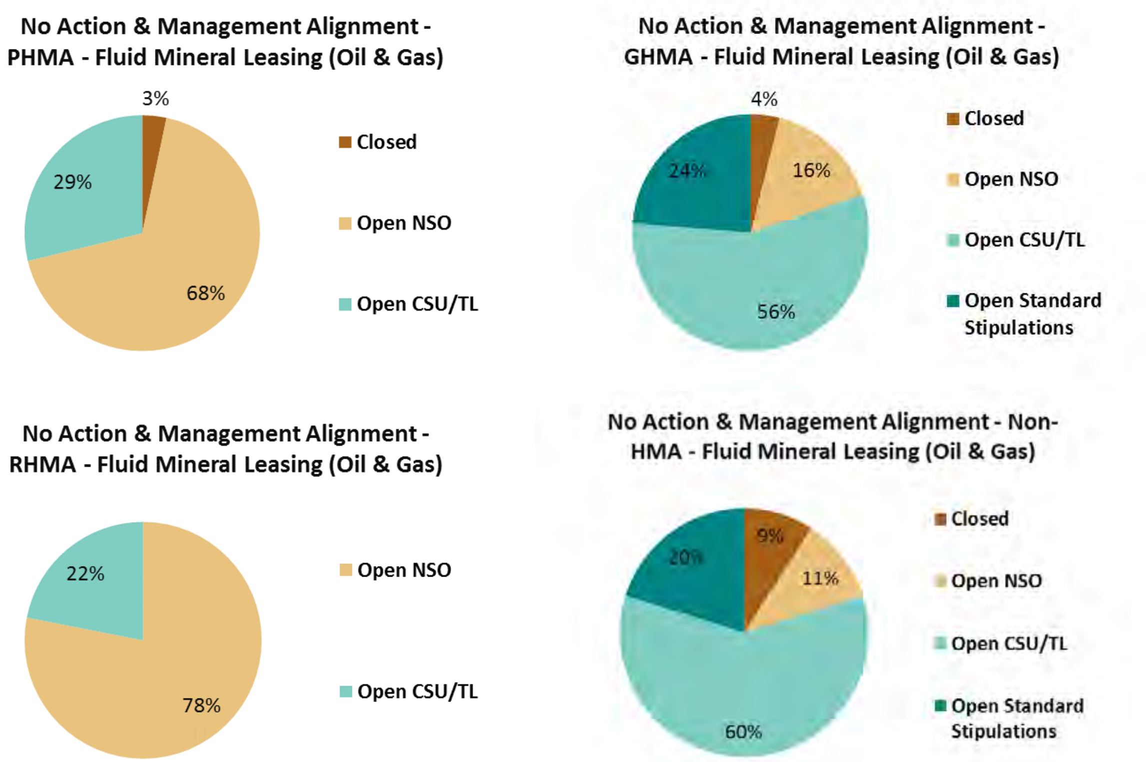


Figure 8 – Fluid Minerals (Oil & Gas) Decisions within MZ I

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. [4]Data not available for a portion of MT. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

VIII. Rights-of-Ways

Table 10 – Rights-of-Ways Decisions within MZ I

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Rights-of-Ways Decisions in MZ I by Habitat Management Area Type					
Rights-of-Ways	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Exclusion	110,000	240,000	0	86,000	**436,000**
Avoidance	3,163,000	1,819,000	72,000	282,478	**5,336,478**
Open	5,000	1,067,000	87,000	1,206,000	**2,364,000**
Total	**3,278,000**	**3,126,000**	**159,000**	**1,574,478**	**8,136,478**

Approximate % of Habitat Management Area by Rights-of-Ways Decision within Habitat in MZ I					
Rights-of-Ways	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Exclusion	3%	8%	0%	5%	**5%**
Avoidance	97%	58%	45%	18%	**66%**
Open	0%	34%	55%	77%	**29%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

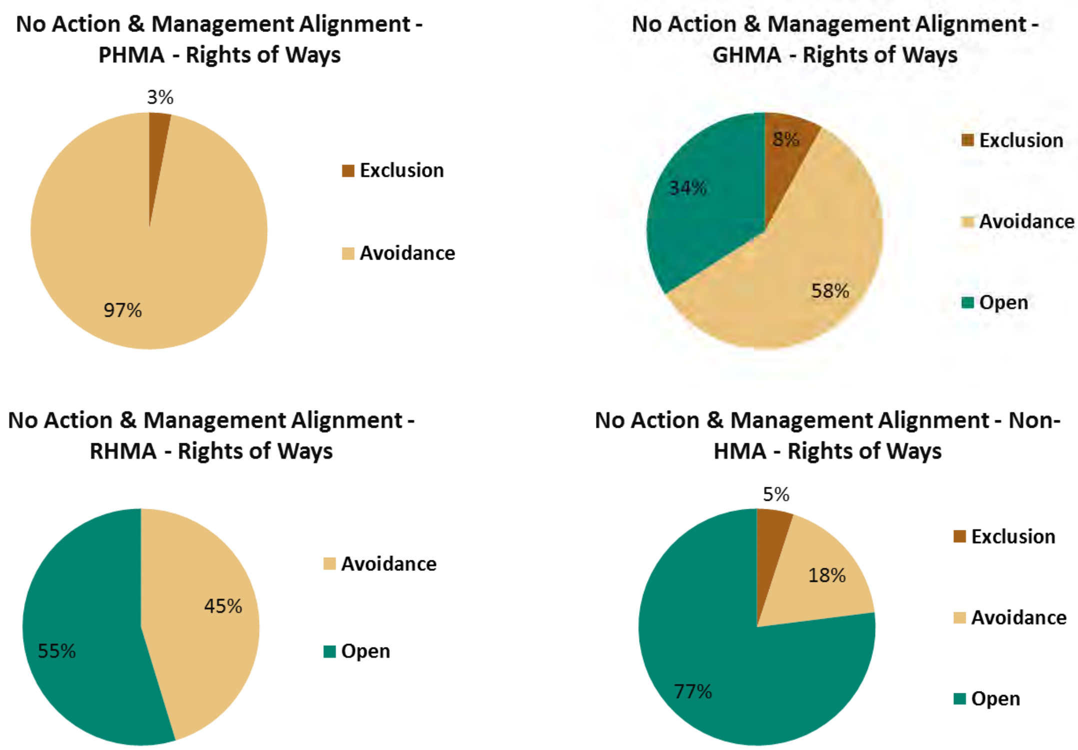


Figure 9 – Rights-of-Ways Decisions within MZ I

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

IX. Salable Minerals Materials

Table 11 – Salable Minerals Decisions within MZ I

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Salable Minerals Materials Decisions in MZ I by Habitat Management Area Type					
Salable Minerals Materials	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	3,870,000	402,000	9,000	424,000	**4,705,000**
Open	1,882,000	8,787,000	267,000	2,990,000	**13,926,000**
Total	**5,752,000**	**9,189,000**	**276,000**	**3,414,000**	**18,631,000**

Approximate % of Habitat Management Area by Salable Minerals Materials Decision within Habitat in MZ I					
Salable Minerals Materials	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	67%	4%	3%	12%	**25%**
Open	33%	96%	97%	88%	**75%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

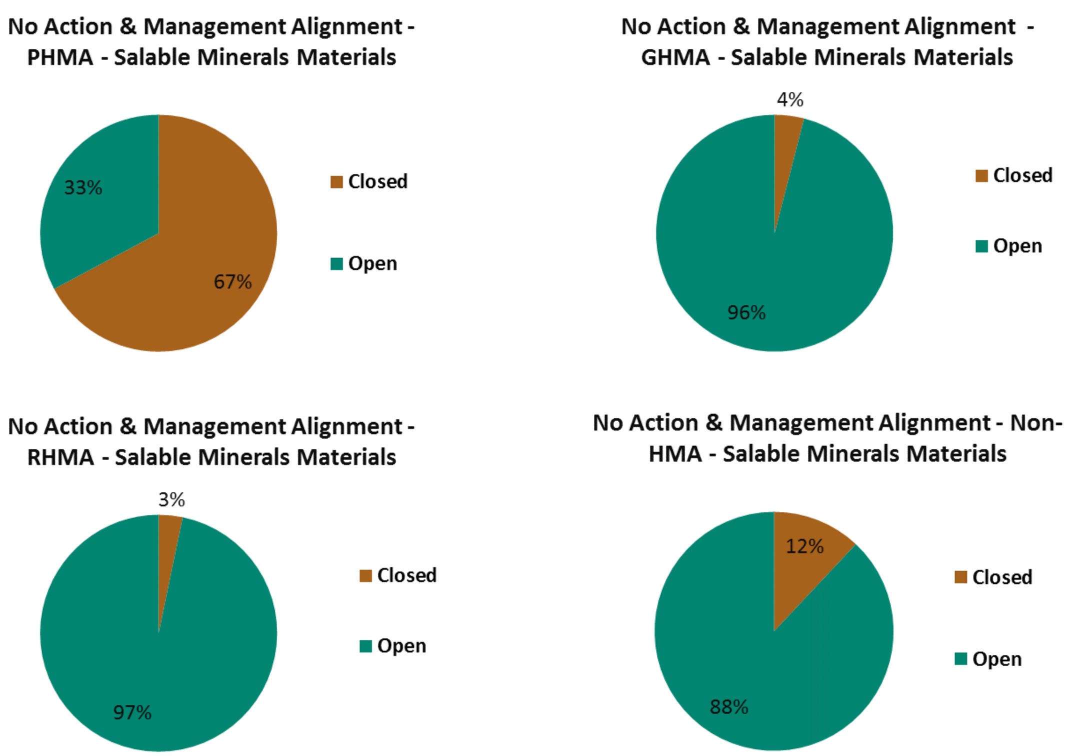


Figure 10 – Salable Minerals Materials Decisions within MZ I

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

X. Solar Energy

Table 12 – Solar Energy Decisions within MZ I

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding.
[5] Data not available for Wyoming. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Solar Energy Decisions[5] in MZ I by Habitat Management Area Type					
Solar Energy	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Exclusion	2,709,000	249,000	93,000	239,000	**3,290,000**
Avoidance	0	1,844,000	55,000	172,000	**2,071,000**
Open	0	0	0	1,144,000	**1,145,000**
Total	**2,709,000**	**2,093,000**	**148,000**	**1,555,000**	**6,506,000**

Approximate % of Habitat Management Area by Solar Energy Decision[5] within Habitat in MZ I					
Solar Energy	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Exclusion	100%	12%	63%	11%	**51%**
Avoidance	0%	88%	37%	15%	**32%**
Open	0%	0%	0%	74%	**18%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

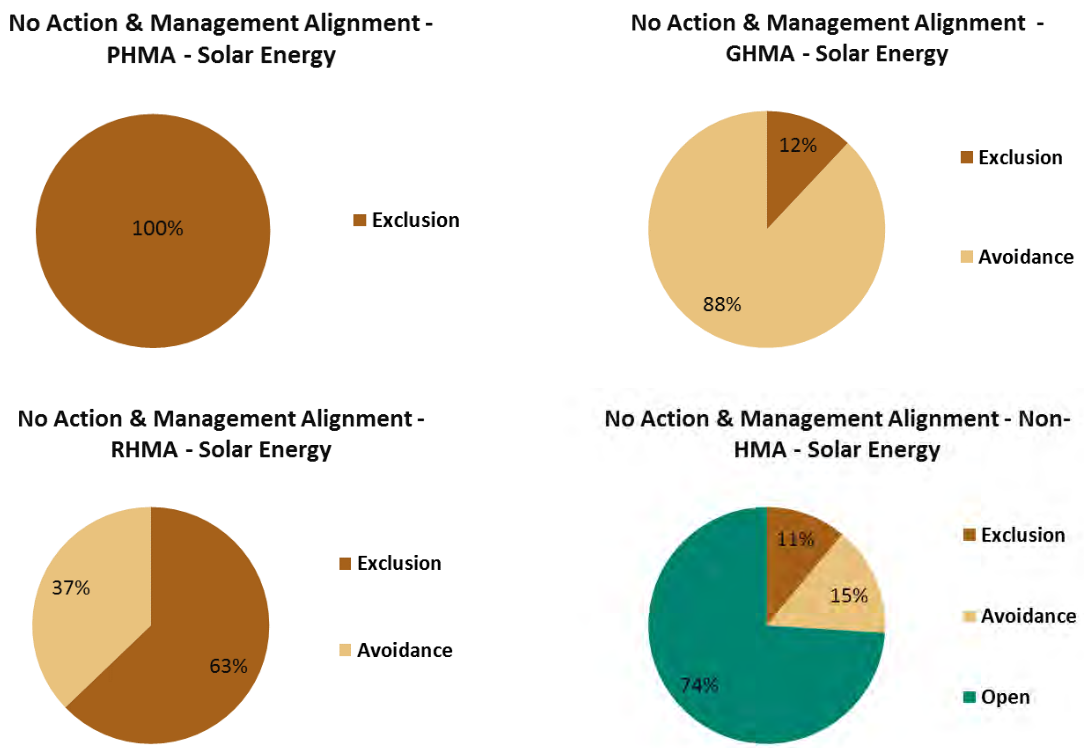


Figure 11 - Solar Energy Decisions within MZ I

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding.
[5] Data not available for Wyoming. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

XI. Trails and Travel Management

Table 13 – Trails and Travel Management Decisions within MZ I

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Trails and Travel Management Decisions in MZ I by Habitat Management Area Type					
Trails and Travel Management	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	2,000	39,000	0	11,000	**52,000**
Limited	3,306,000	3,125,000	159,000	1,655,000	**8,245,000**
Open	0	0	0	0	**0**
Total	**3,308,000**	**3,164,000**	**159,000**	**1,666,000**	**8,297,000**

Approximate % of Habitat Management Area by Trails and Travel Management Decision within Habitat in MZ I					
Trails and Travel Management	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	0%	1%	0%	1%	**1%**
Limited	100%	99%	100%	99%	**99%**
Open	0%	0%	0%	0%	**0%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

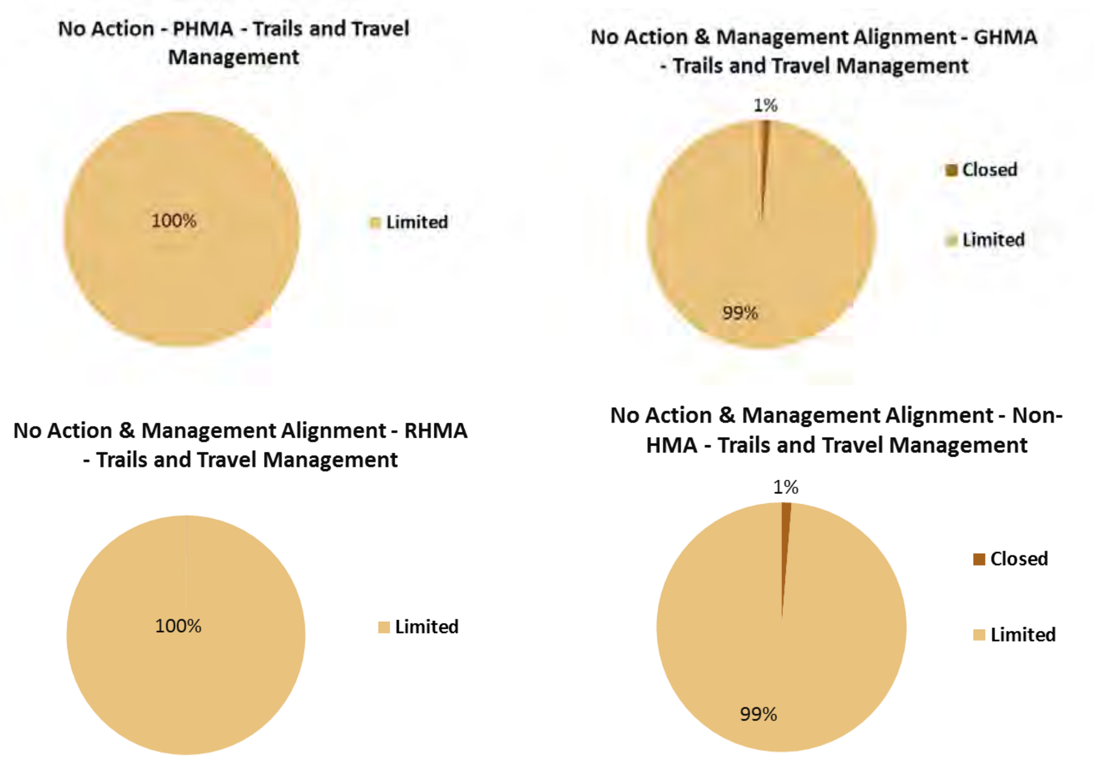


Figure 12 – Trails and Travel Management Decisions within MZ I

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

XII. Wind Energy

Table 14 – Wind Energy Decisions within MZ I

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Wind Energy Decisions in MZ I by Habitat Management Area Type					
Wind Energy	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Exclusion	2,966,000	384,000	93,000	419,000	**3,862,000**
Avoidance	493,000	2,090,000	55,000	594,000	**3,232,000**
Open	0	513,000	0	655,000	**1,168,000**
Total	**3,459,000**	**2,987,000**	**148,000**	**1,668,000**	**8,262,000**

Approximate % of Habitat Management Area by Wind Energy Decision within Habitat in MZ I					
Wind Energy	**No Action & Management Alignment**				
	PHMA	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Exclusion	86%	13%	63%	25%	**47%**
Avoidance	14%	70%	37%	36%	**39%**
Open	0%	17%	0%	39%	**14%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

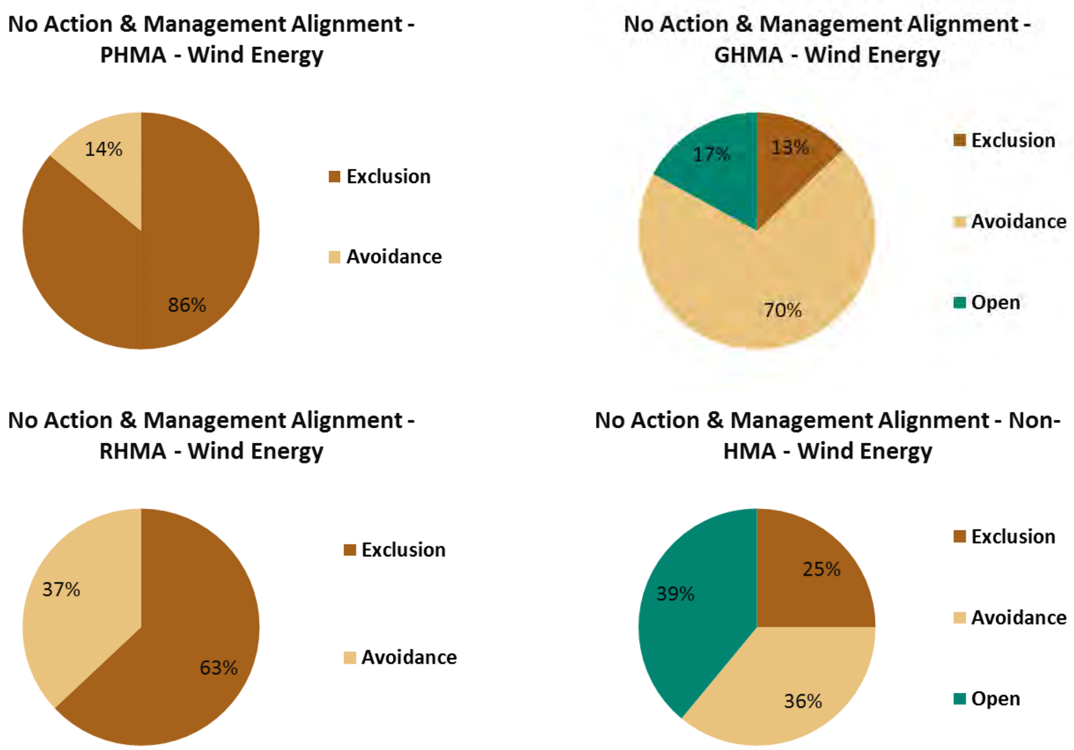


Figure 13 – Wind Energy Decisions within MZ I

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

G.2.2 Management Zones II/VII – WY, CO, UT, ID

I. Habitat Management

Table 15 – Habitat Management Areas within MZs II/VII

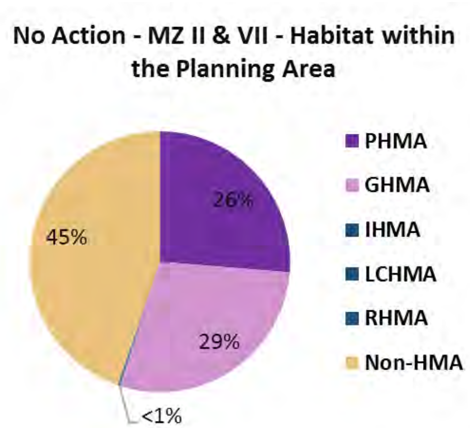
Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of HMA in MZs II/VII					
No Action					
PHMA	IHMA	GHMA	LCHMA[2]	RHMA	Non-HMA
16,699,000	69,000	18,220,000	295,000	8,000	28,409,000

Management Alignment					
PHMA	IHMA	GHMA	LCHMA	RHMA	Non-HMA
16,664,000	69,000	17,394,000	295,000	8,000	29,270,000

Approximate Percent of MZs II/VII that is HMA					
No Action					
PHMA	IHMA	GHMA	LCHMA	RHMA	Non-HMA
26%	<1%	29%	<1%	<1%	45%

Management Alignment					
PHMA	IHMA	GHMA	LCHMA	RHMA	Non-HMA
26%	<1%	27%	<1%	<1%	46%



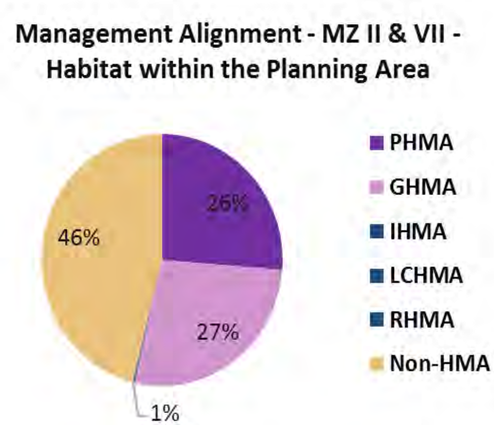


Figure 14 – Habitat Management Areas within MZs II/VII

Percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

[2] Linkage Connectivity Habitat Management Area (LCHMA)

II. Geothermal Energy

Table 16 – Geothermal Energy Decisions within MZ II/VII

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. [6] Data not available for portions of MT and WY. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Geothermal Energy Decisions[6] in MZ II/VII by Habitat Management Area Type							
Geothermal Energy	**No Action**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	781,000	1,000	285,000	1,000	NA	2,342,000	**3,409,000**
Open NSO	2,271,000	29,000	342,000	54,000	NA	1,917,000	**4,615,000**
Open CSU/TL	983,000	0	1,316,000	81,000	NA	3,511,000	**5,891,000**
Open Standard Stipulations	0	0	245,000	8,000	NA	2,407,000	**2,660,000**
Total	**4,037,000**	**29,000**	**2,187,000**	**144,000**	**NA**	**10,179,000**	**16,575,000**

Geothermal Energy	**Management Alignment**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	565,000	1,000	260,000	1,000	NA	2,355,000	**3,181,000**
Open NSO	2,451,000	29,000	348,000	54,000	NA	1,923,000	**4,804,000**
Open CSU/TL	983,000	0	1,109,000	81,000	NA	3,719,000	**5,891,000**
Open Standard Stipulations	0	0	140,000	8,000	NA	2,512,000	**2,660,000**
Total	**4,000,000**	**29,000**	**1,857,000**	**144,000**	**NA**	**10,509,000**	**16,538,000**

Approximate % of Habitat Management Area by Geothermal Energy Decision[6] in MZ II/VII							
Geothermal Energy	**No Action**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	19%	<1%	13%	1%	NA	23%	**21%**
Open NSO	56%	100%	16%	38%	NA	19%	**28%**
Open CSU/TL	24%	0%	60%	56%	NA	34%	**36%**
Open Standard Stipulations	0%	0%	11%	6%	NA	24%	**16%**
Total	**100%**	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

Geothermal Energy	**Management Alignment**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	14%	<1%	14%	1%	NA	22%	**19%**
Open NSO	61%	100%	19%	38%	NA	18%	**29%**
Open CSU/TL	25%	0%	60%	56%	NA	35%	**36%**
Open Standard Stipulations	0%	0%	8%	6%	NA	24%	**16%**
Total	**100%**	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

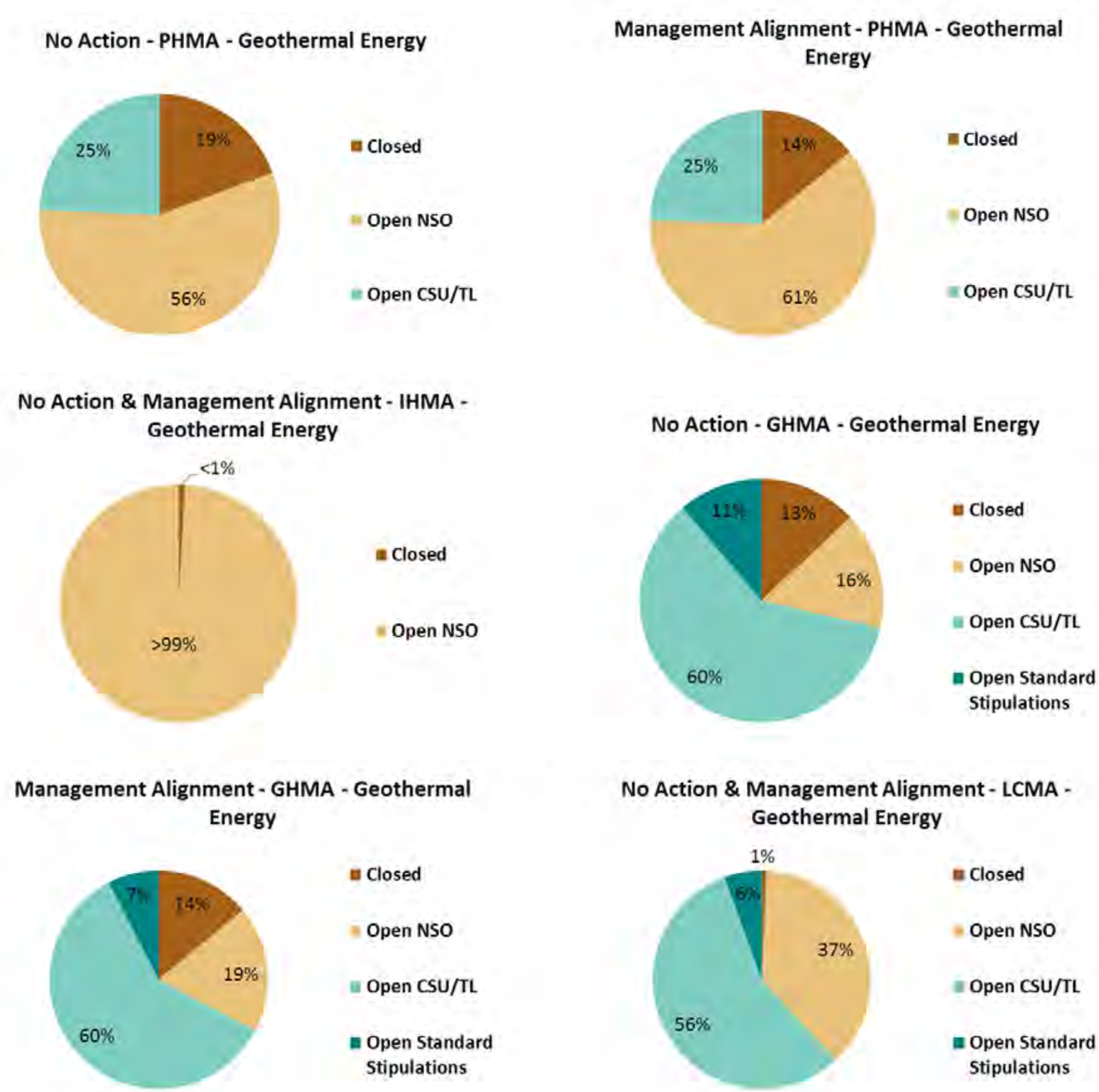
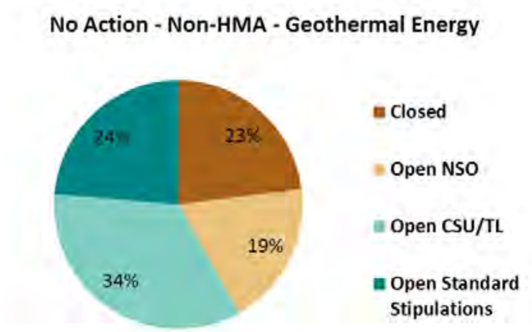


Figure 15 – Geothermal Energy Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. [6] Data not available for portions of MT and WY. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.



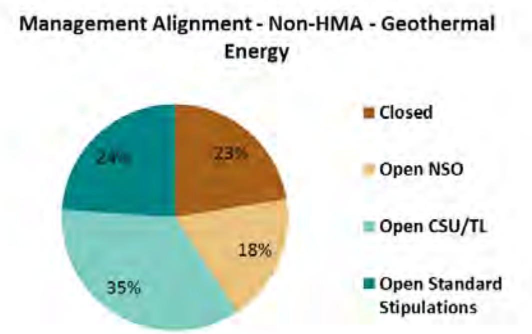


Figure 15 (cont'd) - Geothermal Energy Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. [6] Data not available for portions of MT and WY. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

III. Land Tenure

Table 17 – Land Tenure Decisions within MZ II/VII

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Land Tenure Decisions in MZ II/VII by Habitat Management Area Type							
Land Tenure	**No Action**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Disposal	57,000	0	154,000	0	0	115,000	**325,000**
Retention	8,894,000	18,000	8,972,000	82,000	7,000	11,837,000	**29,811,000**
Total	**8,951,000**	**18,000**	**9,126,000**	**82,000**	**7,000**	**11,952,000**	**30,136,000**

Land Tenure	**Management Alignment**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Disposal	57,000	0	154,000	0	0	115,000	**325,000**
Retention	8,894,000	18,000	8,685,000	82,000	7,000	12,125,000	**29,811,000**
Total	**8,951,000**	**18,000**	**8,839,000**	**82,000**	**7,000**	**12,239,000**	**30,136,000**

Approximate % of Habitat Management Area by Land Tenure Decision in MZ II/VII							
Land Tenure	**No Action & Management Alignment**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Disposal	1%	0%	2%	0%	0%	1%	**1%**
Retention	99%	100%	98%	100%	100%	99%	**99%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

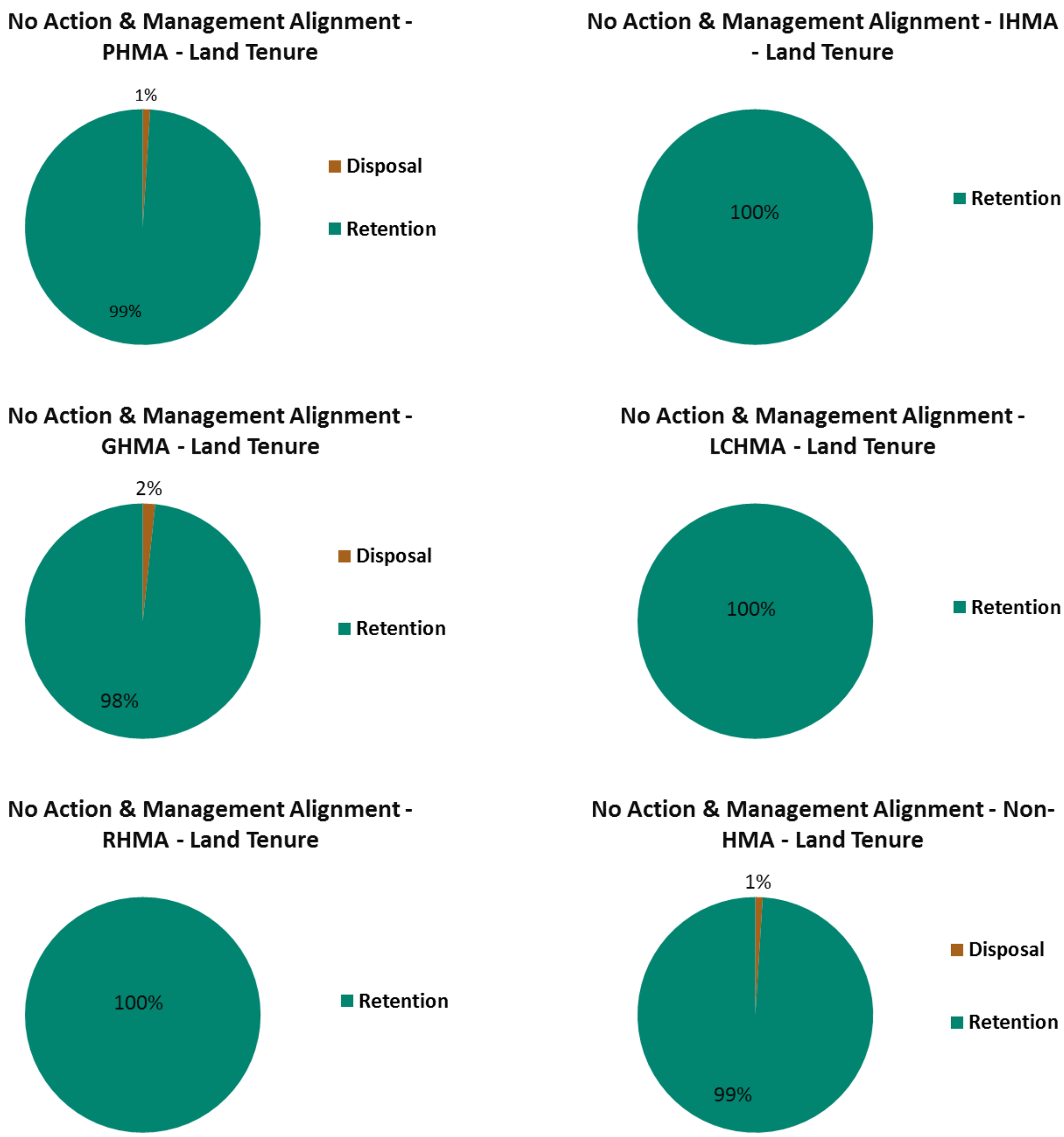


Figure 16 – Land Tenure Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

IV. Livestock Grazing

Table 18 – Livestock Grazing Decisions within MZ II/VII

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Livestock Grazing Decisions in MZ II/VII by Habitat Management Area Type							
Livestock Grazing	**No Action**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Unavailable	40,000	0	40,000	0	0	316,000	**395,000**
Available	8,872,000	18,000	9,069,000	81,000	7,000	8,193,000	**26,241,000**
Total	**8,912,000**	**18,000**	**9,109,000**	**81,000**	**7,000**	**8,508,000**	**26,635,000**

Livestock Grazing	**Management Alignment**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Unavailable	40,000	0	40,000	0	0	316,000	**395,000**
Available	8,872,000	18,000	8,784,000	81,000	7,000	8,479,000	**26,241,000**
Total	**8,912,000**	**18,000**	**8,824,000**	**81,000**	**7,000**	**8,794,000**	**26,635,000**

Approximate % of Habitat Management Area by Livestock Grazing Decision in MZ II/VII							
Livestock Grazing	**No Action & Management Alignment**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Unavailable	<1%	0%	<1%	0%	0%	4%	**1%**
Available	100%	100%	100%	100%	100%	96%	**99%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Figure 17 – Livestock Grazing Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

V. Locatable Minerals

Table 19 – Locatable Minerals Decisions within MZ II/VII

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Locatable Minerals Decisions in MZ II/VII by Habitat Management Area Type

Locatable Minerals	No Action						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	1,863,000	7,000	2,394,000	1,000	0	4,804,000	**9,068,000**
Recommended Withdrawals	998,000	0	320,000	0	0	302,000	**1,620,000**
Open	8,323,000	27,000	8,529,000	137,000	7,000	10,250,000	**27,273,000**
Total	**11,185,000**	**33,000**	**11,243,000**	**137,000**	**7,000**	**15,357,000**	**37,962,000**

Locatable Minerals	Management Alignment						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	1,863,000	7,000	2,125,000	1,000	0	5,072,000	**9,068,000**
Recommended Withdrawals	618,000	0	318,000	0	0	302,000	**1,238,000**
Open	8,703,000	27,000	8,420,000	137,000	7,000	10,361,000	**27,656,000**
Total	**11,185,000**	**33,000**	**10,863,000**	**137,000**	**7,000**	**15,736,000**	**37,962,000**

Approximate % of Habitat Management Area by Locatable Minerals Decision in MZ II/VII

Locatable Minerals	No Action						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	17%	20%	21%	<1%	0%	31%	**24%**
Recommended Withdrawals	9%	0%	3%	0%	0%	2%	**4%**
Open	74%	80%	76%	100%	100%	67%	**72%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Locatable Minerals	Management Alignment						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	17%	20%	20%	<1%	0%	32%	**24%**
Recommended Withdrawals	6%	0%	3%	0%	0%	2%	**3%**
Open	78%	80%	78%	100%	100%	66%	**73%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

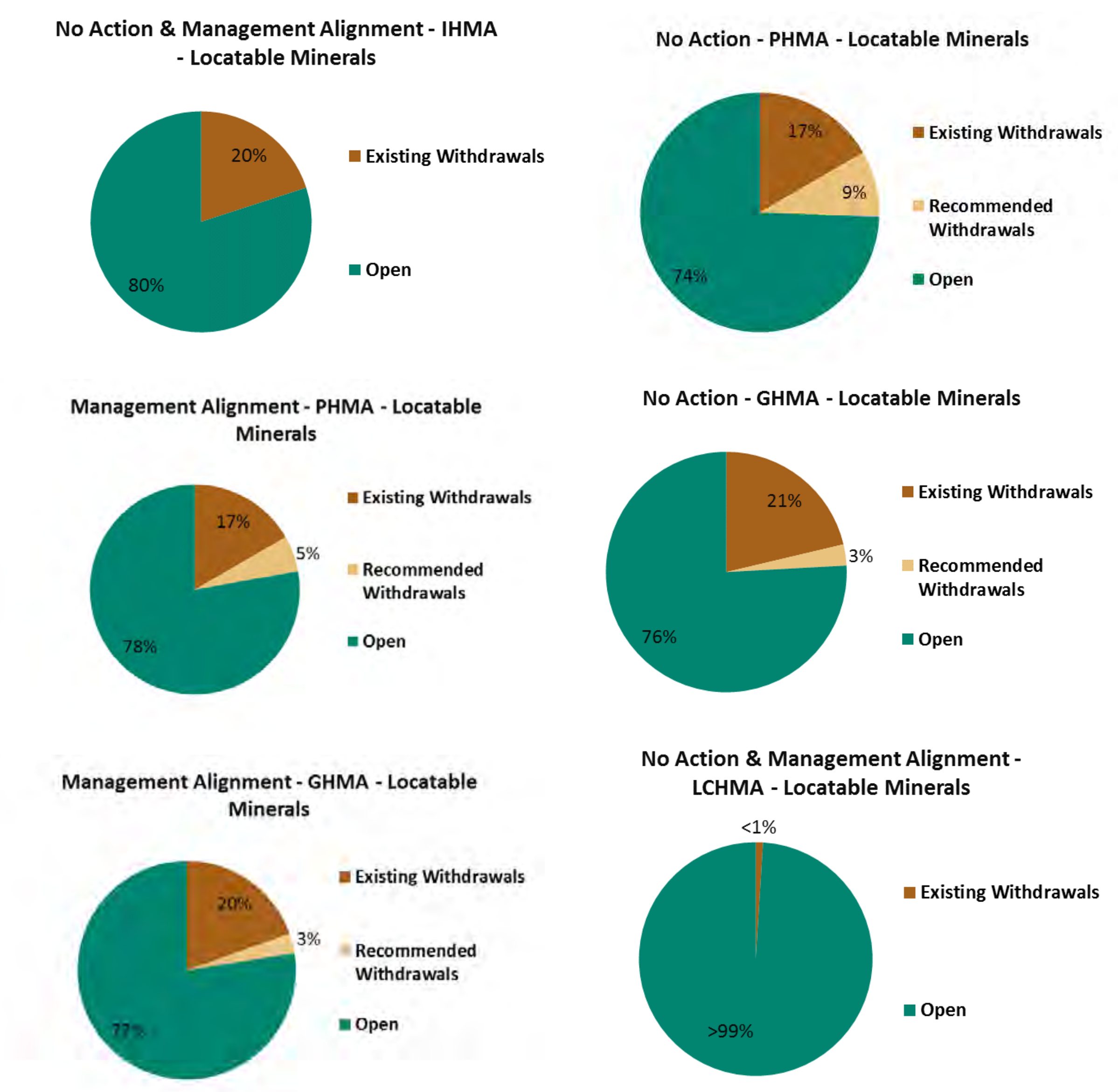


Figure 18 – Locatable Minerals Decisions within MZ II/VII

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

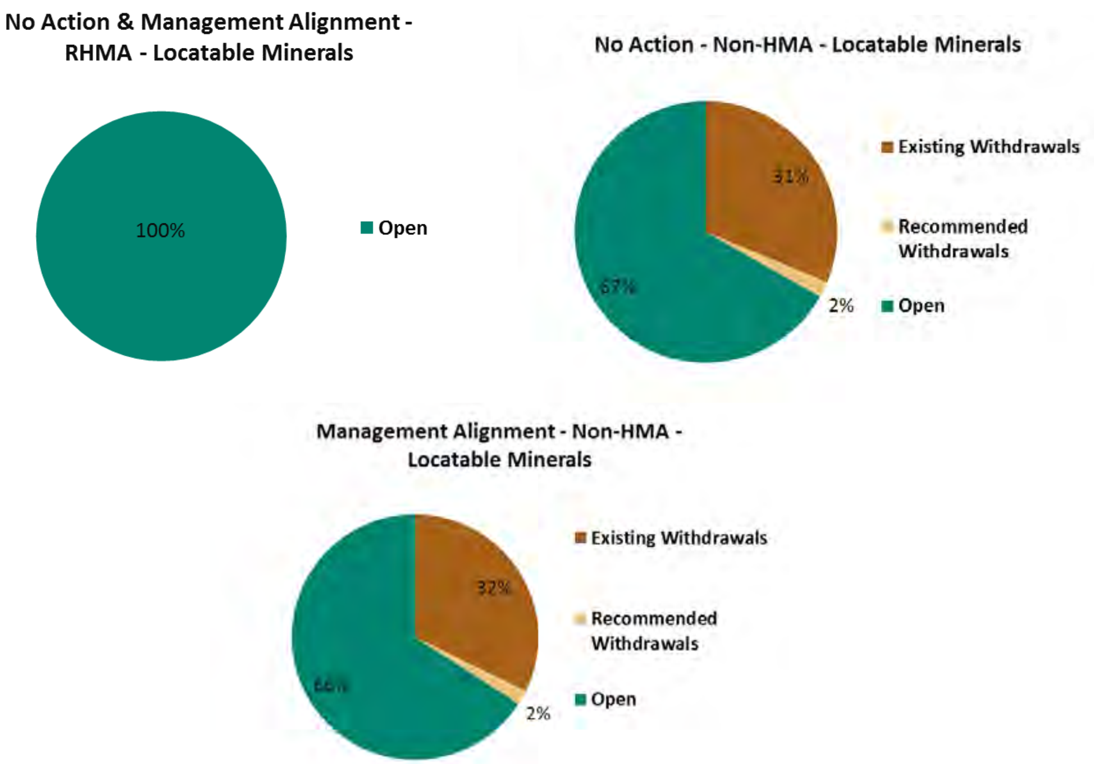


Figure 18 (cont'd) – Locatable Minerals Decisions within MZ II/VII

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

VI. Non-Energy Leasable Minerals

Table 20 – Non-Energy Leasable Minerals Decisions within MZ II/VII

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. [7]Data not available for portions of MT and WY. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Non-Energy Leasable Minerals Decisions[7] in MZ II/VII by Habitat Management Area Type

Non-Energy Leasable Minerals	No Action						
	PHMA	IHMA	GHMA	LCHMA	RHMA	Non-HMA	Total
Closed	3,617,000	7,000	1,256,000	1,000	NA	4,591,000	**9,471,000**
Open	6,052,000	23,000	7,330,000	137,000	NA	10,221,000	**23,763,000**
Total	**9,669,000**	**30,000**	**8,586,000**	**137,000**	**NA**	**14,812,000**	**33,233,000**

Non-Energy Leasable Minerals	Management Alignment						
	PHMA	IHMA	GHMA	LCHMA	RHMA	Non-HMA	Total
Closed	3,581,000	7,000	1,244,000	1,000	NA	4,603,000	**9,436,000**
Open	6,052,000	23,000	6,972,000	137,000	NA	10,614,000	**23,799,000**
Total	**9,633,000**	**30,000**	**8,216,000**	**137,000**	**NA**	**15,217,000**	**33,233,000**

Approximate % of Habitat Management Area by Non-Energy Leasable Minerals Decision[7] in MZ II/VII

Non-Energy Leasable Minerals	No Action						
	PHMA	IHMA	GHMA	LCHMA	RHMA	Non-HMA	Total
Closed	37%	23%	15%	<1%	NA	31%	**28%**
Open	63%	77%	85%	100%	NA	69%	**72%**
Total	**100%**	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

Non-Energy Leasable Minerals	Management Alignment						
	PHMA	IHMA	GHMA	LCHMA	RHMA	Non-HMA	Total
Closed	37%	23%	15%	<1%	NA	30%	**28%**
Open	63%	77%	85%	100%	NA	70%	**72%**
Total	**100%**	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

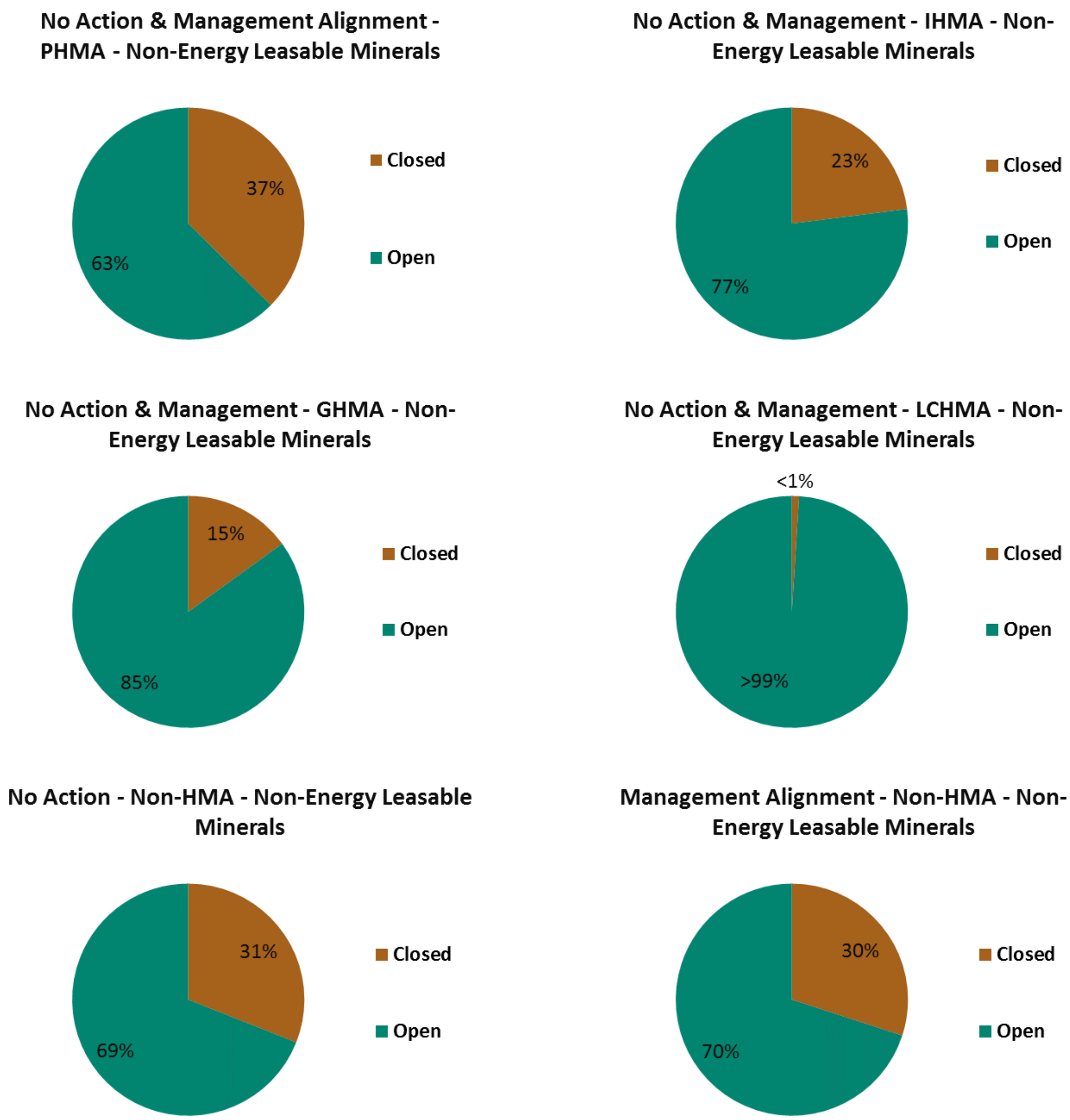


Figure 19 - Non-Energy Leasable Minerals Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. [7]Data not available for portions of MT and WY. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

VII. Fluid Minerals (Oil & Gas)

Table 21 – Fluid Minerals (Oil & Gas) Decisions within MZ II/VII

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in MZ II/VII by Habitat Management Area Type							
Fluid Minerals (Oil & Gas)	**No Action**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	1,294,000	7,000	1,178,000	1,000	0	4,773,000	**7,252,000**
Open NSO	4,399,000	23,000	1,425,000	54,000	5,000	2,628,000	**8,535,000**
Open CSU/TL	5,689,000	0	6,517,000	81,000	2,000	4,748,000	**17,036,000**
Open Standard Stipulations	0	0	2,297,000	8,000	0	2,895,000	**5,200,000**
Total	**11,382,000**	**29,000**	**11,416,000**	**144,000**	**8,000**	**15,046,000**	**38,024,000**

Fluid Minerals (Oil & Gas)	**Management Alignment**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	1,078,000	7,000	1,153,000	1,000	0	4,787,000	**7,024,000**
Open NSO	4,578,000	23,000	1,430,000	54,000	5,000	2,634,000	**8,725,000**
Open CSU/TL	5,689,000	0	6,310,000	81,000	2,000	4,956,000	**17,036,000**
Open Standard Stipulations	0	0	2,193,000	8,000	0	3,000,000	**5,200,000**
Total	**11,345,000**	**29,000**	**11,086,000**	**144,000**	**8,000**	**15,376,000**	**37,988,000**

Approximate % of Habitat Management Area by Fluid Minerals (Oil & Gas) Decision in MZ II/VII							
Fluid Minerals (Oil & Gas)	**No Action**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	11%	21%	10%	<1%	0%	32%	**19%**
Open NSO	39%	79%	12%	38%	63%	17%	**22%**
Open CSU/TL	50%	0%	57%	56%	37%	32%	**45%**
Open Standard Stipulations	0%	0%	20%	6%	0%	19%	**14%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Fluid Minerals (Oil & Gas)	**Management Alignment**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	10%	21%	10%	<1%	0%	31%	**18%**
Open NSO	40%	79%	13%	38%	63%	17%	**23%**
Open CSU/TL	50%	0%	57%	56%	37%	32%	**45%**
Open Standard Stipulations	0%	0%	20%	6%	0%	20%	**14%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

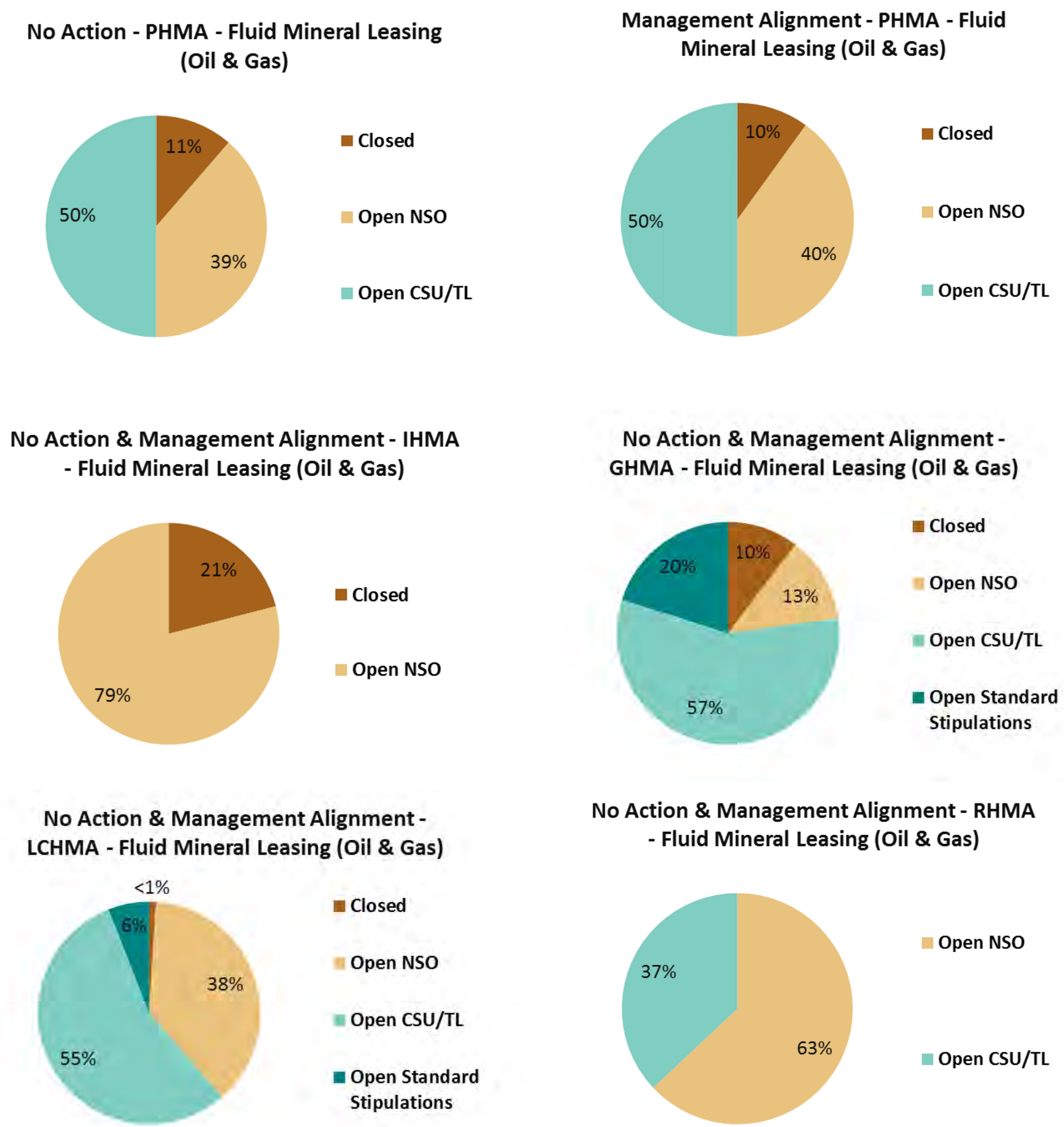


Figure 20 – Fluid Minerals (Oil & Gas) Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Figure 20 (cont'd) – Fluid Minerals (Oil & Gas) Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

VIII. Rights-of-Ways

Table 22 – Rights-of-Ways Decisions within MZ II/VII

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Rights-of-Ways Decisions in MZ II/VII by Habitat Management Area Type							
Rights-of-Ways	No Action						
	PHMA	IHMA	GHMA	LCHMA	RHMA	Non-HMA	Total
Exclusion	561,000	0	654,000	0	0	1,255,000	**2,471,000**
Avoidance	8,119,000	18,000	3,132,000	16,000	7,000	1,172,000	**12,465,000**
Open	71,000	16,000	5,256,000	51,000	0	5,067,000	**10,460,000**
Total	**8,752,000**	**34,000**	**9,041,000**	**67,000**	**7,000**	**7,494,000**	**25,395,000**

Rights-of-Ways	Management Alignment						
	PHMA	IHMA	GHMA	LCHMA	RHMA	Non-HMA	Total
Exclusion	561,000	0	651,000	0	0	1,258,000	**2,471,000**
Avoidance	8,119,000	18,000	3,132,000	16,000	7,000	1,172,000	**12,465,000**
Open	71,000	16,000	4,971,000	51,000	0	5,351,000	**10,460,000**
Total	**8,752,000**	**34,000**	**8,754,000**	**67,000**	**7,000**	**7,781,000**	**25,395,000**

Approximate % of Habitat Management Area by Rights-of-Ways Decision in MZ II/VII							
Rights-of-Ways	No Action						
	PHMA	IHMA	GHMA	LCHMA	RHMA	Non-HMA	Total
Exclusion	6%	0%	7%	0%	0%	17%	**10%**
Avoidance	93%	53%	35%	24%	100%	16%	**49%**
Open	1%	47%	58%	76%	0%	68%	**41%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Rights-of-Ways	Management Alignment						
	PHMA	IHMA	GHMA	LCHMA	RHMA	Non-HMA	Total
Exclusion	6%	0%	7%	0%	0%	16%	**10%**
Avoidance	93%	53%	36%	24%	100%	15%	**49%**
Open	1%	47%	57%	76%	0%	69%	**41%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

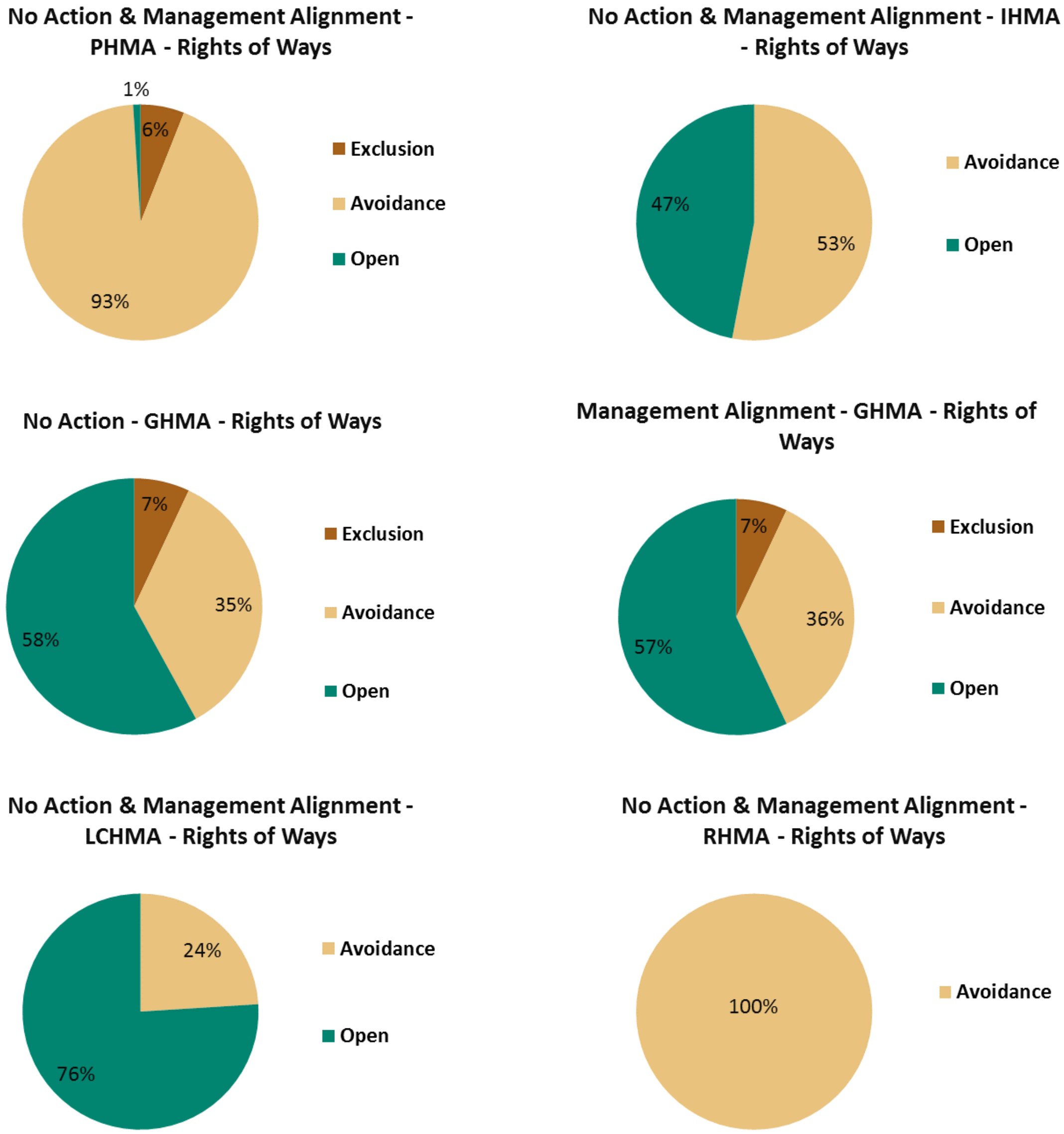


Figure 21 – Rights-of-Ways Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

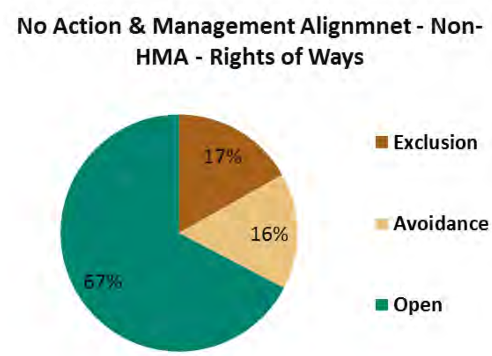


Figure 21 (cont'd) – Rights-of-Ways Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

IX. Salable Minerals Materials

Table 23 – Salable Minerals Materials Decisions within MZ II/VII

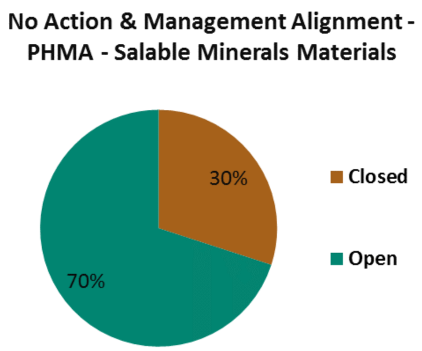
Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Salable Minerals Materials Decisions in MZ II/VII by Habitat Management Area Type							
Salable Minerals Materials	No Action						
	PHMA	IHMA	GHMA	LCHMA	RHMA	Non-HMA	Total
Closed	3,241,000	0	1,401,000	27,000	0	3,592,000	**8,263,000**
Open	7,671,000	28,000	9,745,000	115,000	7,000	9,675,000	**27,239,000**
Total	**10,912,000**	**28,000**	**11,145,000**	**142,000**	**7,000**	**13,268,000**	**35,502,000**

Salable Minerals Materials	Management Alignment						
	PHMA	IHMA	GHMA	LCHMA	RHMA	Non-HMA	Total
Closed	3,241,000	0	1,399,000	27,000	0	3,594,000	**8,263,000**
Open	7,671,000	28,000	9,413,000	115,000	7,000	10,006,000	**27,239,000**
Total	**10,912,000**	**28,000**	**10,813,000**	**142,000**	**7,000**	**13,600,000**	**35,502,000**

Approximate % of Habitat Management Area by Salable Minerals Materials Decision in MZ II/VII							
Salable Minerals Materials	No Action						
	PHMA	IHMA	GHMA	LCHMA	RHMA	Non-HMA	Total
Closed	30%	0%	13%	19%	0%	26%	**23%**
Open	70%	100%	87%	81%	100%	74%	**77%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Salable Minerals Materials	Management Alignment						
	PHMA	IHMA	GHMA	LCHMA	RHMA	Non-HMA	Total
Closed	30%	0%	13%	19%	0%	27%	**23%**
Open	70%	100%	87%	81%	100%	73%	**77%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**



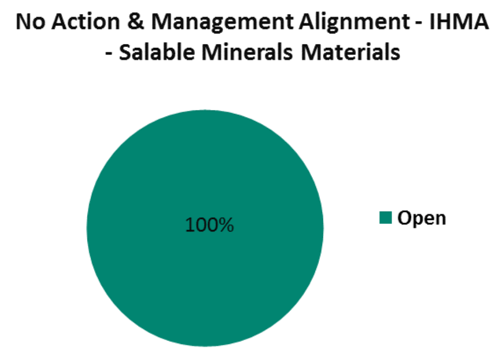


Figure 22 – Salable Minerals Materials Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

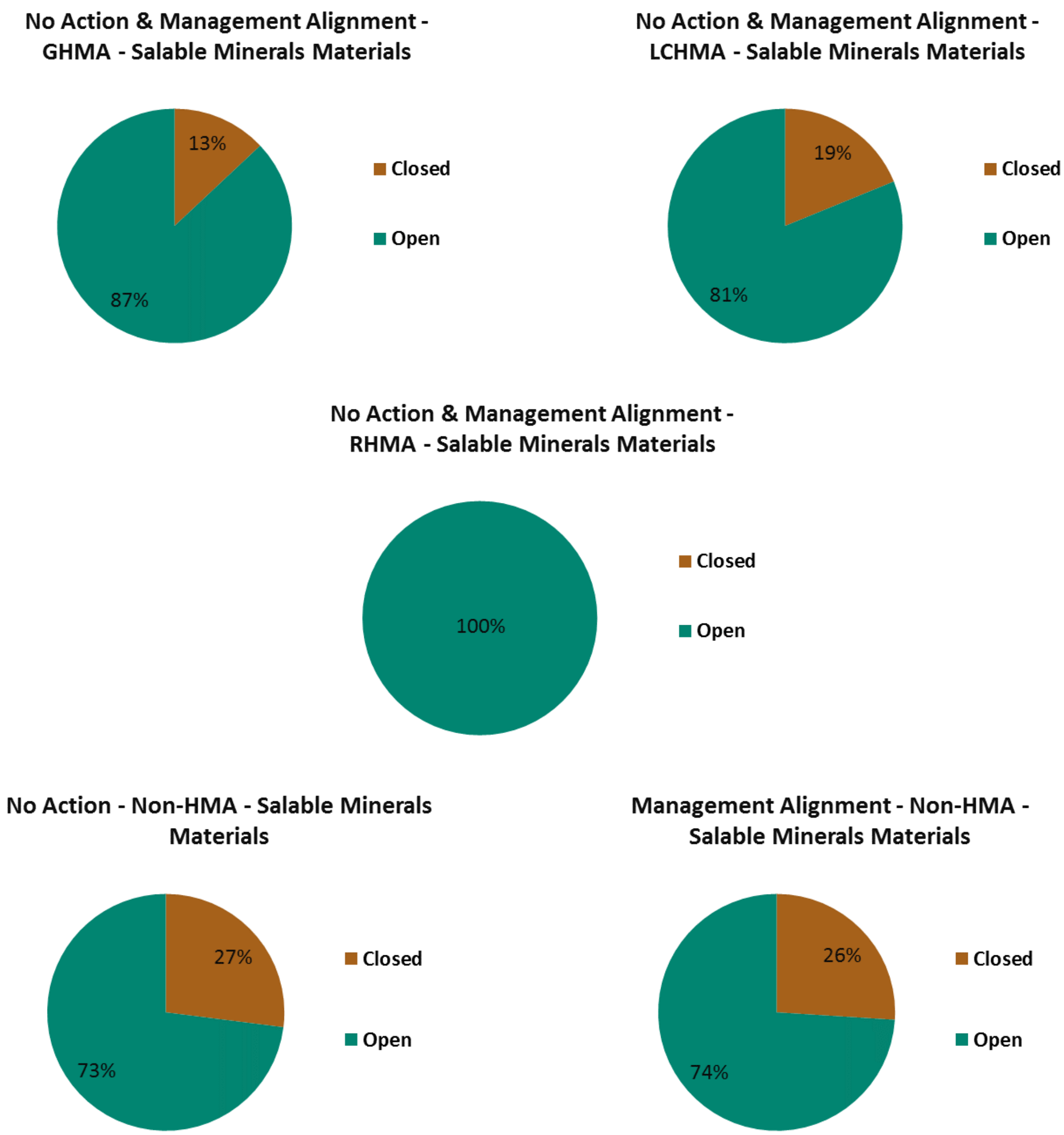


Figure 22 (cont'd) – Salable Minerals Materials Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

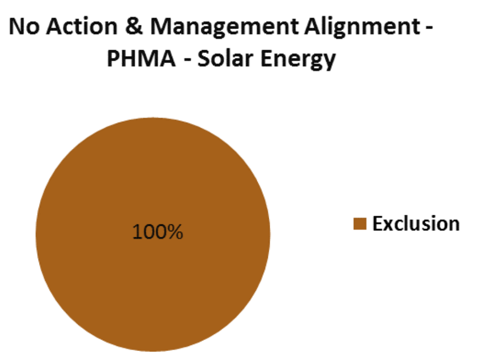
X. Solar Energy

Table 24 – Solar Energy Decisions within MZ II/VII

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. [8] Data not available for WY. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Solar Energy Decisions[8] in MZ II/VII by Habitat Management Area Type							
Solar Energy	**No Action**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Exclusion	1,494,000	0	317,000	0	7,000	4,352,000	**6,169,000**
Avoidance	2,000	18,000	764,000	83,000	0	742,000	**1,610,000**
Open	0	0	1,000	0	0	2,170,000	**2,171,000**
Total	**1,496,000**	**18,000**	**1,082,000**	**83,000**	**7,000**	**7,265,000**	**9,950,000**
Solar Energy	**Management Alignment**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Exclusion	1,494,000	0	30,000	0	7,000	4,639,000	**6,169,000**
Avoidance	2,000	18,000	764,000	83,000	0	742,000	**1,610,000**
Open	0	0	1,000	0	0	2,170,000	**2,171,000**
Total	**1,496,000**	**18,000**	**795,000**	**83,000**	**7,000**	**7,551,000**	**9,950,000**

Approximate % of Habitat Management Area by Solar Energy Decision[8] in MZ II/VII							
Solar Energy	**No Action**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Exclusion	100%	0%	29%	0%	100%	60%	**62%**
Avoidance	0%	100%	71%	100%	0%	10%	**16%**
Open	0%	0%	<1%	0%	0%	30%	**22%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Solar Energy	**Management Alignment**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Exclusion	100%	0%	4%	0%	100%	61%	**62%**
Avoidance	0%	100%	96%	100%	0%	10%	**16%**
Open	0%	0%	<1%	0%	0%	29%	**22%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**



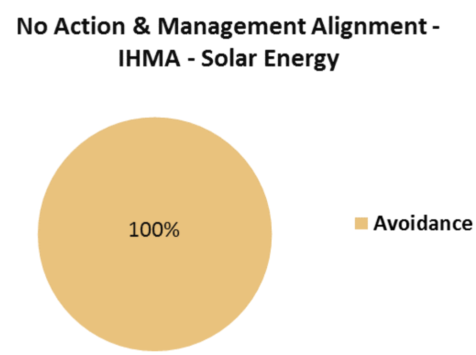


Figure 23 – Solar Energy Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. [8] Data not available for WY. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

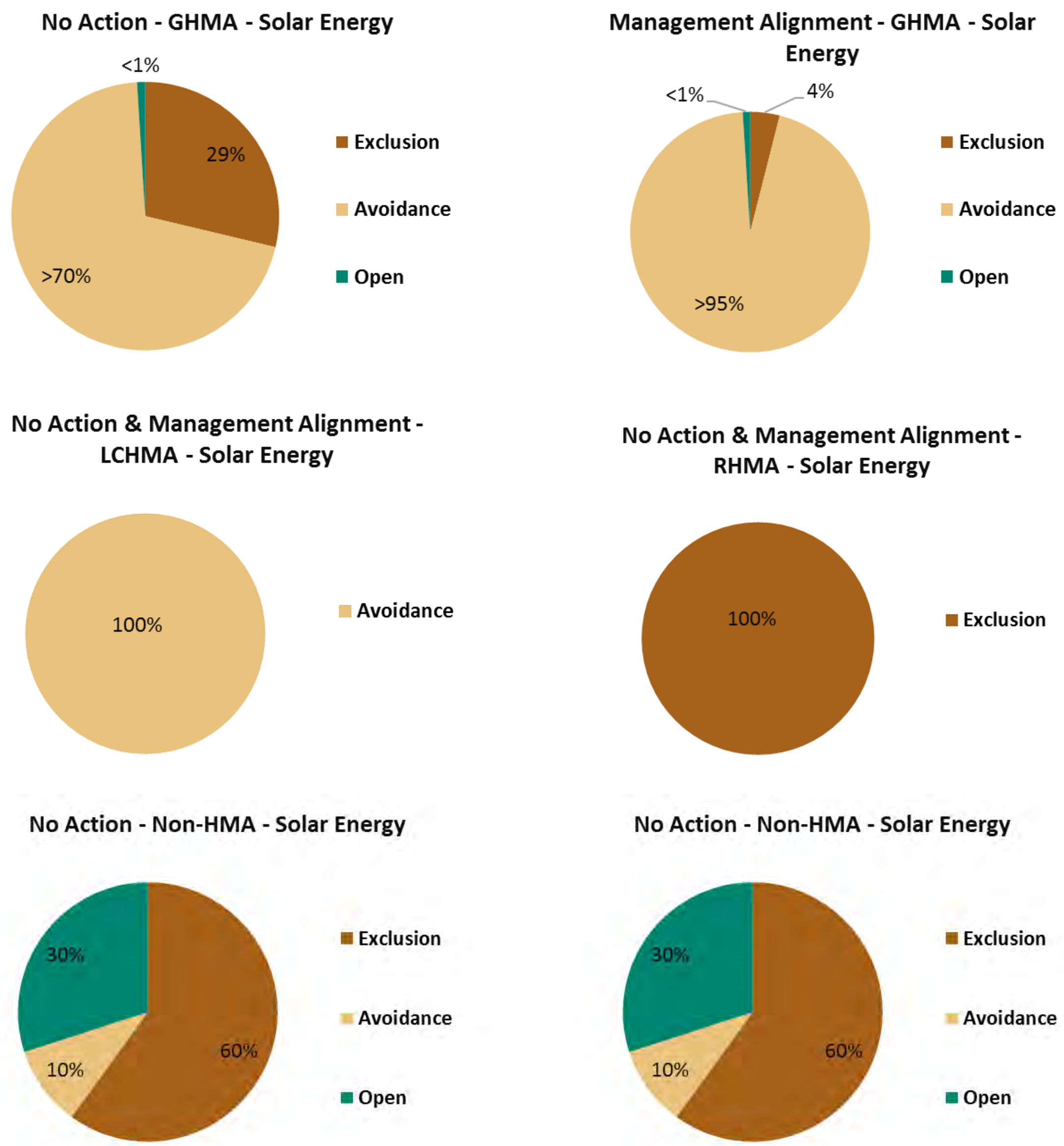


Figure 23 (cont'd) – Solar Energy Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. [8] Data not available for WY. Calculations reflect only the portions of the MZ where data was available. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

XI. Trails and Travel Management

Table 25 – Trails and Travel Management Decisions within MZ II/VII

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Trails and Travel Management Decisions in MZ II/VII by Habitat Management Area Type							
Trails and Travel Management	**No Action**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	103,000	0	369,000	11,000	0	1,304,000	**1,787,000**
Limited	8,840,000	18,000	8,696,000	69,000	7,000	6,337,000	**23,966,000**
Open	4,000	0	54,000	3,000	0	891,000	**953,000**
Total	**8,947,000**	**18,000**	**9,121,000**	**82,000**	**7,000**	**8,531,000**	**26,706,000**

Trails and Travel Management	**Management Alignment**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	103,000	0	366,000	11,000	0	1,307,000	**1,787,000**
Limited	8,840,000	18,000	8,413,000	69,000	7,000	6,620,000	**23,966,000**
Open	4,000	0	54,000	3,000	0	891,000	**953,000**
Total	**8,947,000**	**18,000**	**8,834,000**	**82,000**	**7,000**	**8,819,000**	**26,706,000**

Approximate % of Habitat Management Area by Trails and Travel Management Decision in MZ II/VII							
Trails and Travel Management	**No Action & Management Alignment**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	1%	0%	4%	13%	0%	15%	**7%**
Limited	99%	100%	95%	84%	100%	74%	**90%**
Open	0%	0%	1%	4%	0%	10%	**4%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

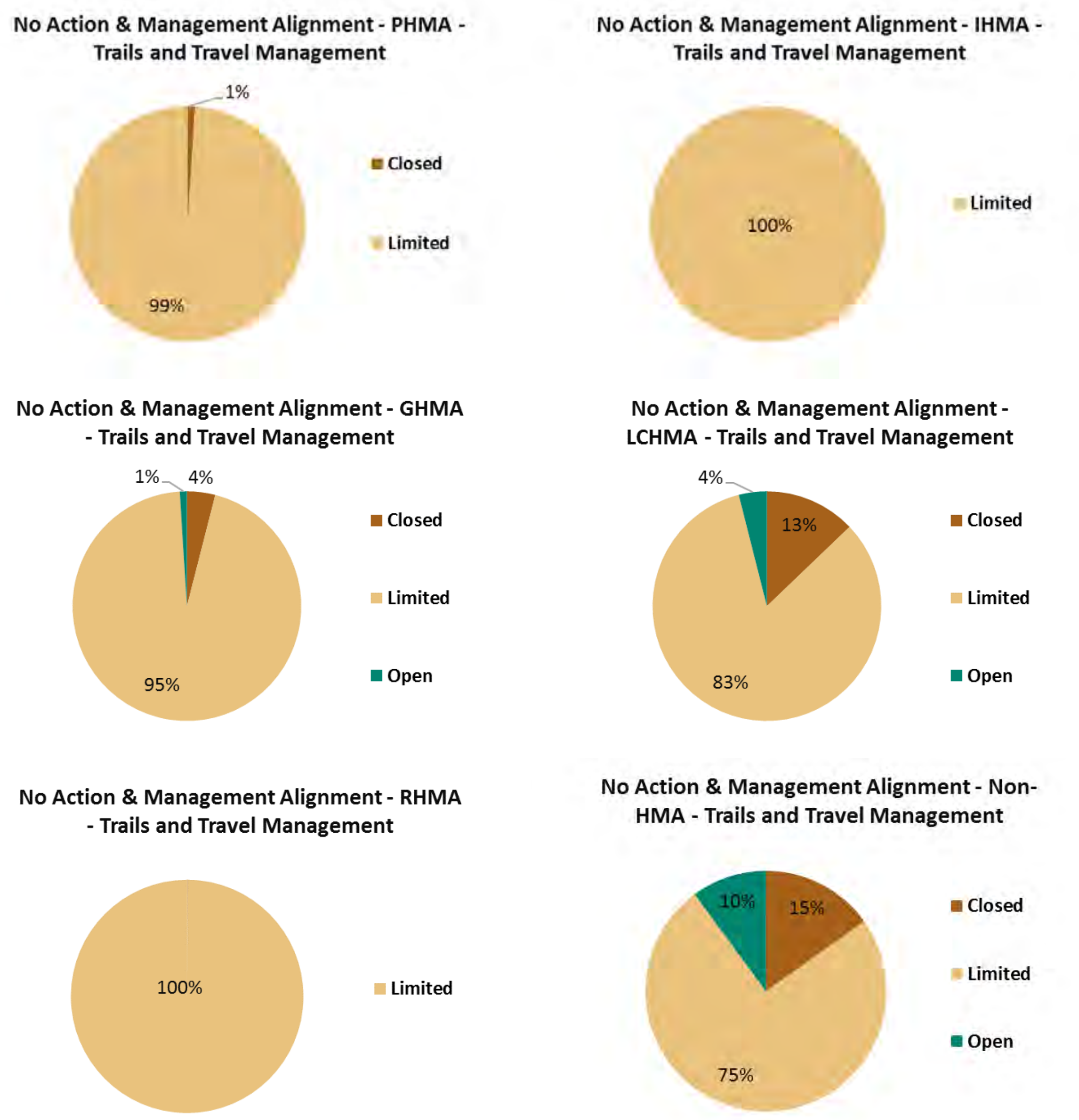


Figure 24 – Trails and Travel Management Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

XII. Wind Energy

Table 26 – Wind Energy Decisions within MZ II/VII

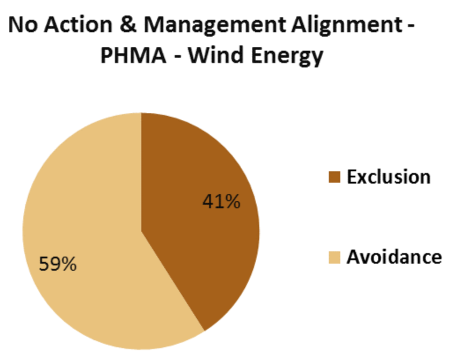
Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Wind Energy Decisions in MZ II/VII by Habitat Management Area Type							
Wind Energy	**No Action**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Exclusion	3,660,000	0	1,041,000	0	7,000	1,327,000	**6,035,000**
Avoidance	5,294,000	18,000	2,805,000	83,000	0	1,103,000	**9,304,000**
Open	0	0	5,272,000	0	0	5,045,000	**10,317,000**
Total	**8,953,000**	**18,000**	**9,119,000**	**83,000**	**7,000**	**7,476,000**	**25,656,000**

Wind Energy	**Management Alignment**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Exclusion	3,660,000	0	1,038,000	0	7,000	1,330,000	**6,035,000**
Avoidance	5,294,000	18,000	2,805,000	83,000	0	1,103,000	**9,304,000**
Open	0	0	4,988,000	0	0	5,329,000	**10,317,000**
Total	**8,953,000**	**18,000**	**8,831,000**	**83,000**	**7,000**	**7,763,000**	**25,656,000**

Approximate % of Habitat Management Area by Wind Energy Decision in MZ II/VII							
Wind Energy	**No Action**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Exclusion	41%	0%	11%	0%	100%	18%	**24%**
Avoidance	59%	100%	31%	100%	0%	15%	**36%**
Open	0%	0%	58%	0%	0%	67%	**40%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Wind Energy	**Management Alignment**						
	PHMA	**IHMA**	**GHMA**	**LCHMA**	**RHMA**	**Non-HMA**	**Total**
Exclusion	41%	0%	12%	0%	100%	17%	**24%**
Avoidance	59%	100%	32%	100%	0%	14%	**36%**
Open	0%	0%	56%	0%	0%	69%	**40%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**



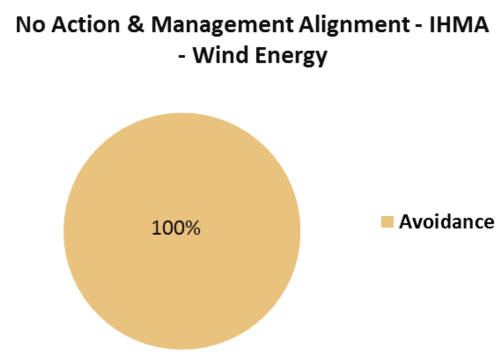


Figure 25 – Wind Energy Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

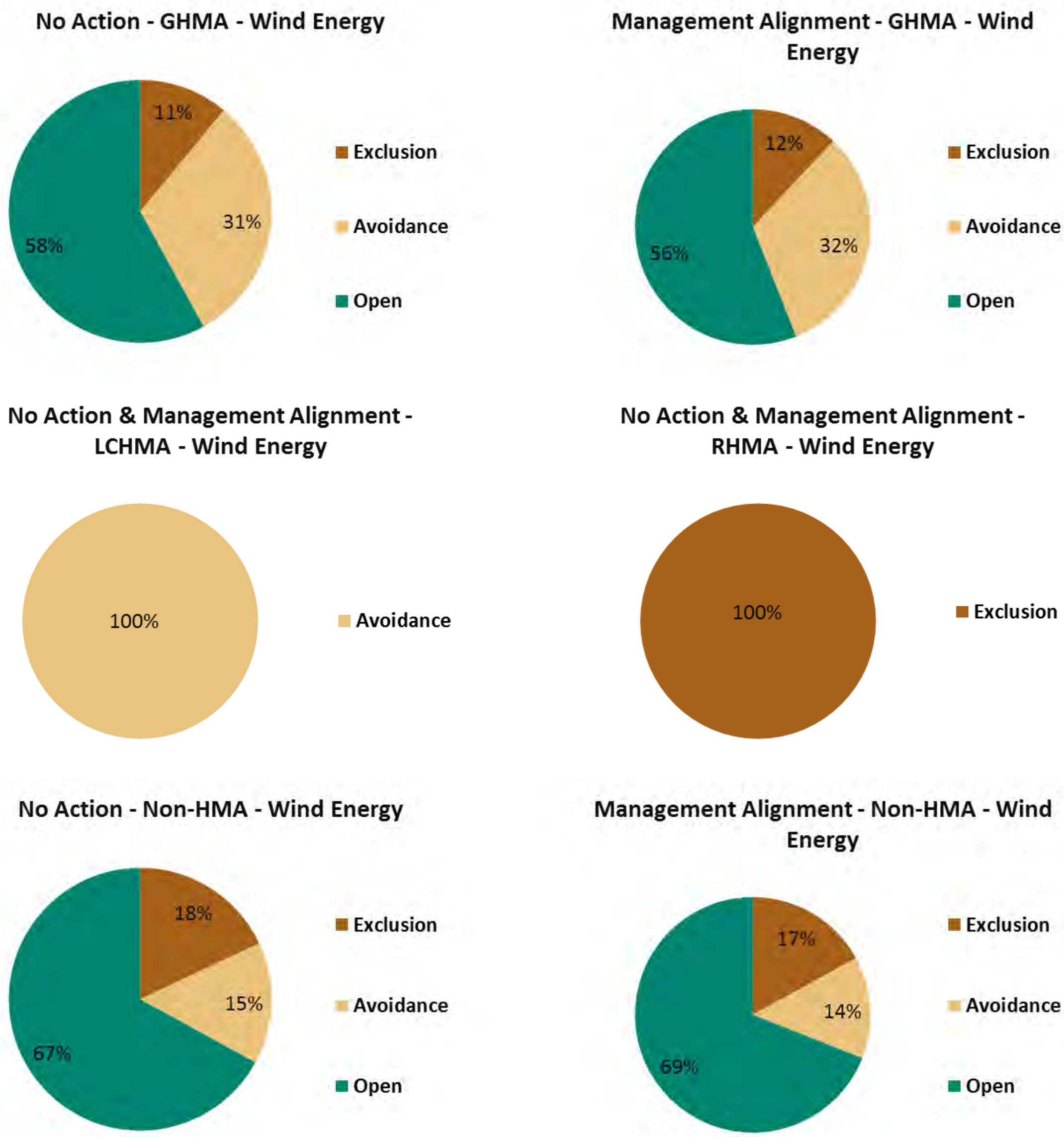


Figure 25 (cont'd) – Wind Energy Decisions within MZ II/VII

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

G.2.3 Management Zone III – UT, NV

I. Habitat Management

Table 27 – Habitat Management Areas within MZ III

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of HMA in MZ III									
No Action					Management Alignment				
PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA
7,093,000	5,953,000	5,651,000	42,000	54,928,000	6,974,000	4,474,000	4,253,000	42,000	57,925,000

Approximate Percent of MZ III that is HMA									
No Action					Management Alignment				
PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA
10%	8%	8%	<1%	75%	**9%**	**6%**	**6%**	**<1%**	**79%**

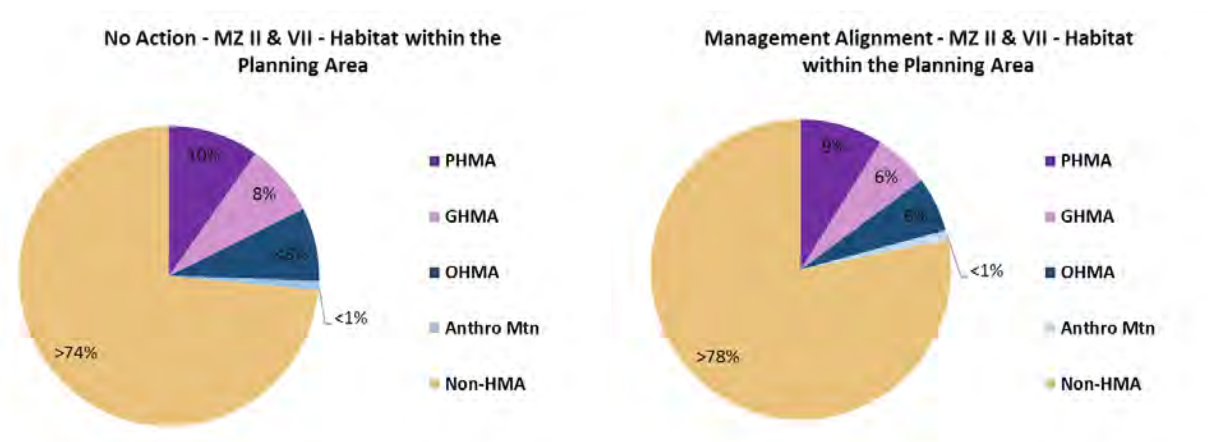


Figure 26 – Habitat Management Areas within MZ III

Percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

II. Geothermal Energy

Table 28 – Geothermal Energy Decisions within MZ III

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Geothermal Energy Decisions in MZ III by Habitat Management Area Type						
Geothermal Energy	**No Action**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Closed	126,000	165,000	230,000	7,000	4,948,000	**5,476,000**
Open NSO	5,358,000	23,000	0	35,000	3,939,000	**9,354,000**
Open CSU/TL	0	3,628,000	0	0	2,135,000	**5,763,000**
Open Standard Stipulations	0	86,000	4,042,000	0	26,065,000	**30,193,000**
Total	**5,484,000**	**3,902,000**	**4,272,000**	**42,000**	**37,087,000**	**50,787,000**

Geothermal Energy	**Management Alignment**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Closed	124,000	176,000	159,000	7,000	4,990,000	**5,457,000**
Open NSO	5,483,000	0	0	35,000	3,961,000	**9,479,000**
Open CSU/TL	0	3,565,000	0	0	2,191,000	**5,756,000**
Open Standard Stipulations	0	0	3,534,000	0	26,554,000	**30,088,000**
Total	**5,607,000**	**3,741,000**	**3,693,000**	**42,000**	**37,696,000**	**50,780,000**

Approximate % of Habitat Management Area by Geothermal Energy Decision in MZ III						
Geothermal Energy	**No Action**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Closed	2%	4%	5%	17%	13%	**11%**
Open NSO	98%	1%	0%	83%	11%	**18%**
Open CSU/TL	0%	93%	0%	0%	6%	**11%**
Open Standard Stipulations	0%	2%	95%	0%	70%	**59%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Geothermal Energy	**Management Alignment**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Closed	2%	5%	4%	17%	13%	**11%**
Open NSO	98%	0%	0%	83%	11%	**19%**
Open CSU/TL	0%	95%	0%	0%	6%	**11%**
Open Standard Stipulations	0%	0%	96%	0%	70%	**59%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

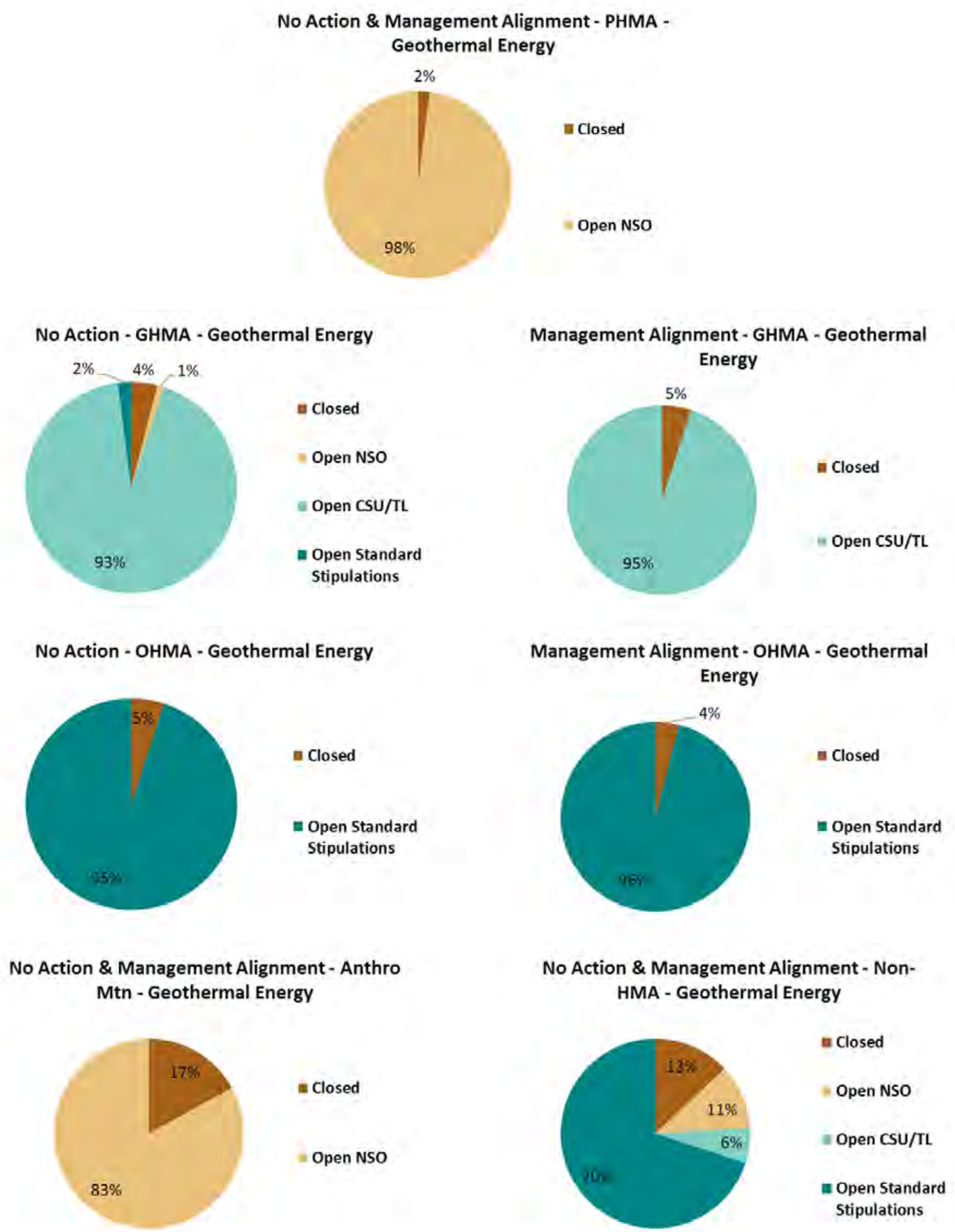


Figure 27 – Geothermal Energy Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

III. Land Tenure

Table 29 – Land Tenure Decisions within MZ III

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Land Tenure Decisions in MZ III by Habitat Management Area Type						
Land Tenure	**No Action**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Disposal	0	0	280,000	NA	2,178,000	**2,458,000**
Retention	4,722,000	3,875,000	3,992,000	NA	30,234,000	**42,824,000**
Total	**4,722,000**	**3,875,000**	**4,272,000**	**NA**	**32,413,000**	**45,283,000**
Land Tenure	**Management Alignment**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Disposal	3,000	62,000	304,000	NA	2,214,000	**2,583,000**
Retention	4,844,000	3,679,000	3,389,000	NA	30,782,000	**42,694,000**
Total	**4,847,000**	**3,741,000**	**3,693,000**	**NA**	**32,996,000**	**45,277,000**

Approximate % of Habitat Management Area by Land Tenure Decision in MZ III						
Land Tenure	**No Action**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Disposal	0%	0%	7%	NA	7%	**5%**
Retention	100%	100%	93%	NA	93%	**95%**
Total	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**
Land Tenure	**Management Alignment**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Disposal	0%	2%	8%	NA	7%	**6%**
Retention	100%	98%	92%	NA	93%	**94%**
Total	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

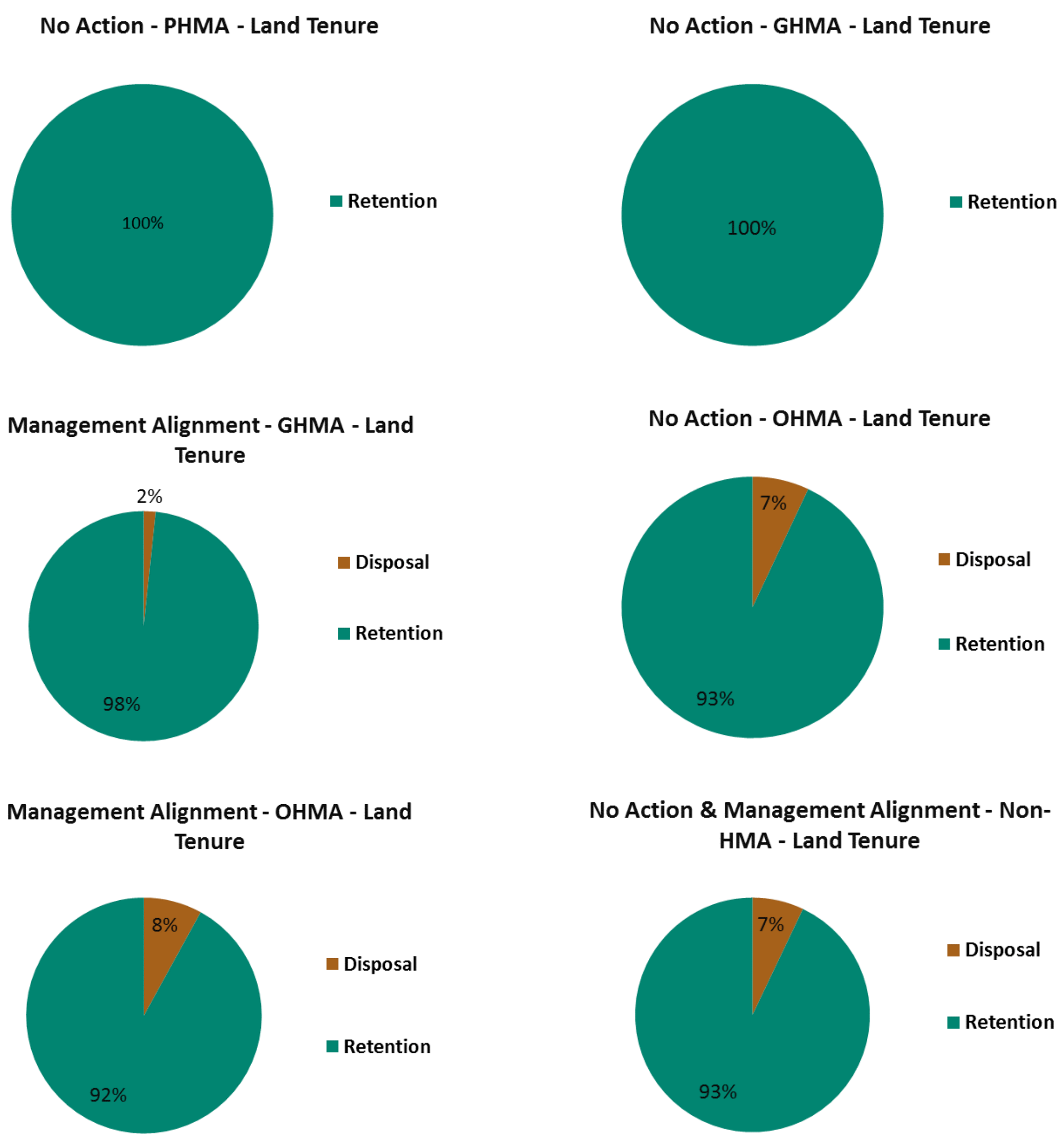


Figure 28 – Land Tenure Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

IV. Livestock Grazing

Table 30 – Livestock Grazing Decisions within MZ III

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Livestock Grazing Decisions in MZ III by Habitat Management Area Type						
Livestock Grazing	**No Action**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Unavailable	0	0	0	NA	129,000	**129,000**
Available	4,722,000	3,868,000	4,265,000	NA	31,559,000	**44,415,000**
Total	**4,722,000**	**3,868,000**	**4,265,000**	**NA**	**31,688,000**	**44,544,000**

Livestock Grazing	**Management Alignment**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Unavailable	0	0	0	NA	129,000	**129,000**
Available	4,845,000	3,741,000	3,690,000	NA	32,135,000	**44,410,000**
Total	**4,845,000**	**3,741,000**	**3,690,000**	**NA**	**32,264,000**	**44,539,000**

Approximate % of Habitat Management Area by Livestock Grazing Decision in MZ III						
Livestock Grazing	**No Action**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Unavailable	0%	0%	0%	NA	<1%	**<1%**
Available	100%	100%	100%	NA	100%	**100%**
Total	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

Livestock Grazing	**Management Alignment**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Unavailable	0%	0%	0%	NA	<1%	**<1%**
Available	100%	100%	100%	NA	100%	**100%**
Total	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

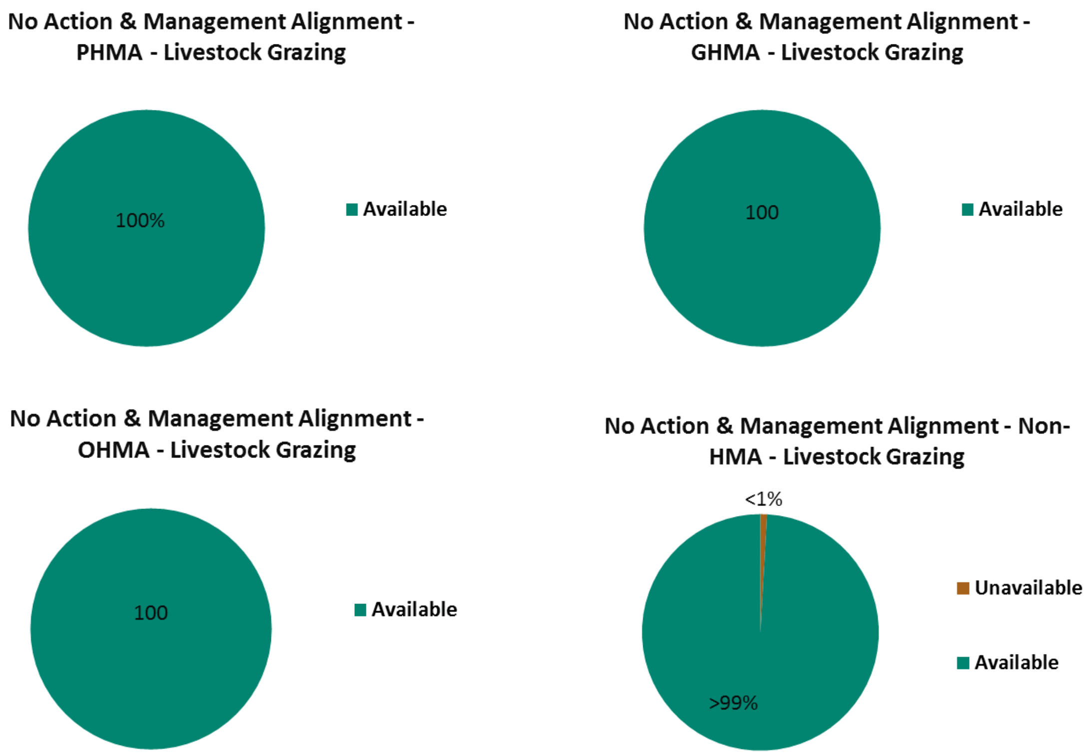


Figure 29 – Livestock Grazing Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

V. Locatable Minerals

Table 31 – Locatable Minerals Decisions within MZ III

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Locatable Minerals Decisions in MZ III by Habitat Management Area Type

Locatable Minerals	No Action					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Existing Withdrawals	56,000	143,000	52,000	0	3,350,000	**3,602,000**
Recommended Withdrawals	4,000	0	0	0	49,000	**53,000**
Open	5,429,000	3,788,000	4,219,000	42,000	34,853,000	**48,332,000**
Total	**5,489,000**	**3,931,000**	**4,272,000**	**42,000**	**38,253,000**	**51,987,000**

Locatable Minerals	Management Alignment					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Existing Withdrawals	61,000	100,000	42,000	0	3,398,000	**3,601,000**
Recommended Withdrawals	4,000	0	0	0	50,000	**53,000**
Open	5,552,000	3,641,000	3,650,000	42,000	35,444,000	**48,330,000**
Total	**5,617,000**	**3,741,000**	**3,693,000**	**42,000**	**38,892,000**	**51,985,000**

Approximate % of Habitat Management Area by Geothermal Energy Decision in MZ III

Locatable Minerals	No Action					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Existing Withdrawals	1%	4%	1%	0	9%	**7%**
Recommended Withdrawals	<1%	0%	0%	0%	<1%	**<1%**
Open	99%	96%	99%	100%	91%	**93%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Locatable Minerals	Management Alignment					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Existing Withdrawals	**1%**	**3%**	**1%**	**0%**	**9%**	**7%**
Recommended Withdrawals	**<1%**	**0%**	**0%**	**0%**	**0%**	**<1%**
Open	**99%**	**97%**	**99%**	**100%**	**91%**	**93%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

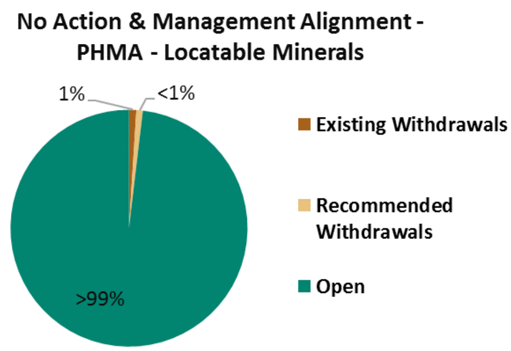


Figure 30 – Locatable Minerals Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

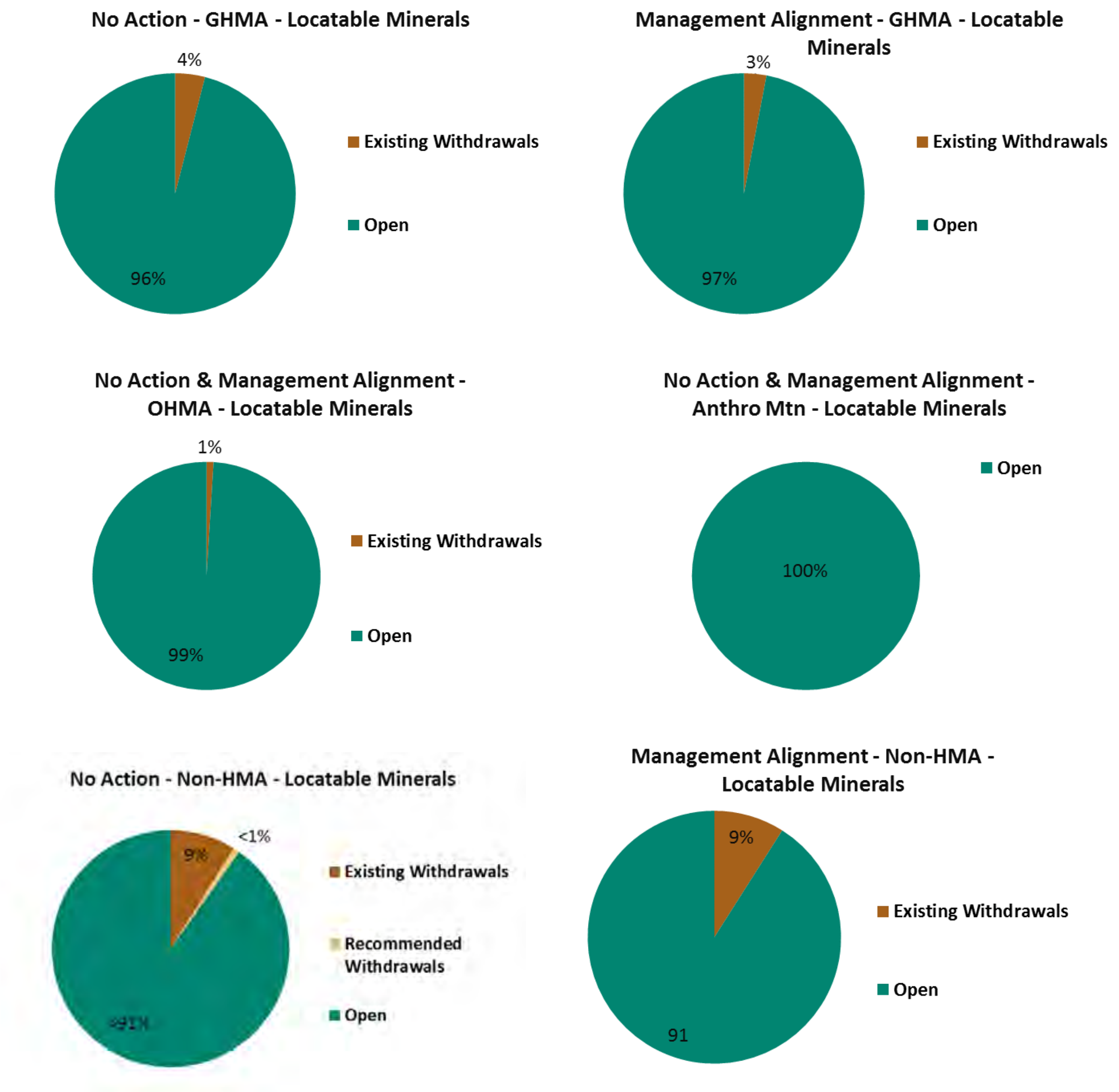


Figure 30 (cont'd) – Locatable Minerals Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

VI. Non-Energy Leasable Minerals

Table 32 – Non-Energy Leasable Minerals Decisions within MZ III

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Non-Energy Leasable Minerals Decisions in MZ III by Habitat Management Area Type

Non-Energy Leasable Minerals	No Action					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Closed	5,486,000	165,000	230,000	42,000	4,948,000	**10,871,000**
Open	0	3,766,000	4,042,000	0	33,308,000	**41,116,000**
Total	**5,486,000**	**3,931,000**	**4,272,000**	**42,000**	**38,256,000**	**51,987,000**

Non-Energy Leasable Minerals	Management Alignment					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Closed	5,611,000	176,000	159,000	42,000	4,990,000	**10,978,000**
Open	0	3,565,000	3,534,000	0	33,904,000	**41,004,000**
Total	**5,611,000**	**3,741,000**	**3,693,000**	**42,000**	**38,894,000**	**51,981,000**

Approximate % of Habitat Management Area by Non-Energy Leasable Minerals Decision in MZ III

Non-Energy Leasable Minerals	No Action					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Closed	100%	4%	5%	100%	13%	**21%**
Open	0%	96%	95%	0%	87%	**79%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Non-Energy Leasable Minerals	Management Alignment					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Closed	100%	5%	4%	100%	13%	**21%**
Open	0%	95%	96%	0%	87%	**79%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

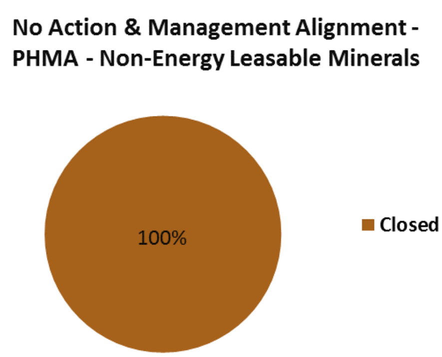


Figure 31 – Non-Energy Leasable Minerals Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

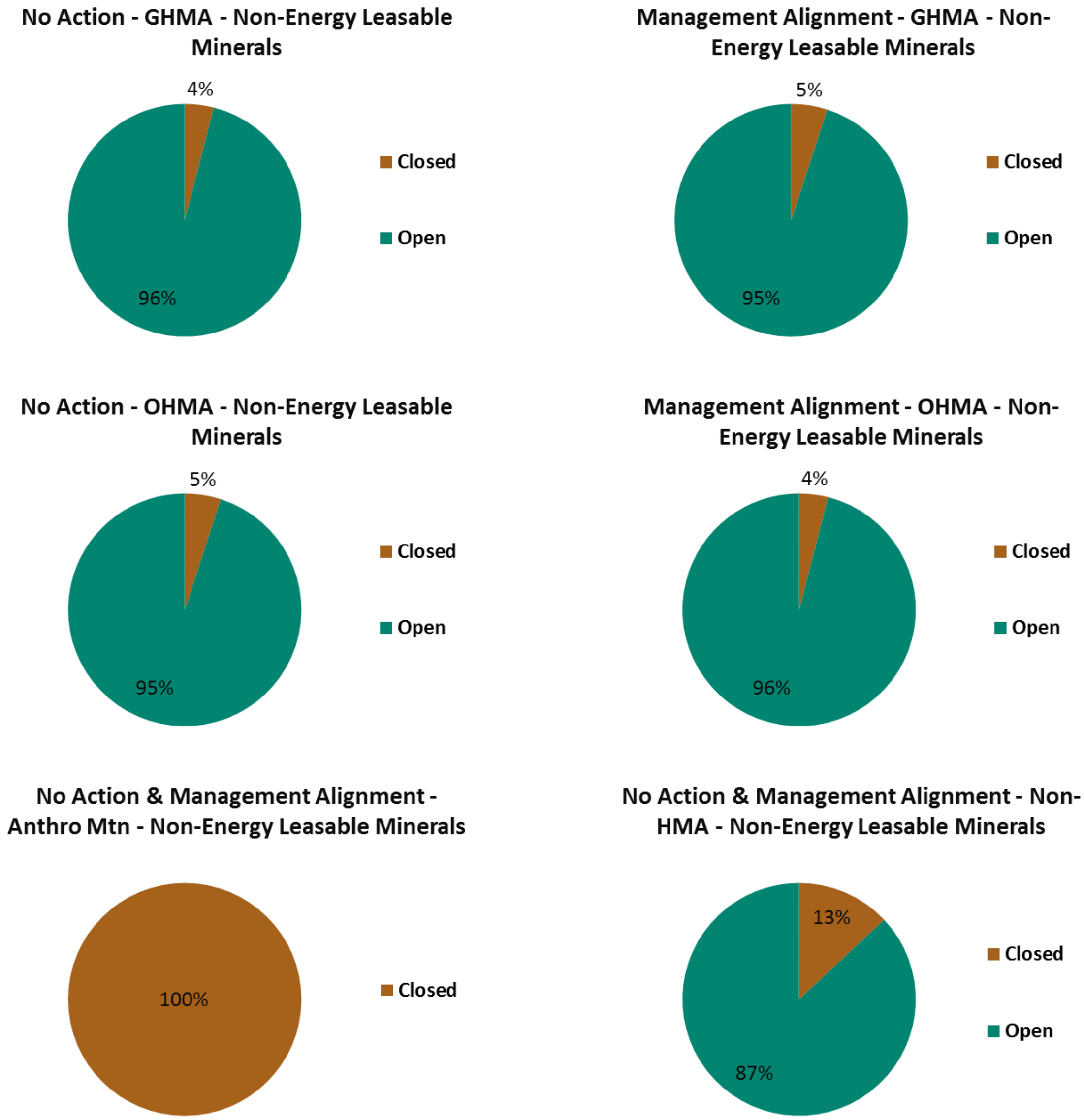


Figure 31 (cont'd) – Non-Energy Leasable Minerals Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

VII. Fluid Minerals (Oil & Gas)

Table 33 – Fluid Mineral (Oil & Gas) Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Fluid Mineral (Oil & Gas) Decisions in MZ III by Habitat Management Area Type

Fluid Mineral (Oil & Gas) Decisions	No Action					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Closed	126,000	165,000	230,000	7,000	4,948,000	**5,476,000**
Open NSO	5,358,000	23,000	0	35,000	3,431,000	**8,847,000**
Open CSU/TL	0	3,628,000	0	0	2,135,000	**5,763,000**
Open Standard Stipulations	0	86,000	4,042,000	0	26,502,000	**30,630,000**
Total	**5,484,000**	**3,902,000**	**4,272,000**	**42,000**	**37,016,000**	**50,716,000**

Fluid Mineral (Oil & Gas) Decisions	Management Alignment					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Closed	144,000	176,000	159,000	7,000	4,990,000	**5,476,000**
Open NSO	5,464,000	0	0	35,000	3,454,000	**8,952,000**
Open CSU/TL	0	3,565,000	0	0	2,191,000	**5,756,000**
Open Standard Stipulations	0	0	3,534,000	0	26,991,000	**30,525,000**
Total	**5,607,000**	**3,741,000**	**3,693,000**	**42,000**	**37,626,000**	**50,710,000**

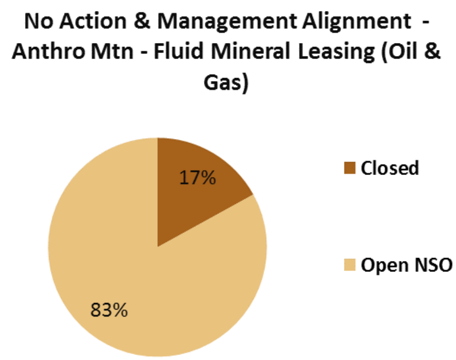
Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in MZ III

Fluid Mineral (Oil & Gas) Decisions	No Action					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Closed	2%	4%	5%	17%	13%	**11%**
Open NSO	98%	1%	0%	83%	9%	**17%**
Open CSU/TL	0%	93%	0%	0%	6%	**11%**
Open Standard Stipulations	0%	2%	95%	0%	72%	**60%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Fluid Mineral (Oil & Gas) Decisions	Management Alignment					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Closed	3%	5%	4%	17%	13%	**11%**
Open NSO	97%	0%	0%	83%	9%	**18%**
Open CSU/TL	0%	95%	0%	0%	6%	**11%**
Open Standard Stipulations	0%	0%	96%	0%	72%	**60%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Figure 32 – Fluid Mineral (Oil & Gas) Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.



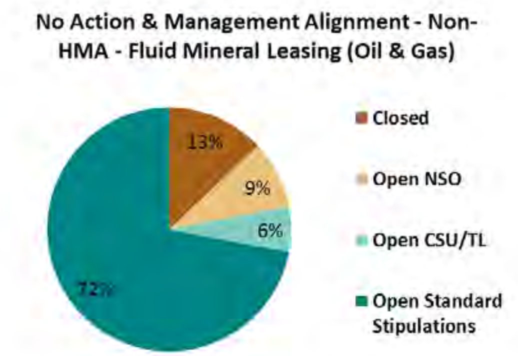


Figure 32 (cont'd) – Fluid Mineral (Oil & Gas) Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

VIII. Rights-of-Ways

Table 34 – Rights-of-Ways Decisions within MZ III

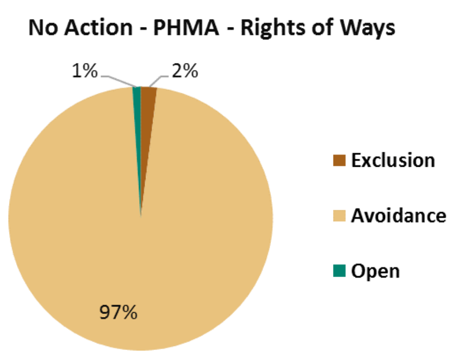
Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Rights-of-Ways Decisions in MZ III by Habitat Management Area Type						
Rights-of-Ways	**No Action**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Exclusion	86,000	164,000	230,000	NA	3,794,000	**4,274,000**
Avoidance	4,591,000	3,495,000	0	NA	799,000	**8,884,000**
Open	46,000	216,000	4,043,000	NA	27,890,000	**32,195,000**
Total	**4,722,000**	**3,875,000**	**4,272,000**	**NA**	**32,483,000**	**45,353,000**

Rights-of-Ways	**Management Alignment**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Exclusion	104,000	176,000	159,000	NA	3,837,000	**4,275,000**
Avoidance	4,726,000	3,565,000	0	NA	373,000	**8,664,000**
Open	17,000	0	3,534,000	NA	28,857,000	**32,408,000**
Total	**4,847,000**	**3,741,000**	**3,693,000**	**NA**	**33,066,000**	**45,348,000**

Approximate % of Habitat Management Area by Rights-of-Ways Decision in MZ III						
Rights-of-Ways	**No Action**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Exclusion	2%	4%	5%	NA	12%	**9%**
Avoidance	97%	90%	0%	NA	2%	**20%**
Open	1%	6%	95%	NA	86%	**71%**
Total	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

Rights-of-Ways	**Management Alignment**					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Exclusion	2%	5%	4%	NA	12%	**9%**
Avoidance	98%	95%	0%	NA	1%	**19%**
Open	<1%	0%	96%	NA	87%	**71%**
Total	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**



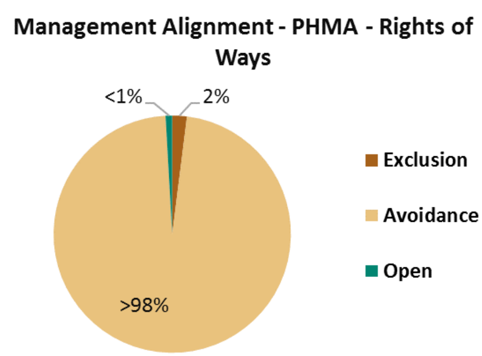


Figure 33 – Rights-of-Ways Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

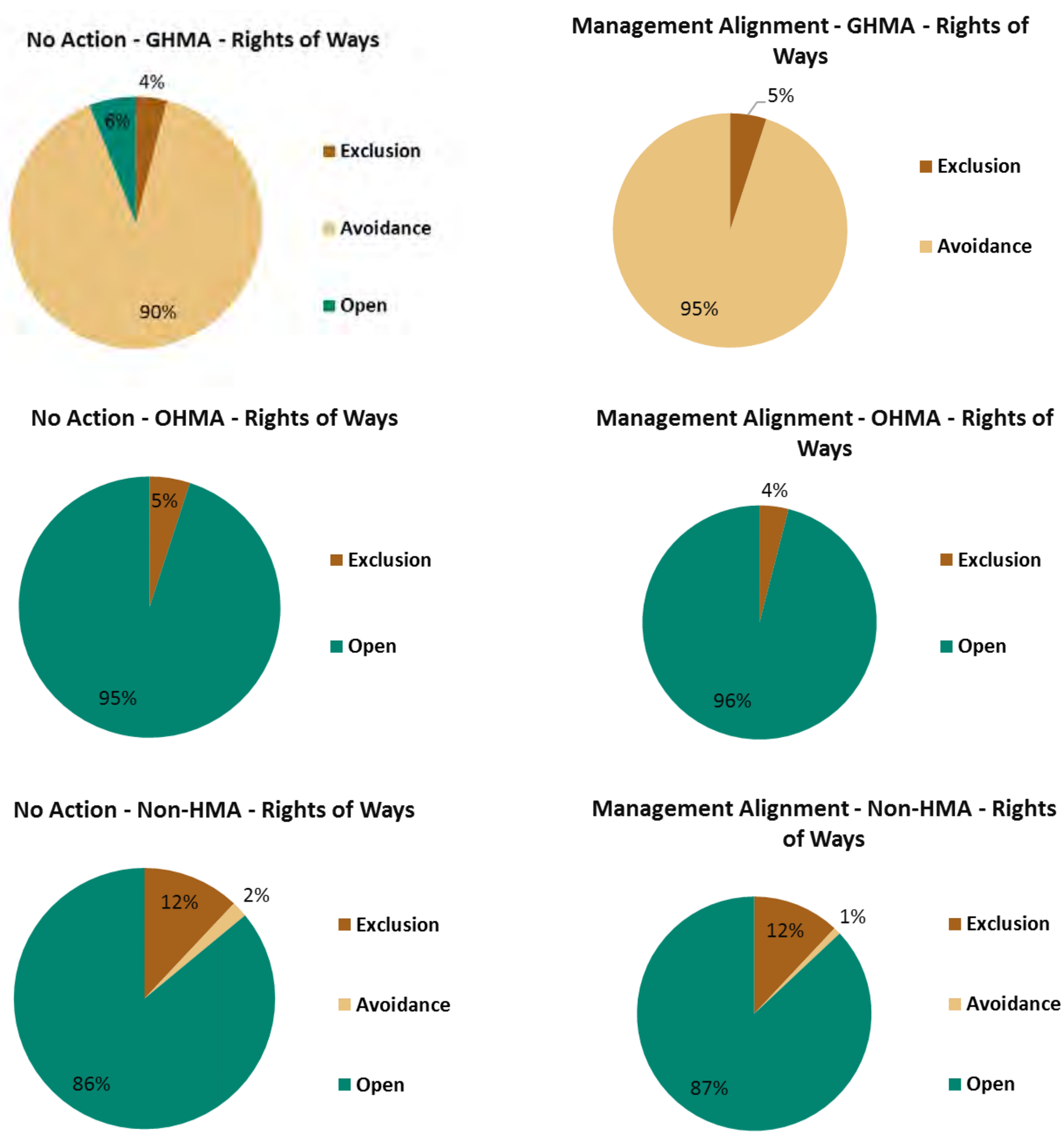


Figure 33 (cont'd) – Rights-of-Ways Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

IX. Salable Minerals Materials

Table 35 – Salable Minerals Materials Decisions within MZ III

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Salable Minerals Materials Decisions in MZ III by Habitat Management Area Type

Salable Minerals Materials	No Action					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Closed	4,722,000	172,000	230,000	NA	4,646,000	**9,770,000**
Open	0	3,707,000	4,042,000	NA	27,834,000	**35,583,000**
Total	**4,723,000**	**3,878,000**	**4,272,000**	**NA**	**32,479,000**	**45,353,000**

Salable Minerals Materials	Management Alignment					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Closed	4,847,000	176,000	159,000	NA	4,694,000	**9,876,000**
Open	0	3,565,000	3,534,000	NA	28,372,000	**35,471,000**
Total	**4,847,000**	**3,741,000**	**3,693,000**	**NA**	**33,066,000**	**45,347,000**

Approximate % of Habitat Management Area by Non-Energy Leasable Minerals Decision in MZ III

Salable Minerals Materials	No Action					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Closed	100%	4%	5%	NA	14%	**22%**
Open	0%	96%	95%	NA	86%	**78%**
Total	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

Salable Minerals Materials	Management Alignment					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Closed	100%	5%	4%	NA	14%	**22%**
Open	0%	95%	96%	NA	86%	**78%**
Total	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

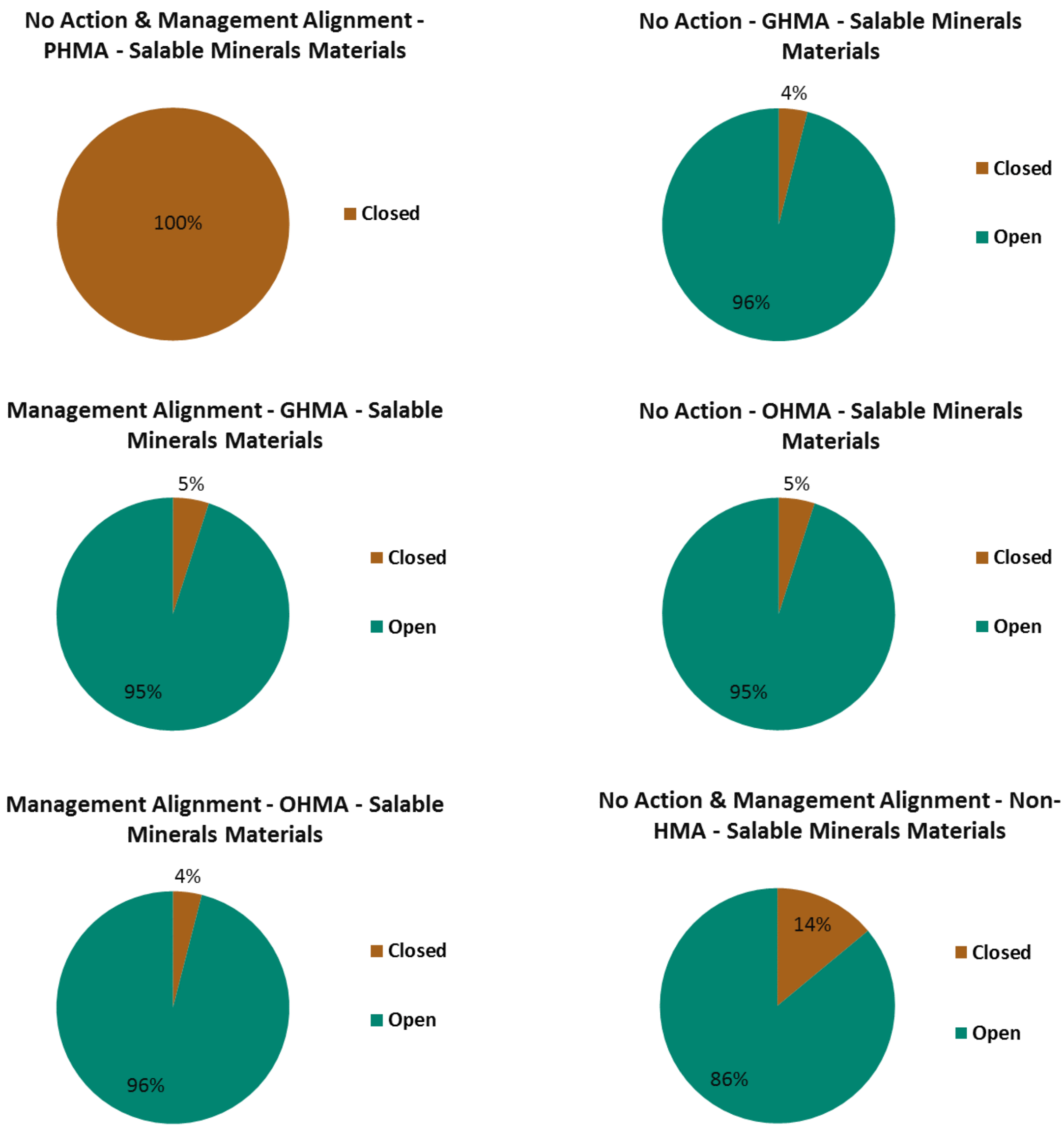


Figure 34 – Salable Minerals Materials Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

X. Solar Energy

Table 36 – Solar Energy Decisions within MZ III

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Solar Energy Decisions in MZ III by Habitat Management Area Type

Solar Energy	No Action					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Exclusion	4,731,000	3,886,000	3,417,000	NA	24,421,000	**36,454,000**
Avoidance	2,000	4,000	857,000	NA	7,637,000	**8,499,000**
Open	0	0	1,000	NA	340,000	**341,000**
Total	**4,732,000**	**3,889,000**	**4,274,000**	**NA**	**32,398,000**	**45,294,000**

Solar Energy	Management Alignment					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Exclusion	4,858,000	3,748,000	3,699,000	NA	24,867,000	**37,172,000**
Avoidance	0	0	0	NA	7,770,000	**7,770,000**
Open	0	0	0	NA	346,000	**346,000**
Total	**4,858,000**	**3,748,000**	**3,699,000**	**NA**	**32,983,000**	**45,288,000**

Approximate % of Habitat Management Area by Solar Energy Decision in MZ III

Solar Energy	No Action					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Exclusion	100%	100%	80%	NA	75%	**80%**
Avoidance	<1%	<1%	20%	NA	24%	**19%**
Open	0%	0%	<1%	NA	1%	**1%**
Total	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

Solar Energy	Management Alignment					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Exclusion	100%	100%	100%	NA	75%	**82%**
Avoidance	0%	0%	0%	NA	24%	**17%**
Open	0%	0%	0%	NA	1%	**1%**
Total	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

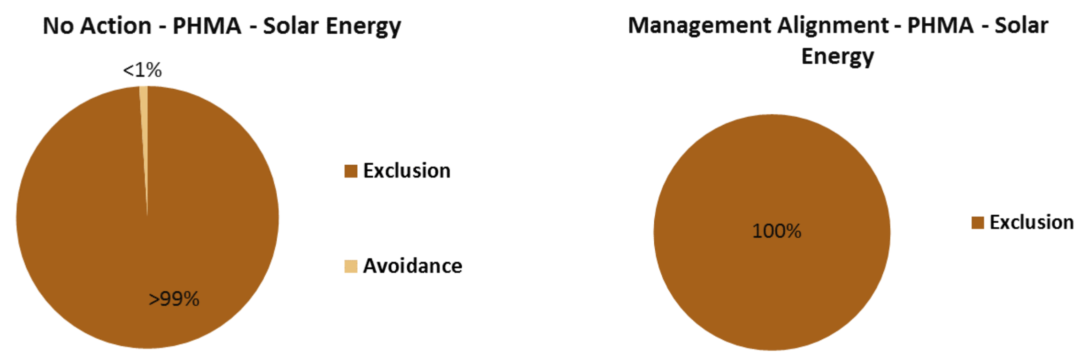


Figure 35 – Solar Energy Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

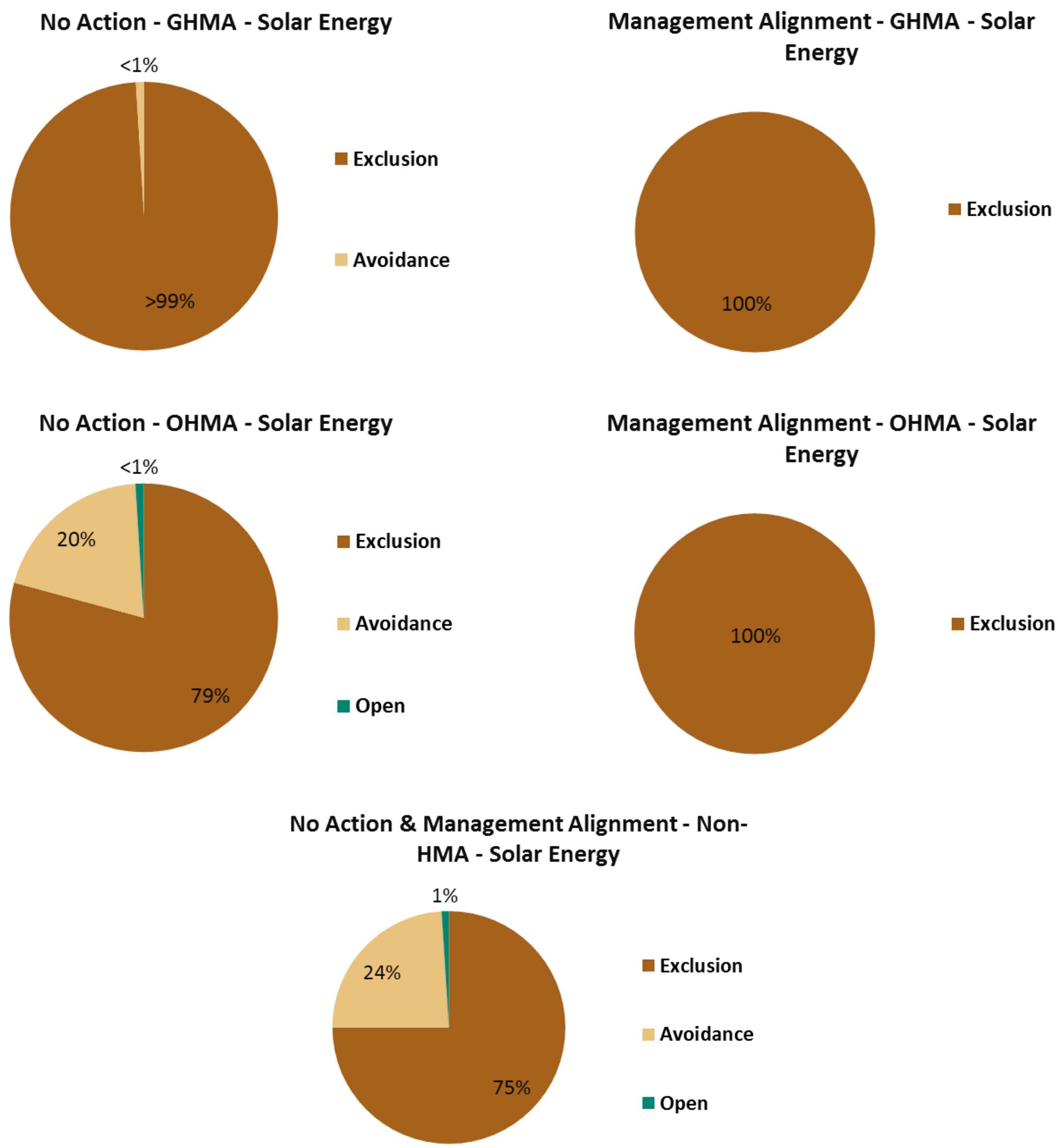


Figure 35 (cont'd) – Solar Energy Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

XI. Trails and Travel Management

Table 37 – Trails and Travel Management Decisions within MZ III

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Trails and Travel Management Decisions in MZ III by Habitat Management Area Type						
Trails and Travel Management Decisions	No Action					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Closed	16,000	84,000	52,000	NA	2,517,000	**2,669,000**
Limited	4,702,000	3,791,000	1,000	NA	5,791,000	**14,285,000**
Open	0	0	4,219,000	NA	24,153,000	**28,372,000**
Total	**4,718,000**	**3,875,000**	**4,273,000**	**NA**	**32,461,000**	**45,326,000**

Trails and Travel Management Decisions	Management Alignment					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Closed	21,000	100,000	42,000	NA	2,505,000	**2,668,000**
Limited	4,821,000	3,642,000	14,000	NA	6,095,000	**14,572,000**
Open	0	0	3,637,000	NA	24,429,000	**28,066,000**
Total	**4,842,000**	**3,741,000**	**3,693,000**	**NA**	**33,030,000**	**45,307,000**

Approximate % of Habitat Management Area by Trails and Travel Management Decisions Decision in MZ III						
Trails and Travel Management Decisions	No Action					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Closed	<1%	2%	1%	NA	8%	**6%**
Limited	100%	98%	0%	NA	18%	**32%**
Open	0%	0%	99%	NA	74%	**63%**
Total	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

Trails and Travel Management Decisions	Management Alignment					
	PHMA	GHMA	OHMA	Anthro Mtn	Non-HMA	Total
Closed	<1%	3%	1%	NA	8%	**6%**
Limited	100%	97%	0%	NA	18%	**32%**
Open	0%	0%	98%	NA	74%	**62%**
Total	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

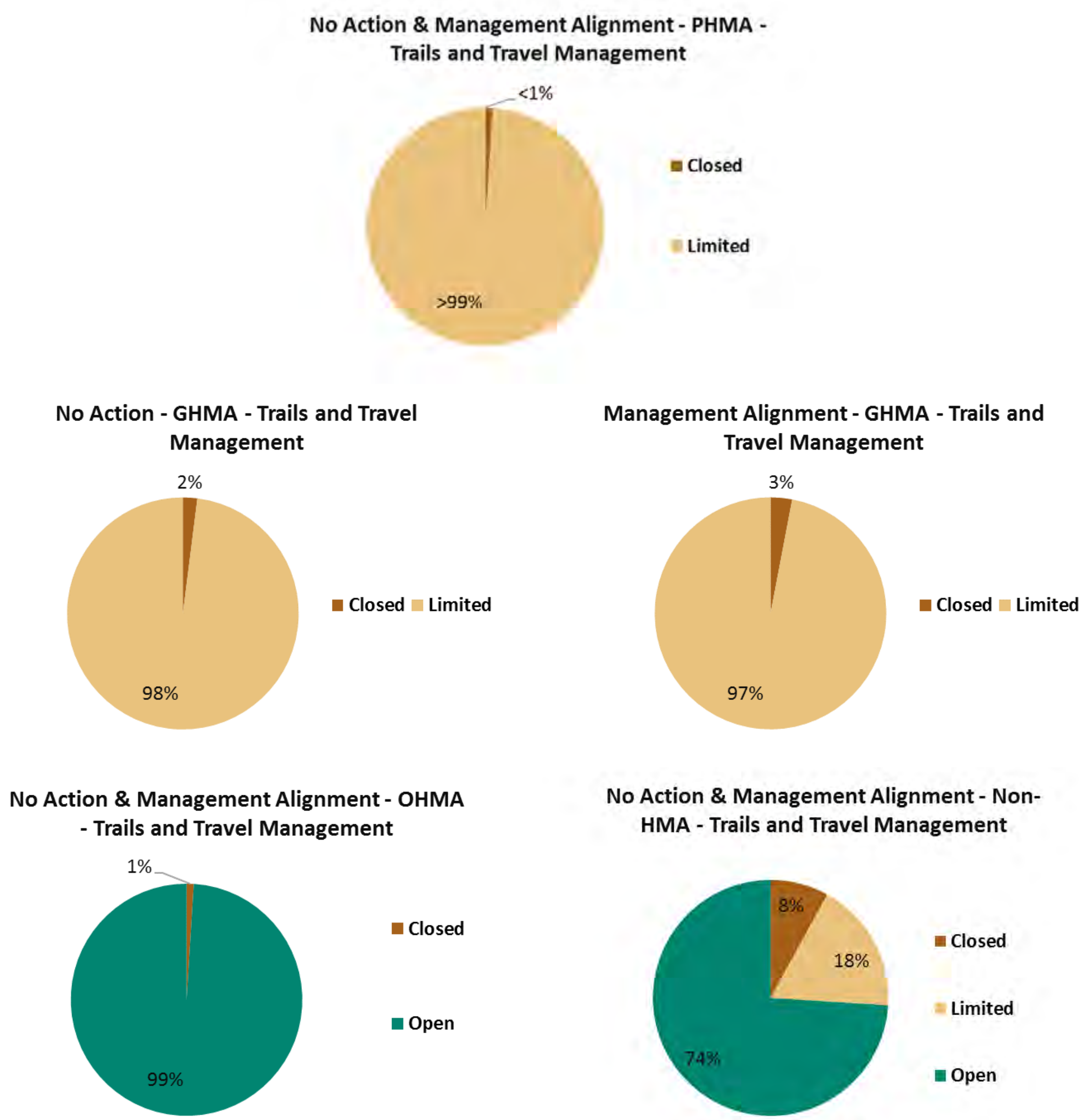


Figure 36 – Trails and Travel Management Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

XII. Wind Energy

Table 38 – Wind Energy Decisions within MZ III

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Wind Energy Decisions in MZ III by Habitat Management Area Type

Wind Energy	No Action					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Exclusion	4,669,000	166,000	230,000	NA	3,939,000	**9,004,000**
Avoidance	0	3,572,000	0	NA	212,000	**3,784,000**
Open	54,000	137,000	4,042,000	NA	28,265,000	**32,498,000**
Total	**4,723,000**	**3,876,000**	**4,272,000**	**NA**	**32,415,000**	**45,286,000**

Wind Energy	Management Alignment					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Exclusion	4,793,000	176,000	159,000	NA	3,982,000	**9,110,000**
Avoidance	0	3,565,000	0	NA	212,000	**3,777,000**
Open	54,000	0	3,534,000	NA	28,805,000	**32,393,000**
Total	**4,847,000**	**3,741,000**	**3,693,000**	**NA**	**32,999,000**	**45,280,000**

Approximate % of Habitat Management Area by Wind Energy Decision in MZ III

Wind Energy	No Action					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Exclusion	0%	92%	0%	NA	1%	**8%**
Avoidance	99%	4%	5%	NA	12%	**20%**
Open	1%	4%	95%	NA	87%	**72%**
Total	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

Wind Energy	Management Alignment					
	PHMA	**GHMA**	**OHMA**	**Anthro Mtn**	**Non-HMA**	**Total**
Exclusion	0%	95%	0%	NA	1%	**8%**
Avoidance	99%	5%	4%	NA	12%	**20%**
Open	1%	0%	96%	NA	87%	**72%**
Total	**100%**	**100%**	**100%**	**NA**	**100%**	**100%**

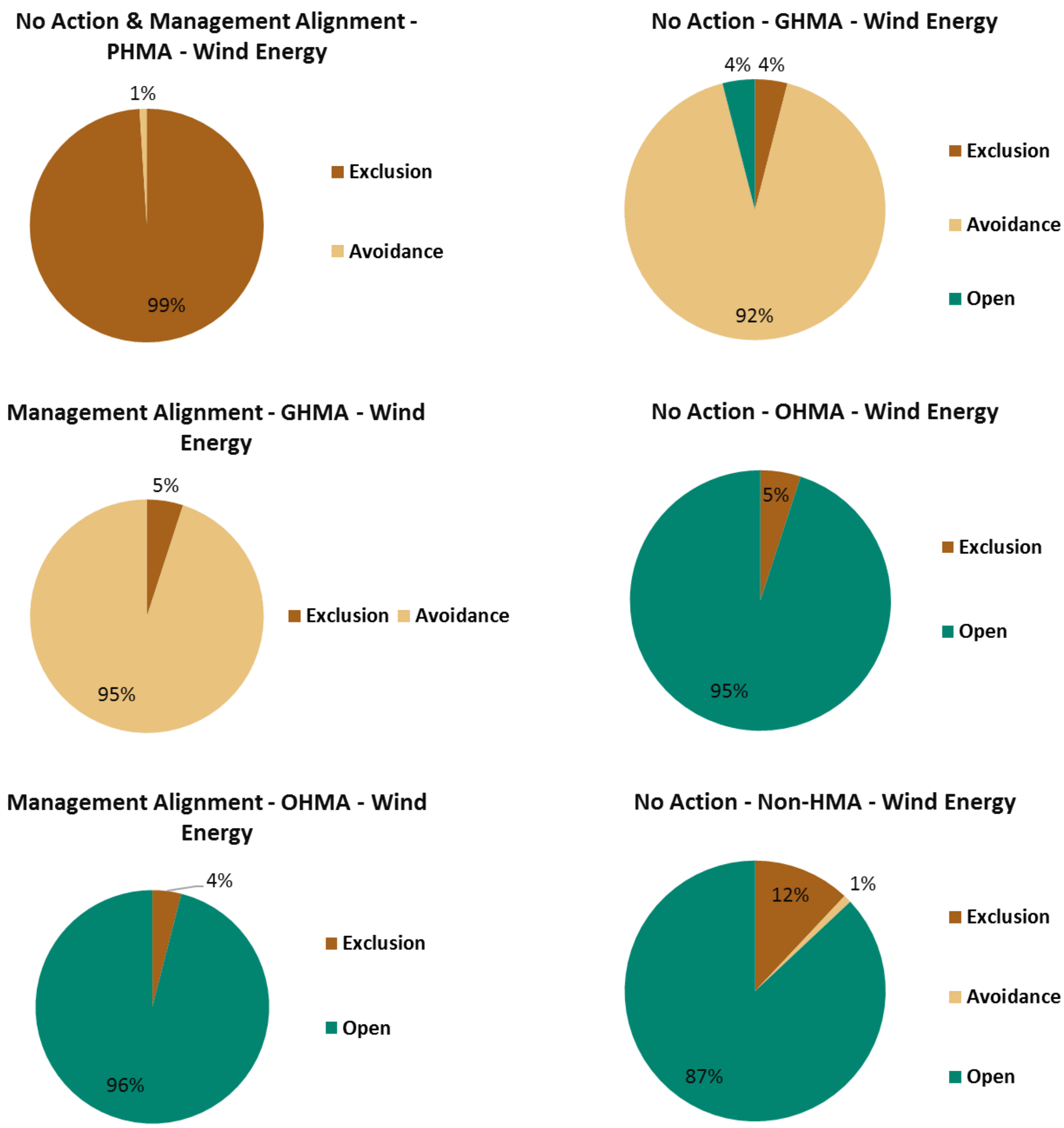


Figure 37 – Wind Energy Decisions within MZ III

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

G.2.4 Management Zone IV – ID, UT, NV, OR

I. Habitat Management

Table 39 – Habitat Management Areas within MZ IV

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of HMA in MZ IV									
No Action					Management Alignment				
PHMA	IHMA	GHMA	OHMA	Non-HMA	PHMA	IHMA	GHMA	OHMA	Non-HMA
17,170,000	4,449,000	11,447,00	1,261,000	41,395,000	16,147,000	4,519,000	11,297,000	990,000	42,769,022

Approximate Percent of MZ IV that is HMA									
No Action					Management Alignment				
PHMA	IHMA	GHMA	OHMA	Non-HMA	PHMA	IHMA	GHMA	OHMA	Non-HMA
23%	6%	15%	2%	55%	21%	6%	15%	1%	56%

Figure 38 – Habitat Management Areas within MZ IV

Percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

II. Geothermal Energy

Table 40 – Geothermal Energy Decisions within MZ IV

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Geothermal Energy Decisions in MZ IV by Habitat Management Area Type						
Geothermal Energy	**No Action**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,923,000	918,000	1,130,000	4,000	9,440,000	**13,415,000**
Open NSO	10,256,000	2,638,000	424,000	0	1,125,000	**14,443,000**
Open CSU/TL	0	0	4,881,000	0	2,196,000	**7,077,000**
Open Standard Stipulations	0	3,000	20,000	704,000	4,529,000	**5,257,000**
Total	**12,178,000**	**3,560,000**	**6,455,000**	**708,000**	**17,290,000**	**40,191,000**

Geothermal Energy	**Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,913,000	918,000	1,133,000	6,000	9,439,000	**13,410,000**
Open NSO	9,848,000	2,702,000	424,000	0	1,125,000	**14,099,000**
Open CSU/TL	0	0	4,974,000	0	2,196,000	**7,169,000**
Open Standard Stipulations	0	3,000	20,000	616,000	4,855,000	**5,494,000**
Total	**11,762,000**	**3,624,000**	**6,550,000**	**622,000**	**17,615,000**	**40,173,000**

Approximate % of Habitat Management Area by Geothermal Energy Decision in MZ IV						
Geothermal Energy	**No Action**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	16%	26%	18%	1%	55%	**33%**
Open NSO	84%	74%	7%	0%	7%	**36%**
Open CSU/TL	0%	0%	76%	0%	13%	**18%**
Open Standard Stipulations	0%	0%	0%	99%	26%	**13%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Geothermal Energy	**Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	16%	25%	17%	1%	54%	**33%**
Open NSO	84%	75%	6%	0%	6%	**35%**
Open CSU/TL	0%	0%	76%	0%	12%	**18%**
Open Standard Stipulations	0%	0%	0%	99%	28%	**14%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

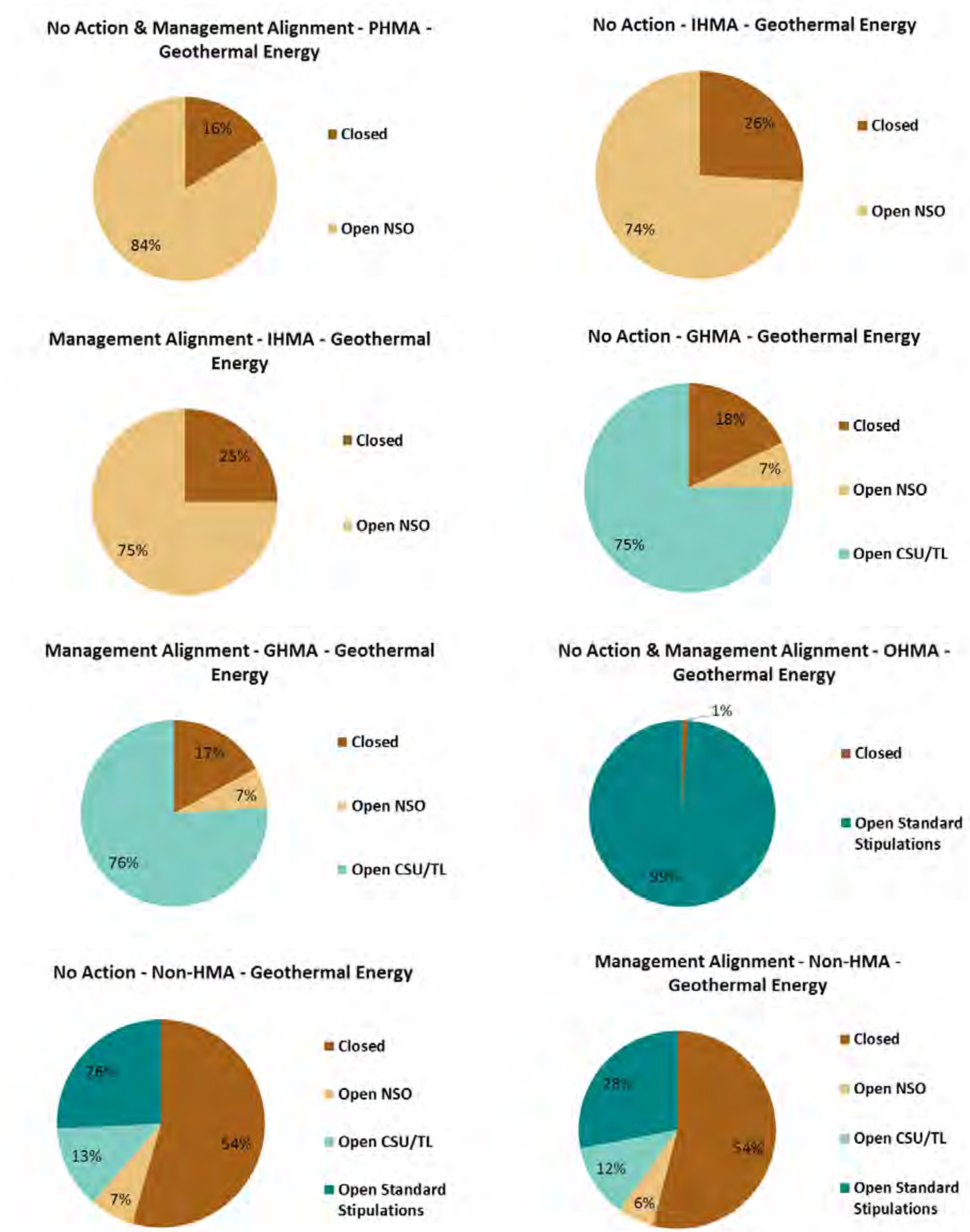


Figure 39 – Geothermal Energy Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

III. Land Tenure

Table 41 – Land Tenure Decisions within MZ IV

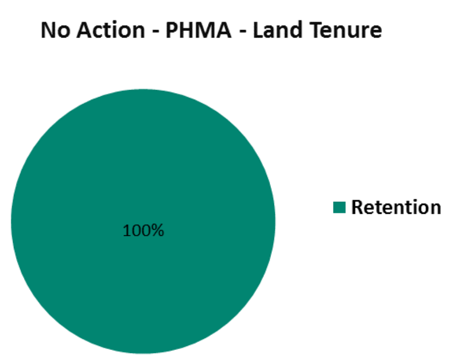
Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Land Tenure Decisions in MZ IV by Habitat Management Area Type						
Land Tenure	No Action					
	PHMA	IHMA	GHMA	OHMA	Non-HMA	Total
Disposal	0	0	1,000	146,000	659,000	**805,000**
Retention	10,726,000	2,719,000	4,948,000	562,000	4,277,000	**23,232,000**
Total	**10,727,000**	**2,719,000**	**4,949,000**	**708,000**	**4,935,000**	**24,038,000**

Land Tenure	Management Alignment					
	PHMA	IHMA	GHMA	OHMA	Non-HMA	Total
Disposal	6,000	0	25,000	85,000	799,000	**914,000**
Retention	10,319,000	2,780,000	5,019,000	537,000	4,462,000	**23,117,000**
Total	**10,325,000**	**2,780,000**	**5,043,000**	**622,000**	**5,261,000**	**24,032,000**

Approximate % of Habitat Management Area by Land Tenure Decision in MZ III						
Land Tenure	No Action					
	PHMA	IHMA	GHMA	OHMA	Non-HMA	Total
Disposal	0%	0%	<1%	21%	13%	**3%**
Retention	100%	100%	100%	79%	87%	**97%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Land Tenure	Management Alignment					
	PHMA	IHMA	GHMA	OHMA	Non-HMA	Total
Disposal	<1%	0%	<1%	14%	15%	**4%**
Retention	100%	100%	100%	86%	85%	**96%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**



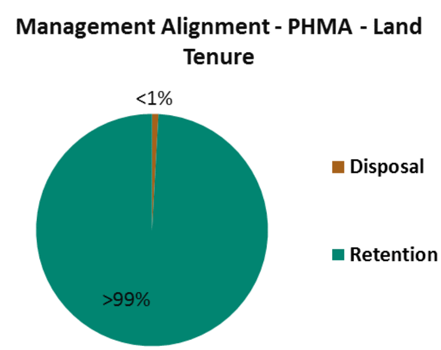


Figure 40 – Land Tenure Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Figure 40 (cont'd) – Land Tenure Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

IV. Livestock Grazing

Table 42 – Livestock Grazing Decisions within MZ IV

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Livestock Grazing Decisions in MZ IV by Habitat Management Area Type						
Livestock Grazing	**No Action**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Unavailable	182,000	18,000	43,000	0	92,000	**335,000**
Available	10,515,000	2,701,000	4,923,000	709,000	4,562,000	**23,411,000**
Total	**10,697,000**	**2,719,000**	**4,966,000**	**709,000**	**4,655,000**	**23,746,000**

Livestock Grazing	**Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Unavailable	182,000	18,000	43,000	0	92,000	**335,000**
Available	10,112,000	2,762,000	5,029,000	620,000	4,883,000	**23,406,000**
Total	**10,294,000**	**2,780,000**	**5,072,000**	**620,000**	**4,975,000**	**23,740,000**

Approximate % of Habitat Management Area by Livestock Grazing Decision in MZ IV						
Livestock Grazing	**No Action & Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Unavailable	2%	1%	1%	0%	2%	**1%**
Available	98%	99%	99%	100%	98%	**99%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

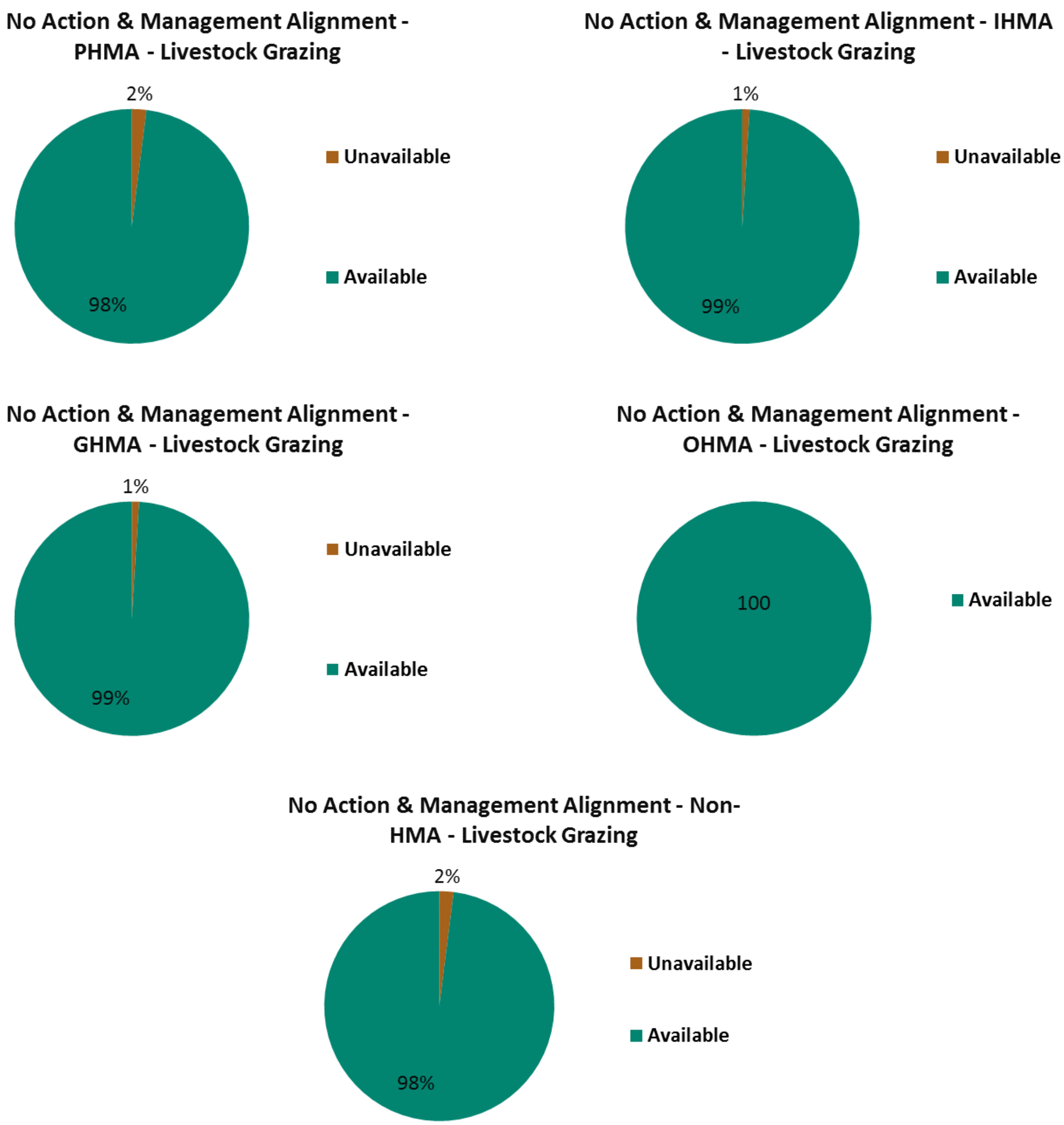


Figure 41 – Livestock Grazing Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

V. Locatable Minerals

Table 43 – Locatable Minerals Decisions within MZ IV

Acreages and Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Locatable Minerals Decisions in MZ IV by Habitat Management Area Type						
Locatable Minerals	**No Action**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	1,079,000	442,000	432,000	0	3,606,000	**5,560,000**
Recommended Withdrawals	4,836,000	0	2,000	0	0	**4,838,000**
Open	6,074,000	2,858,000	6,055,000	708,000	13,798,000	**29,492,000**
Total	**11,990,000**	**3,300,000**	**6,489,000**	**708,000**	**17,404,000**	**39,891,000**

Locatable Minerals	**Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	1,078,000	442,000	431,000	0	3,605,000	**5,556,000**
Recommended Withdrawals	0	0	2,000	0	0	**2,000**
Open	10,518,000	2,923,000	6,151,000	622,000	14,113,000	**34,327,000**
Total	**11,597,000**	**3,364,000**	**6,584,000**	**622,000**	**17,718,000**	**39,885,000**

Approximate % of Habitat Management Area by Geothermal Energy Decision in MZ IV						
Locatable Minerals	**No Action**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	9%	13%	7%	0%	21%	**14%**
Recommended Withdrawals	40%	0%	0%	0%	0%	**12%**
Open	51%	87%	93%	100%	79%	**74%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Locatable Minerals	**Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	9%	13%	9%	0%	20%	**14%**
Recommended Withdrawals	0%	0%	<1%	0%	0%	**0%**
Open	91%	87%	91%	100%	80%	**86%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Figure 42 – Locatable Minerals Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

VI. Non-Energy Leasable Minerals

Table 44 – Non-Energy Leasable Minerals Decisions within MZ IV

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Non-Energy Leasable Minerals Decisions in MZ IV by Habitat Management Area Type						
Non-Energy Leasable Minerals	**No Action**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	12,180,000	682,000	1,059,000	4,000	9,139,000	**23,064,000**
Open	0	2,877,000	5,413,000	704,000	8,375,000	**17,369,000**
Total	**12,180,000**	**3,559,000**	**6,472,000**	**708,000**	**17,514,000**	**40,433,000**

Non-Energy Leasable Minerals	**Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	11,775,000	682,000	1,062,000	6,000	9,138,000	**22,663,000**
Open	0	2,941,000	5,505,000	616,000	8,701,000	**17,763,000**
Total	**11,775,000**	**3,624,000**	**6,567,000**	**622,000**	**17,839,000**	**40,426,000**

Approximate % of Habitat Management Area by Non-Energy Leasable Minerals Decision in MZ IV						
Non-Energy Leasable Minerals	**No Action**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	100%	19%	16%	1%	52%	**57%**
Open	0%	81%	84%	99%	48%	**43%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Non-Energy Leasable Minerals	**Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	100%	19%	16%	1%	51%	**56%**
Open	0%	81%	84%	99%	49%	**44%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

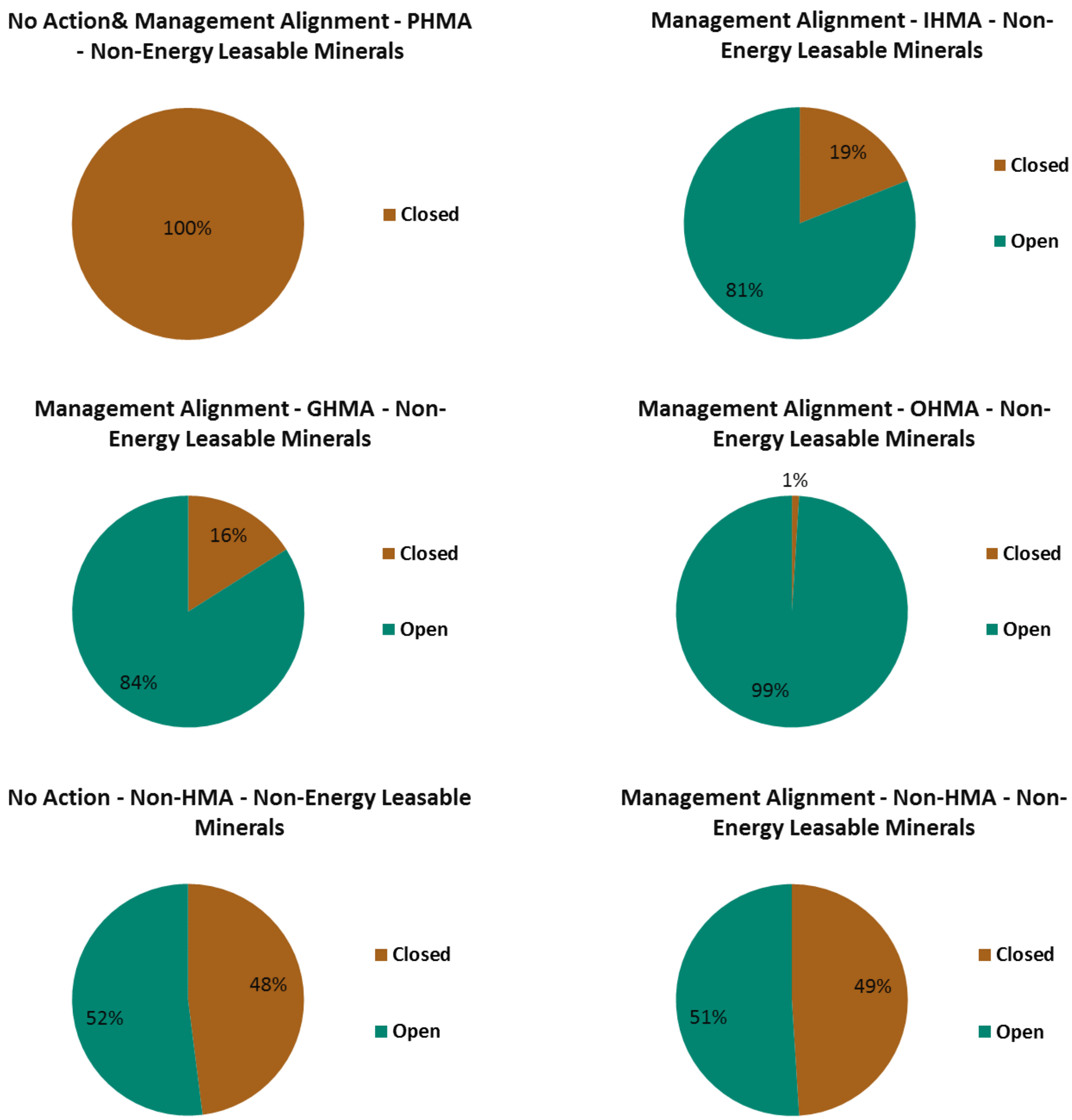


Figure 43 – Non-Energy Leasable Minerals Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

VII. Fluid Minerals (Oil & Gas)

Table 45 – Fluid Mineral (Oil & Gas) Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Fluid Mineral (Oil & Gas) Decisions in MZ IV by Habitat Management Area Type						
Fluid Mineral (Oil & Gas) Decisions	**No Action**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,924,000	1,136,000	1,136,000	4,000	9,542,000	**13,523,000**
Open NSO	10,245,000	436,000	436,000	0	1,164,000	**14,493,000**
Open CSU/TL	18,000	4,947,000	4,947,000	0	2,266,000	**7,230,000**
Open Standard Stipulations	1,000	3,000	3,000	704,000	4,729,000	**5,437,000**
Total	**12,187,000**	**6,522,000**	**6,522,000**	**708,000**	**17,701,000**	**40,683,000**

Fluid Mineral (Oil & Gas) Decisions	**Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,917,000	917,000	1,138,000	6,000	9,541,000	**13,520,000**
Open NSO	9,846,000	2,712,000	436,000	0	1,176,000	**14,171,000**
Open CSU/TL	17,000	0	5,039,000	0	2,266,000	**7,322,000**
Open Standard Stipulations	1,000	0	3,000	616,000	5,043,000	**5,663,000**
Total	**11,782,000**	**3,629,000**	**6,616,000**	**622,000**	**18,027,000**	**40,676,000**

Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in MZ IV						
Fluid Mineral (Oil & Gas) Decisions	**No Action**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	16%	26%	17%	1%	54%	**33%**
Open NSO	84%	74%	7%	0%	7%	**36%**
Open CSU/TL	<1%	0%	76%	0%	13%	**18%**
Open Standard Stipulations	<1%	0%	<1%	99%	27%	**13%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Fluid Mineral (Oil & Gas) Decisions	**Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	16%	25%	17%	1%	53%	**33%**
Open NSO	84%	75%	7%	0%	7%	**35%**
Open CSU/TL	<1%	0%	76%	0%	13%	**18%**
Open Standard Stipulations	<1%	0%	<1%	99%	28%	**14%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

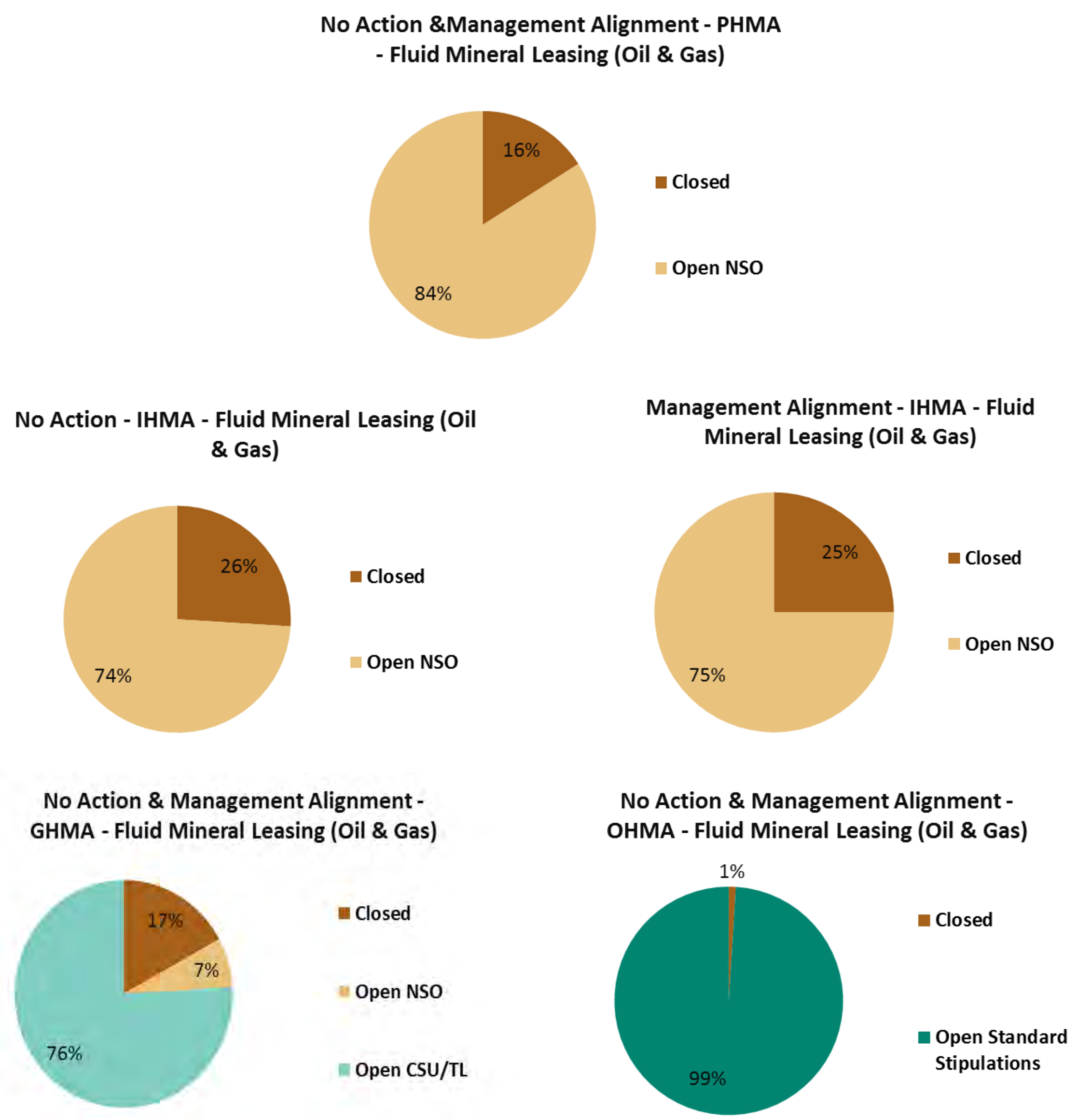


Figure 44 – Fluid Mineral (Oil & Gas) Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Figure 44 (cont'd) – Fluid Mineral (Oil & Gas) Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

VIII. Rights-of-Ways

Table 46 – Rights-of-Ways Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Rights-of-Ways Decisions in MZ IV by Habitat Management Area Type						
Rights-of-Ways	No Action					
	PHMA	IHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	637,000	131,000	269,000	3,000	244,000	**1,283,000**
Avoidance	9,993,000	2,565,000	3,095,000	0	463,000	**16,117,000**
Open	98,000	24,000	1,827,000	705,000	4,381,000	**7,035,000**
Total	**10,728,000**	**2,719,000**	**5,192,000**	**708,000**	**5,088,000**	**24,435,000**
Rights-of-Ways	Management Alignment					
	PHMA	IHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	631,000	131,000	272,000	6,000	245,000	**1,285,000**
Avoidance	9,623,000	2,626,000	3,204,000	0	475,000	**15,928,000**
Open	68,000	24,000	1,810,000	615,000	4,700,000	**7,217,000**
Total	**10,322,000**	**2,780,000**	**5,286,000**	**621,000**	**5,420,000**	**24,429,000**

Approximate % of Habitat Management Area by Rights-of-Ways Decision in MZ IV						
Rights-of-Ways	No Action					
	PHMA	IHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	6%	5%	5%	0%	5%	**5%**
Avoidance	93%	94%	60%	0%	9%	**65%**
Open	1%	1%	35%	100%	86%	**29%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Rights-of-Ways	Management Alignment					
	PHMA	IHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	6%	5%	5%	1%	4%	**5%**
Avoidance	93%	94%	61%	0%	9%	**65%**
Open	1%	1%	34%	99%	87%	**30%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

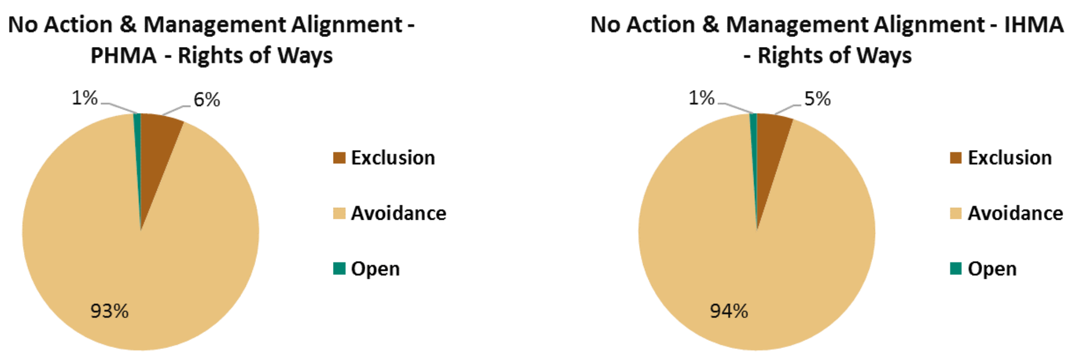


Figure 45 – Rights-of-Ways Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

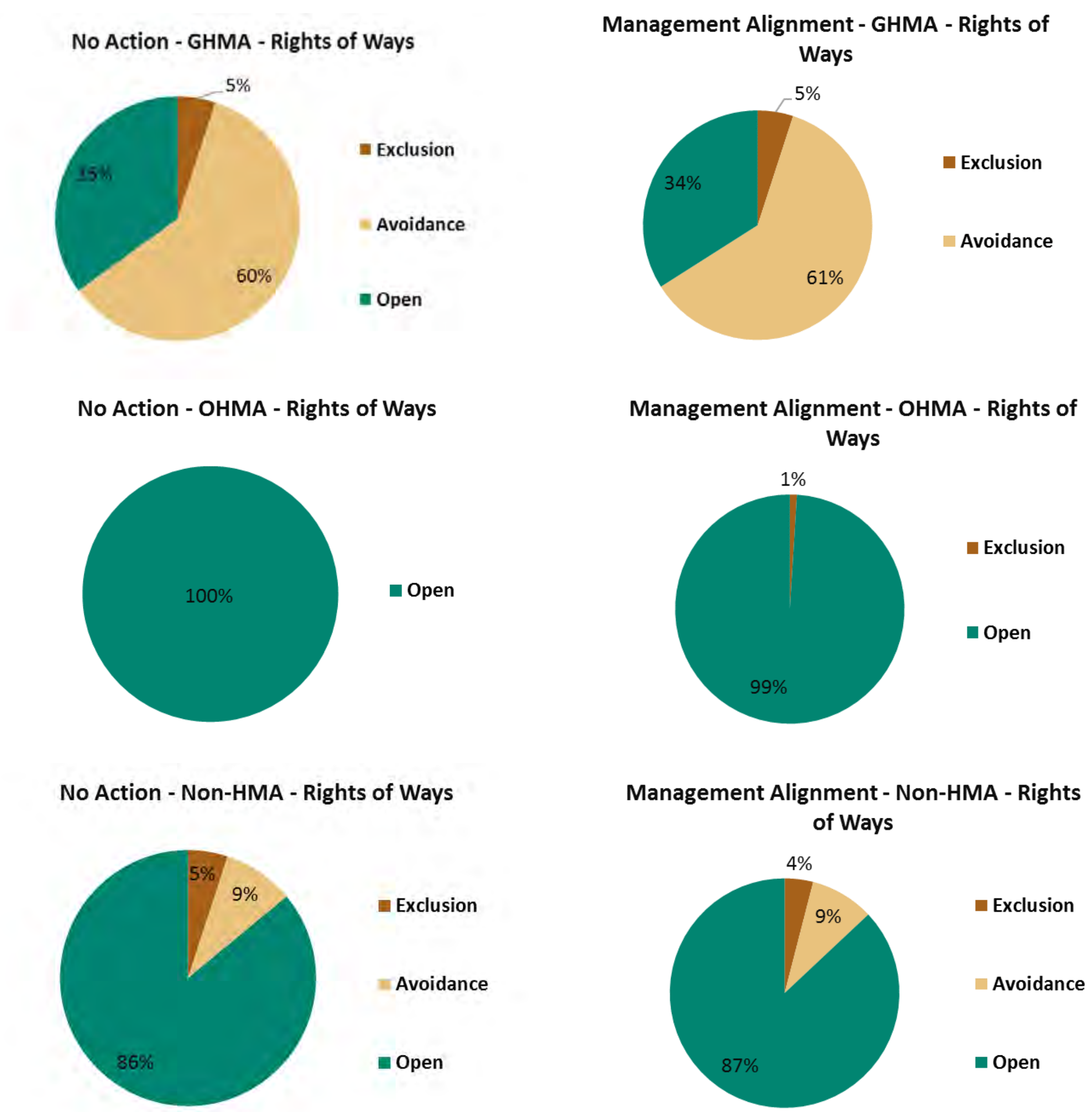


Figure 45 (cont'd) – Rights-of-Ways Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

IX. Salable Minerals Materials

Table 47 – Salable Minerals Materials Decisions within MZ IV

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Salable Minerals Materials Decisions in MZ IV by Habitat Management Area Type						
Salable Minerals Materials	**No Action**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	11,494,000	313,000	682,000	4,000	830,000	**13,323,000**
Open	4,000	2,878,000	5,250,000	704,000	5,504,000	**14,339,000**
Total	**11,497,000**	**3,191,000**	**5,932,000**	**708,000**	**6,334,000**	**27,662,000**

Salable Minerals Materials	**Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	11,089,000	313,000	684,000	6,000	829,000	**12,922,000**
Open	4,000	2,942,000	5,343,000	616,000	5,830,000	**14,734,000**
Total	**11,093,000**	**3,255,000**	**6,027,000**	**622,000**	**6,659,000**	**27,656,000**

Approximate % of Habitat Management Area by Non-Energy Leasable Minerals Decision in MZ IV						
Salable Minerals Materials	**No Action**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	100%	10%	11%	1%	13%	**48%**
Open	<1%	90%	89%	99%	87%	**52%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Salable Minerals Materials	**Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	100%	10%	11%	1%	12%	**47%**
Open	<1%	90%	89%	99%	88%	**53%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

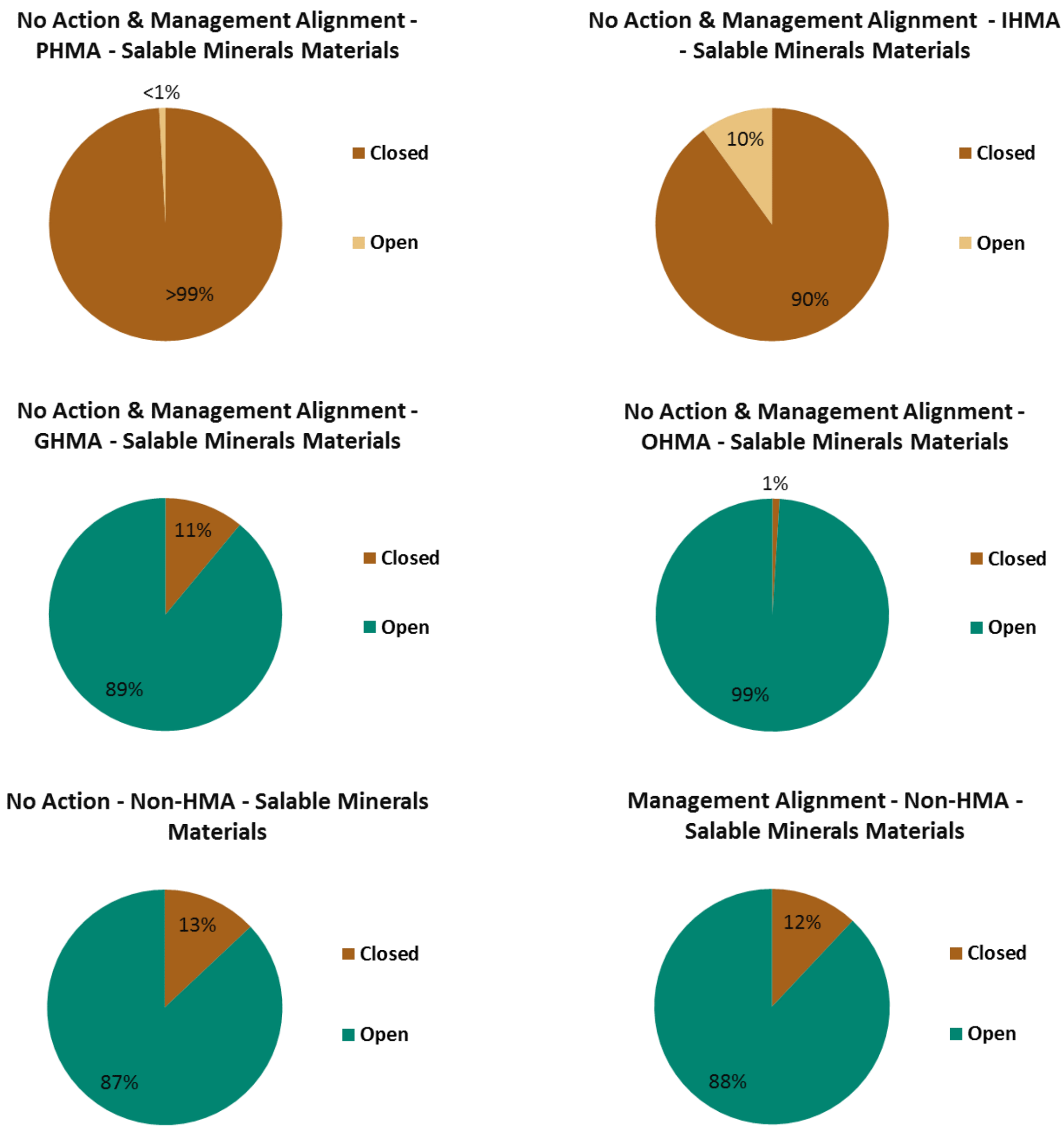


Figure 46 – Salable Minerals Materials Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

X. Solar Energy

Table 48 – Solar Energy Decisions within MZ IV

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Solar Energy Decisions in MZ IV by Habitat Management Area Type

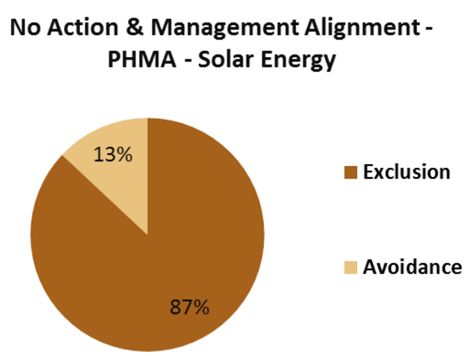
Solar Energy	No Action					
	PHMA	IHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	9,341,000	363,000	1,210,000	706,000	2,275,000	**13,895,000**
Avoidance	1,390,000	2,357,000	2,235,000	0	123,000	**6,105,000**
Open	0	0	1,500,000	1,000	2,521,000	**4,022,000**
Total	**10,731,000**	**2,719,000**	**4,945,000**	**707,000**	**4,919,000**	**24,021,000**

Solar Energy	Management Alignment					
	PHMA	IHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	8,937,000	363,000	1,304,000	622,000	2,605,000	**13,831,000**
Avoidance	1,390,000	2,417,000	2,235,000	0	123,000	**6,165,000**
Open	0	0	1,500,000	0	2,520,000	**4,020,000**
Total	**10,326,000**	**2,780,000**	**5,039,000**	**622,000**	**5,248,000**	**24,015,000**

Approximate % of Habitat Management Area by Solar Energy Decision in MZ IV

Solar Energy	No Action					
	PHMA	IHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	87%	13%	24%	100%	46%	**58%**
Avoidance	13%	87%	45%	0%	3%	**25%**
Open	0%	0%	30%	0%	51%	**17%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Solar Energy	Management Alignment					
	PHMA	IHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	87%	13%	26%	100%	50%	**58%**
Avoidance	13%	87%	44%	0%	2%	**26%**
Open	0%	0%	30%	0%	48%	**17%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**



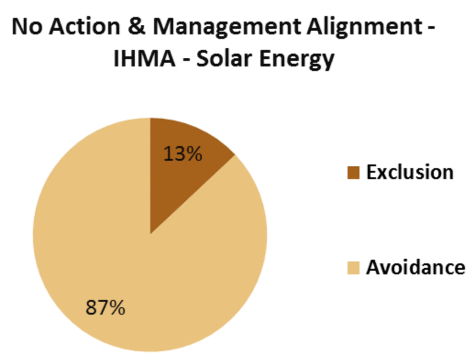


Figure 47 – Solar Energy Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

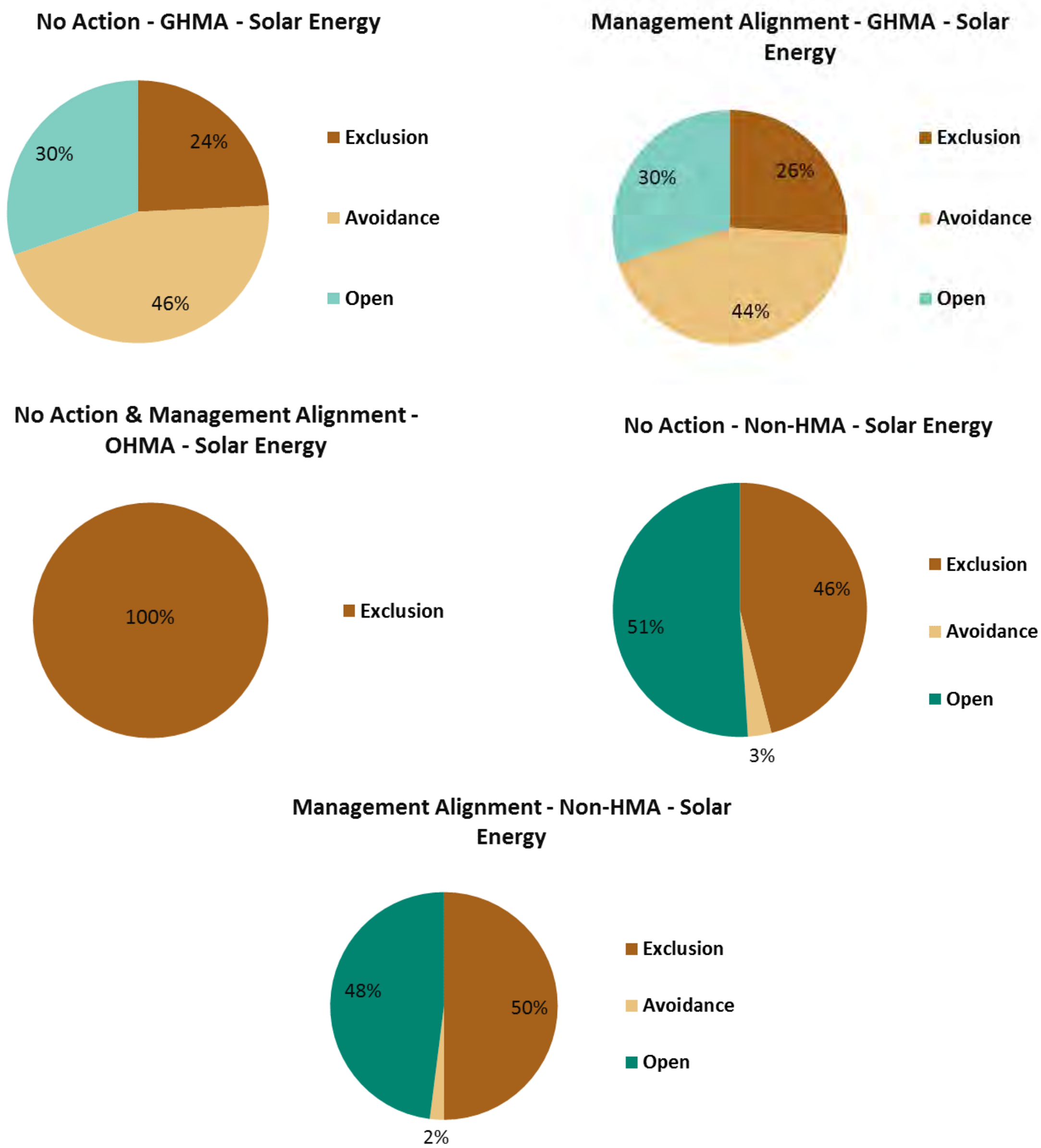


Figure 47 (cont'd) – Solar Energy Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

XI. Trails and Travel Management

Table 49 -– Trails and Travel Management Decisions within MZ IV

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Trails and Travel Management Decisions in MZ IV by Habitat Management Area Type						
Trails and Travel Management Decisions	**No Action**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	560,000	83,000	85,000	1,000	215,000	**943,000**
Limited	10,169,000	2,633,000	4,866,000	1,000	3,101,000	**20,770,000**
Open	0	3,000	0	707,000	1,619,000	**2,329,000**
Total	**10,729,000**	**2,719,000**	**4,951,000**	**708,000**	**4,935,000**	**24,042,000**

Trails and Travel Management Decisions	**Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	559,000	83,000	84,000	0	214,000	**940,000**
Limited	9,768,000	2,694,000	4,961,000	5,000	3,188,000	**20,617,000**
Open	0	3,000	0	617,000	1,859,000	**2,479,000**
Total	**10,327,000**	**2,780,000**	**5,046,000**	**622,000**	**5,261,000**	**24,036,000**

Approximate % of Habitat Management Area by Trails and Travel Management Decisions Decision in MZ IV						
Trails and Travel Management Decisions	**No Action**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	5%	3%	2%	<1%	4%	**4%**
Limited	95%	97%	98%	<1%	63%	**86%**
Open	0%	<1%	0%	100%	33%	**10%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Trails and Travel Management Decisions	**Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	5%	3%	2%	0%	4%	**4%**
Limited	95%	97%	98%	1%	61%	**86%**
Open	0%	0%	0%	99%	35%	**10%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

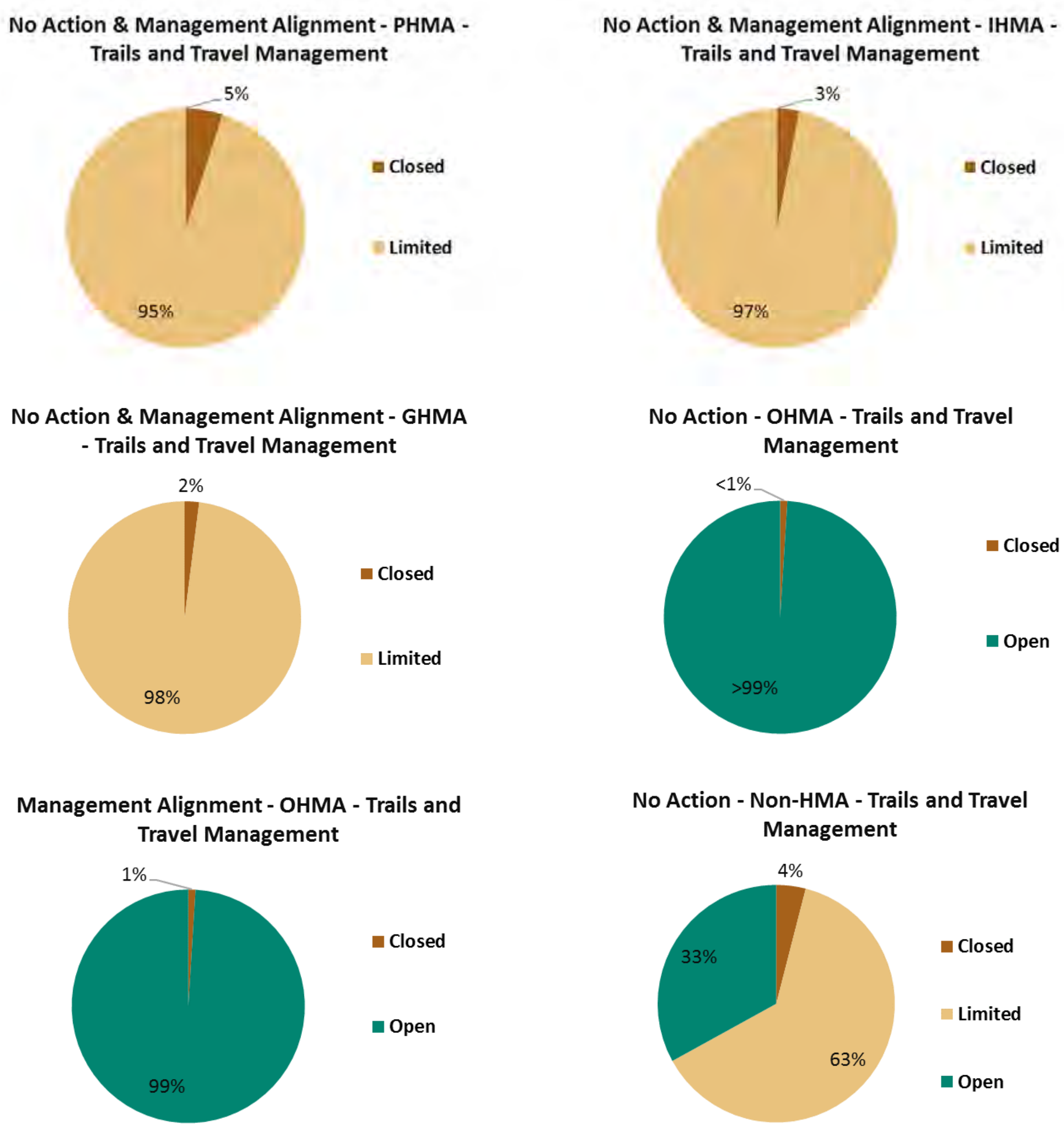


Figure 48 – Trails and Travel Management Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

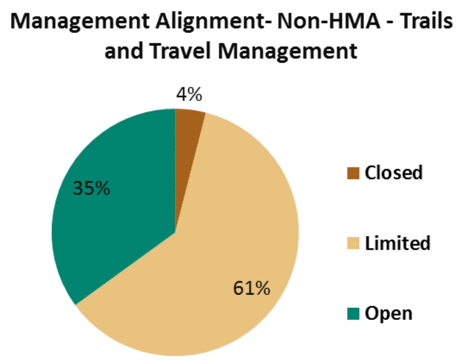


Figure 48 (cont'd) – Trails and Travel Management Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

XII. Wind Energy

Table 50 – Wind Energy Decisions within MZ IV

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Wind Energy Decisions in MZ IV by Habitat Management Area Type						
Wind Energy	**No Action**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Exclusion	9,339,000	363,000	392,000	4,000	1,035,000	**11,133,000**
Avoidance	1,390,000	2,357,000	3,051,000	0	123,000	**6,920,000**
Open	0	0	1,501,000	704,000	3,769,000	**5,973,000**
Total	**10,728,000**	**2,719,000**	**4,944,000**	**708,000**	**4,926,000**	**24,026,000**

Wind Energy	**Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Exclusion	8,938,000	363,000	395,000	6,000	1,046,000	**10,748,000**
Avoidance	1,390,000	2,417,000	3,144,000	0	123,000	**7,073,000**
Open	0	0	1,501,000	616,000	4,083,000	**6,199,000**
Total	**10,327,000**	**2,780,000**	**5,039,000**	**622,000**	**5,252,000**	**24,020,000**

Approximate % of Habitat Management Area by Wind Energy Decision in MZ IV						
Wind Energy	**No Action**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Exclusion	87%	13%	8%	1%	21%	**46%**
Avoidance	13%	87%	62%	0%	2%	**29%**
Open	0%	0%	30%	99%	77%	**25%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Wind Energy	**Management Alignment**					
	PHMA	**IHMA**	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Exclusion	87%	13%	8%	1%	20%	**45%**
Avoidance	13%	87%	62%	0%	2%	**29%**
Open	0%	0%	30%	99%	78%	**26%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

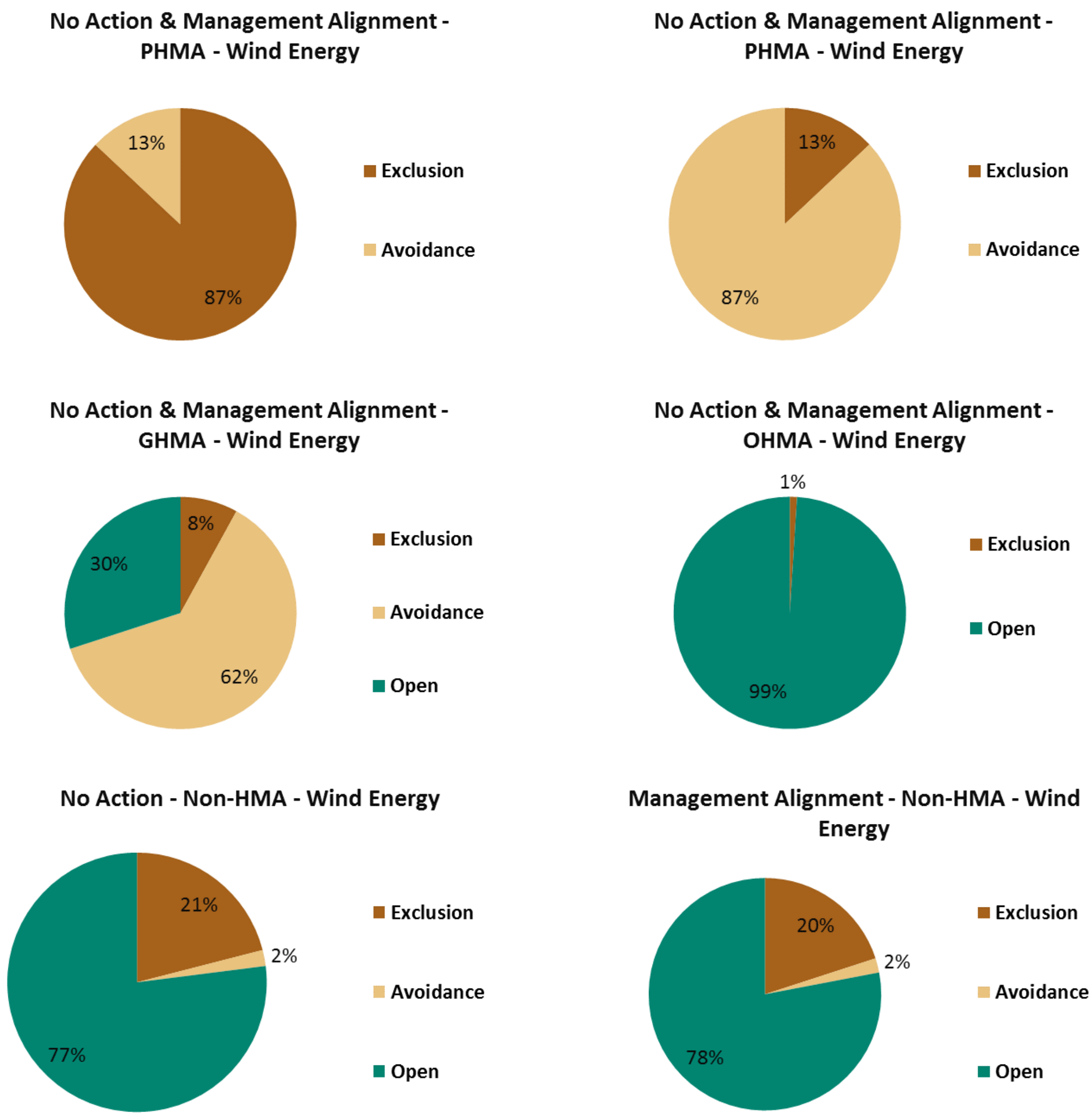


Figure 49 – Wind Energy Decisions within MZ IV

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

G.2.5 Management Zone V – OR, NV, CA

I. Habitat Management

Table 51 – Habitat Management Areas within MZ V

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of HMA in MZ V							
No Action				Management Alignment			
PHMA	GHMA	OHMA	Non-HMA	PHMA	GHMA	OHMA	Non-HMA
6,510,000	7,323,000	1,932,000	15,519,000	6,567,000	6,846,000	1,142,000	16,727,000

Approximate Percent of MZ I that is HMA							
No Action				Management Alignment			
PHMA	GHMA	OHMA	Non-HMA	PHMA	GHMA	OHMA	Non-HMA
21%	23%	6%	50%	21%	22%	4%	53%

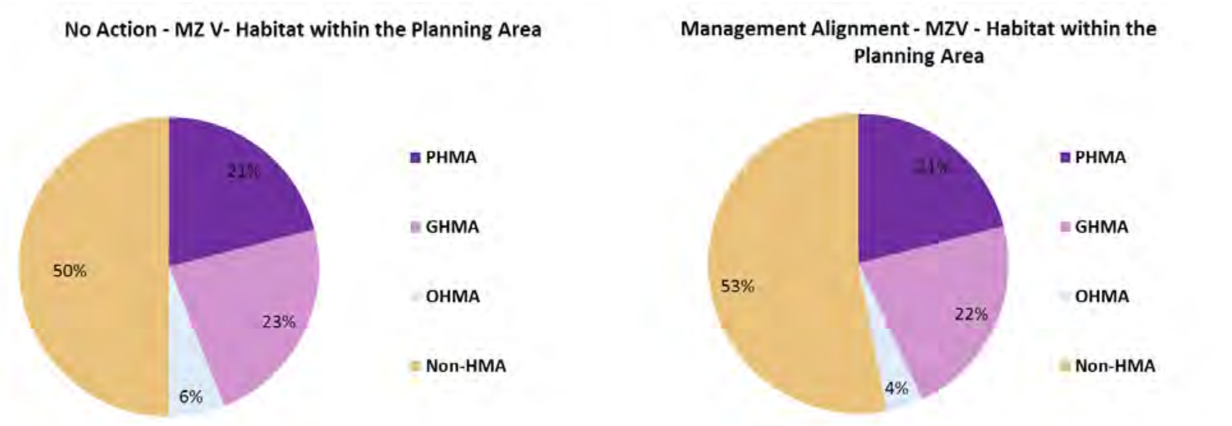


Figure 50 – Habitat Management Areas within MZ V

Percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

II. Geothermal Energy

Table 52 – Geothermal Energy Decisions within MZ V

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Geothermal Energy Decisions in MZ V by Habitat Management Area Type

Geothermal Energy	No Action				
	PHMA	GHMA	OHMA	Non-HMA	Total
Closed	1,626,000	1,359,000	158,000	898,000	**4,042,000**
Open NSO	3,350,000	379,000	0	164,000	**3,893,000**
Open CSU/TL	0	3,287,000	0	335,000	**3,622,000**
Open Standard Stipulations	5,000	0	744,000	2,367,000	**3,117,000**
Total	**4,982,000**	**5,026,000**	**903,000**	**3,764,000**	**14,674,000**

Geothermal Energy	Management Alignment				
	PHMA	GHMA	OHMA	Non-HMA	Total
Closed	1,569,000	1,373,000	141,000	935,000	**4,018,000**
Open NSO	3,566,000	379,000	0	164,000	**4,110,000**
Open CSU/TL	0	3,185,000	0	335,000	**3,520,000**
Open Standard Stipulations	0	0	423,000	2,598,000	**3,021,000**
Total	**5,136,000**	**4,937,000**	**564,000**	**4,032,000**	**14,668,000**

Approximate % of Habitat Management Area by Geothermal Energy Decision in MZ V

Geothermal Energy	No Action				
	PHMA	GHMA	OHMA	Non-HMA	Total
Closed	33%	27%	17%	24%	**28%**
Open NSO	67%	8%	0%	4%	**27%**
Open CSU/TL	0%	65%	0%	9%	**25%**
Open Standard Stipulations	<1%	0%	82%	63%	**21%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Geothermal Energy	Management Alignment				
	PHMA	GHMA	OHMA	Non-HMA	Total
Closed	31%	28%	25%	23%	**27%**
Open NSO	69%	8%	0%	4%	**28%**
Open CSU/TL	0%	65%	0%	8%	**24%**
Open Standard Stipulations	0%	0%	75%	64%	**21%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

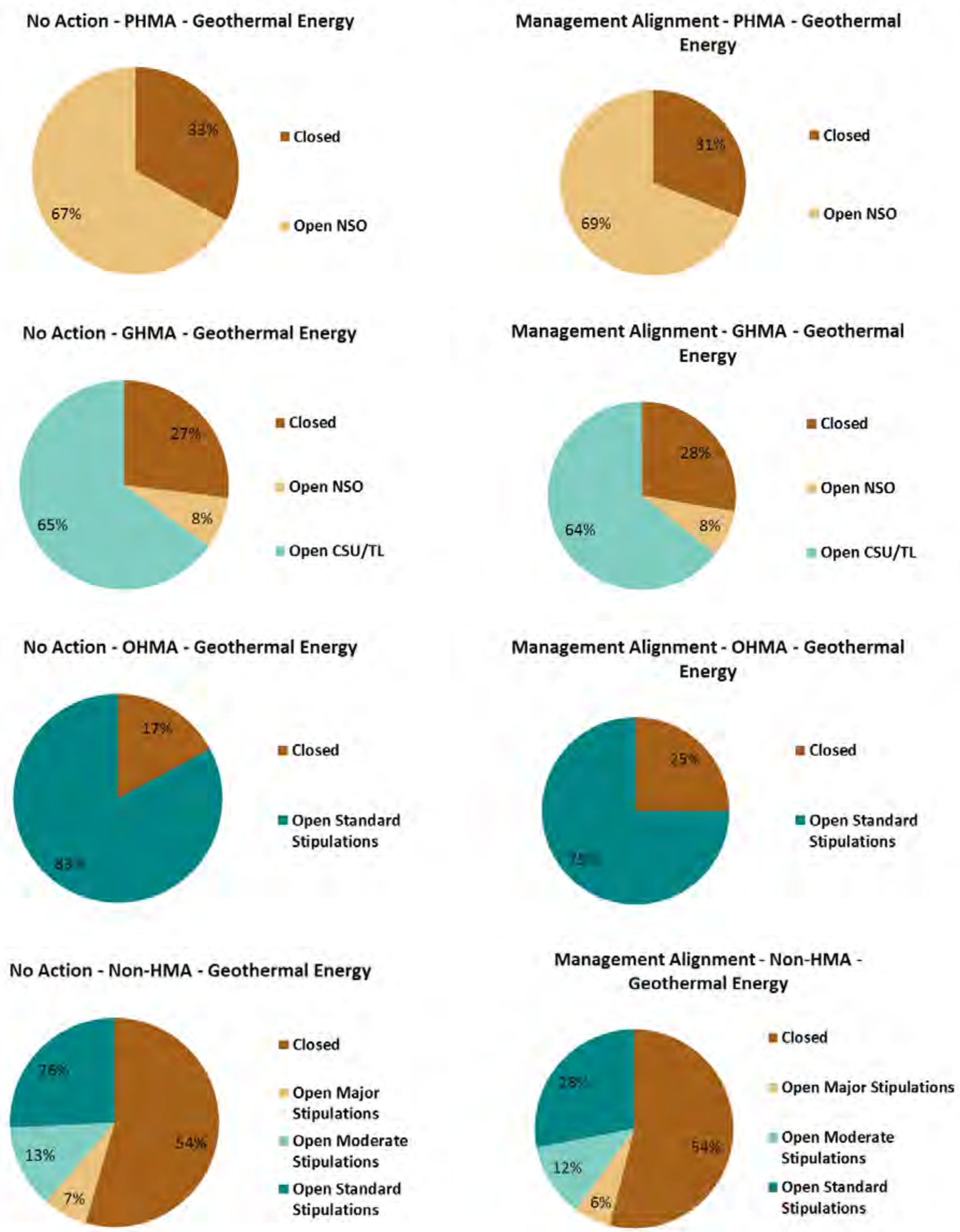


Figure 51 – Geothermal Energy Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

III. Land Tenure

Table 53 – Land Tenure Decisions within MZ V

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Land Tenure Decisions in MZ V by Habitat Management Area Type

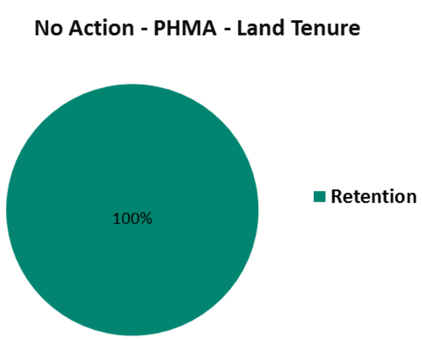
Land Tenure	No Action				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Disposal	0	0	79,000	521,000	**600,000**
Retention	4,649,000	4,896,000	822,000	3,044,000	**13,410,000**
Total	**4,649,000**	**4,896,000**	**901,000**	**3,565,000**	**14,011,000**

Land Tenure	Management Alignment				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Disposal	2,000	19,000	32,000	592,000	**644,000**
Retention	4,802,000	4,787,000	530,000	3,241,000	**13,360,000**
Total	**4,804,000**	**4,806,000**	**562,000**	**3,833,000**	**14,005,000**

Approximate % of Habitat Management Area by Land Tenure Decision in MZ III

Land Tenure	No Action				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Disposal	0%	0%	9%	15%	**4%**
Retention	100%	100%	91%	85%	**96%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Land Tenure	Management Alignment				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Disposal	<1%	<1%	6%	15%	**5%**
Retention	100%	100%	94%	85%	**95%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**



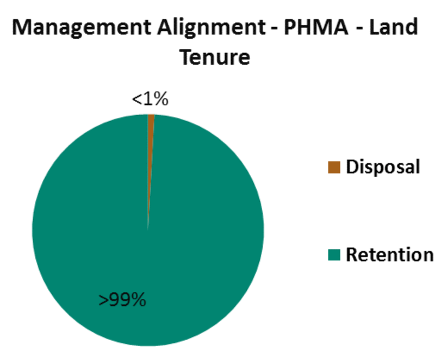


Figure 52 – Land Tenure Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

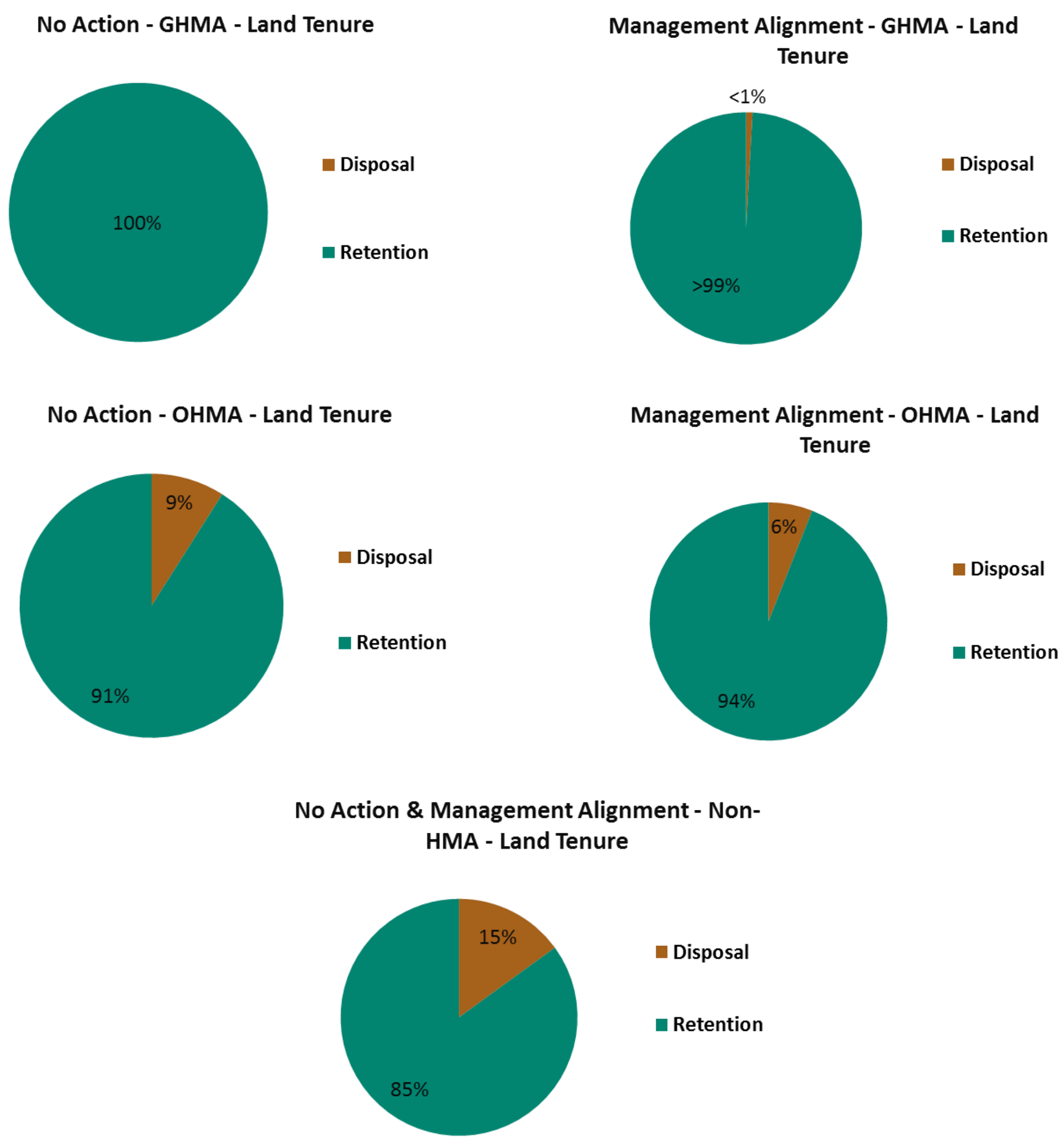


Figure 52 (cont'd) – Land Tenure Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

IV. Livestock Grazing

Table 54 – Livestock Grazing Decisions within MZ V

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Livestock Grazing Decisions in MZ V by Habitat Management Area Type					
Livestock Grazing	**No Action**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Unavailable	47,000	102,000	0	84,000	**232,000**
Available	4,582,000	4,762,000	883,000	3,233,000	**13,461,000**
Total	**4,629,000**	**4,864,000**	**883,000**	**3,317,000**	**13,694,000**

Livestock Grazing	**Management Alignment**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Unavailable	47,000	102,000	0	84,000	**232,000**
Available	4,736,000	4,671,000	550,000	3,493,000	**13,450,000**
Total	**4,783,000**	**4,772,000**	**550,000**	**3,577,000**	**13,682,000**

Approximate % of Habitat Management Area by Livestock Grazing Decision in MZ V					
Livestock Grazing	**No Action**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Unavailable	1%	2%	0%	3%	**2%**
Available	99%	98%	100%	97%	**98%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Livestock Grazing	**Management Alignment**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Unavailable	1%	2%	0%	2%	**2%**
Available	99%	98%	100%	98%	**98%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Figure 53 – Livestock Grazing Decisions within MZ V

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

V. Locatable Minerals

Table 55 – Locatable Minerals Decisions within MZ V

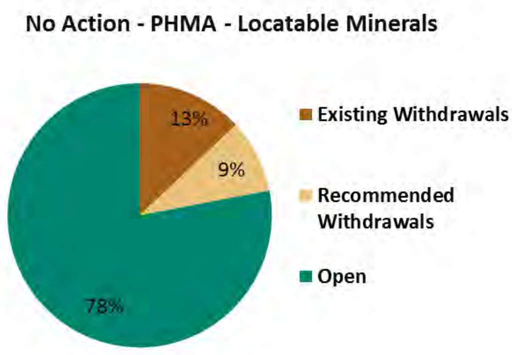
Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Locatable Minerals Decisions in MZ V by Habitat Management Area Type					
Locatable Minerals	**No Action**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	631,000	687,000	59,000	486,000	**1,864,000**
Recommended Withdrawals	435,000	5,000	0	0	**440,000**
Open	3,885,000	4,329,000	842,000	3,048,000	**12,104,000**
Total	**4,951,000**	**5,022,000**	**901,000**	**3,534,000**	**14,408,000**

Locatable Minerals	**Management Alignment**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	626,000	687,000	64,000	487,000	**1,864,000**
Recommended Withdrawals	12,000	5,000	0	0	**17,000**
Open	4,469,000	4,240,000	499,000	3,314,000	**12,522,000**
Total	**5,106,000**	**4,932,000**	**562,000**	**3,801,000**	**14,403,000**

Approximate % of Habitat Management Area by Geothermal Energy Decision in MZ V					
Locatable Minerals	**No Action**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	13%	14%	7%	14%	**13%**
Recommended Withdrawals	9%	0%	0%	0%	**3%**
Open	78%	86%	93%	86%	**84%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Locatable Minerals	**Management Alignment**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	12%	14%	11%	13%	**13%**
Recommended Withdrawals	0%	0%	0%	0%	**0%**
Open	88%	86%	89%	87%	**87%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**



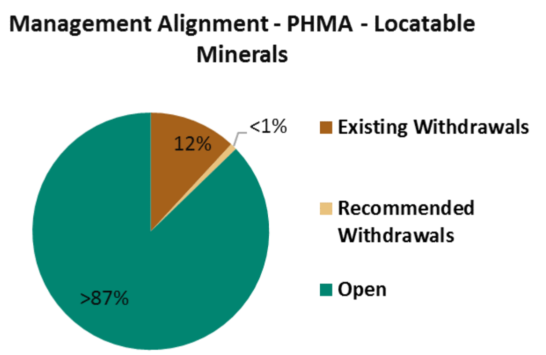


Figure 54 – Locatable Minerals Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Figure 54 (cont'd) – Locatable Minerals Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

VI. Non-Energy Leasable Minerals

Table 56 – Non-Energy Leasable Minerals Decisions within MZ V

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Non-Energy Leasable Minerals Decisions in MZ V by Habitat Management Area Type					
Non-Energy Leasable Minerals	No Action				
	PHMA	GHMA	OHMA	Non-HMA	Total
Closed	4,980,000	1,388,000	158,000	898,000	**7,423,000**
Open	0	3,635,000	744,000	2,866,000	**7,247,000**
Total	**4,980,000**	**5,024,000**	**903,000**	**3,764,000**	**14,671,000**

Non-Energy Leasable Minerals	Management Alignment				
	PHMA	GHMA	OHMA	Non-HMA	Total
Closed	5,135,000	1,402,000	141,000	935,000	**7,613,000**
Open	0	3,532,000	423,000	3,097,000	**7,052,000**
Total	**5,135,000**	**4,934,000**	**564,000**	**4,032,000**	**14,665,000**

Approximate % of Habitat Management Area by Non-Energy Leasable Minerals Decision in MZ V					
Non-Energy Leasable Minerals	No Action				
	PHMA	GHMA	OHMA	Non-HMA	Total
Closed	100%	28%	17%	24%	**51%**
Open	0%	72%	82%	76%	**49%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Non-Energy Leasable Minerals	Management Alignment				
	PHMA	GHMA	OHMA	Non-HMA	Total
Closed	100%	28%	25%	23%	**52%**
Open	0%	72%	75%	77%	**48%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Figure 55 – Non-Energy Leasable Minerals Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

VII. Fluid Minerals (Oil & Gas)

Table 57 – Fluid Mineral (Oil & Gas) Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Fluid Mineral (Oil & Gas) Decisions in MZ V by Habitat Management Area Type					
Fluid Mineral (Oil & Gas) Decisions	No Action				
	PHMA	GHMA	OHMA	Non-HMA	Total
Closed	1,590,000	1,373,000	141,000	935,000	**4,039,000**
Open NSO	3,542,000	379,000	0	164,000	**4,085,000**
Open CSU/TL	0	3,184,000	0	335,000	**3,519,000**
Open Standard Stipulations	0	0	423,000	2,598,000	**3,021,000**
Total	**5,133,000**	**4,936,000**	**564,000**	**4,032,000**	**14,664,000**

Fluid Mineral (Oil & Gas) Decisions	Management Alignment				
	PHMA	GHMA	OHMA	Non-HMA	Total
Closed	1,626,000	1,359,000	158,000	898,000	**4,042,000**
Open NSO	3,354,000	379,000	0	164,000	**3,898,000**
Open CSU/TL	0	3,287,000	0	335,000	**3,622,000**
Open Standard Stipulations	0	0	743,000	2,365,000	**3,108,000**
Total	**4,981,000**	**5,026,000**	**902,000**	**3,762,000**	**14,670,000**

Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in MZ V					
Fluid Mineral (Oil & Gas) Decisions	No Action				
	PHMA	GHMA	OHMA	Non-HMA	Total
Closed	33%	27%	18%	24%	**28%**
Open NSO	67%	8%	0%	4%	**27%**
Open CSU/TL	0%	65%	0%	9%	**25%**
Open Standard Stipulations	0%	0%	82%	63%	**21%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Fluid Mineral (Oil & Gas) Decisions	Management Alignment				
	PHMA	GHMA	OHMA	Non-HMA	Total
Closed	31%	28%	25%	23%	**28%**
Open NSO	69%	8%	0%	4%	**28%**
Open CSU/TL	0%	65%	0%	8%	**24%**
Open Standard Stipulations	0%	0%	75%	64%	**21%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

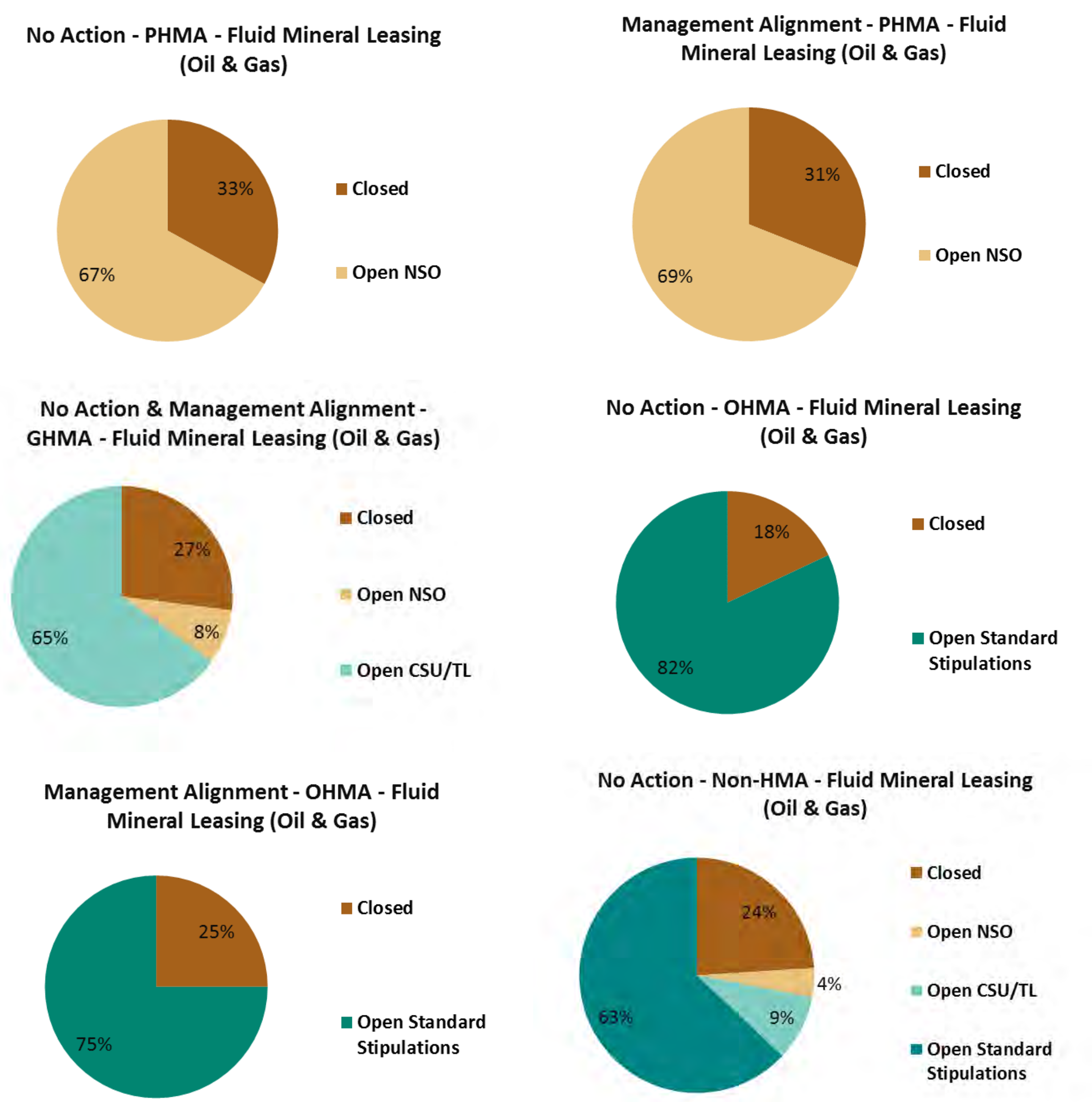


Figure 56 – Fluid Mineral (Oil & Gas) Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

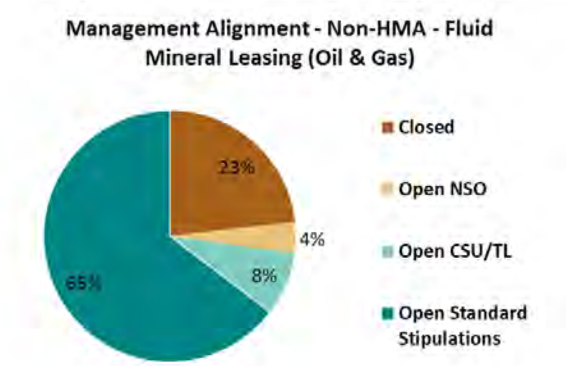


Figure 56 (cont'd) – Fluid Mineral (Oil & Gas) Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

VIII. Rights-of-Ways

Table 58 – Rights-of-Ways Decisions within MZ V

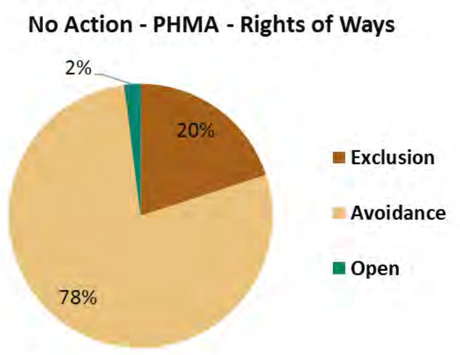
Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Rights-of-Ways Decisions in MZ V by Habitat Management Area Type					
Rights-of-Ways	No Action				
	PHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	956,000	445,000	158,000	787,000	**2,347,000**
Avoidance	3,634,000	4,349,000	0	325,000	**8,307,000**
Open	87,000	106,000	744,000	2,449,000	**3,386,000**
Total	**4,677,000**	**4,900,000**	**902,000**	**3,561,000**	**14,040,000**

Rights-of-Ways	Management Alignment				
	PHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	922,000	459,000	141,000	824,000	**2,346,000**
Avoidance	3,854,000	4,281,000	0	325,000	**8,460,000**
Open	51,000	69,000	423,000	2,685,000	**3,228,000**
Total	**4,827,000**	**4,809,000**	**564,000**	**3,834,000**	**14,034,000**

Approximate % of Habitat Management Area by Rights-of-Ways Decision in MZ V					
Rights-of-Ways	No Action				
	PHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	78%	89%	0%	9%	**59%**
Avoidance	20%	9%	18%	22%	**17%**
Open	2%	2%	82%	69%	**24%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Rights-of-Ways	Management Alignment				
	PHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	80%	89%	0%	8%	**60%**
Avoidance	19%	10%	25%	21%	**17%**
Open	1%	1%	75%	70%	**23%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**



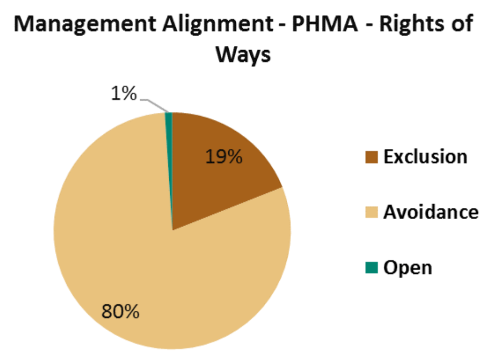


Figure 57 – Rights-of-Ways Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Figure 57 (cont'd) – Rights-of-Ways Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

IX. Salable Minerals Materials

Table 59 – Salable Minerals Materials Decisions within MZ V

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Salable Minerals Materials Decisions in MZ V by Habitat Management Area Type					
Salable Minerals Materials	**No Action**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	4,980,000	1,402,000	158,000	935,000	**7,475,000**
Open	1,000	3,621,000	744,000	2,827,000	**7,194,000**
Total	**4,980,000**	**5,024,000**	**903,000**	**3,762,000**	**14,669,000**

Salable Minerals Materials	**Management Alignment**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	5,135,000	1,416,000	141,000	972,000	**7,664,000**
Open	0	3,518,000	423,000	3,057,000	**6,998,000**
Total	**5,135,000**	**4,934,000**	**564,000**	**4,030,000**	**14,663,000**

Approximate % of Habitat Management Area by Non-Energy Leasable Minerals Decision in MZ V					
Salable Minerals Materials	**No Action**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	100%	28%	17%	25%	**51%**
Open	<1%	72%	83%	75%	**49%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Salable Minerals Materials	**Management Alignment**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	100%	29%	25%	24%	**52%**
Open	0%	71%	75%	76%	**48%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

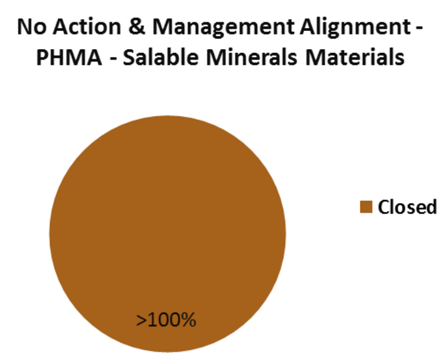


Figure 58 – Salable Minerals Materials Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

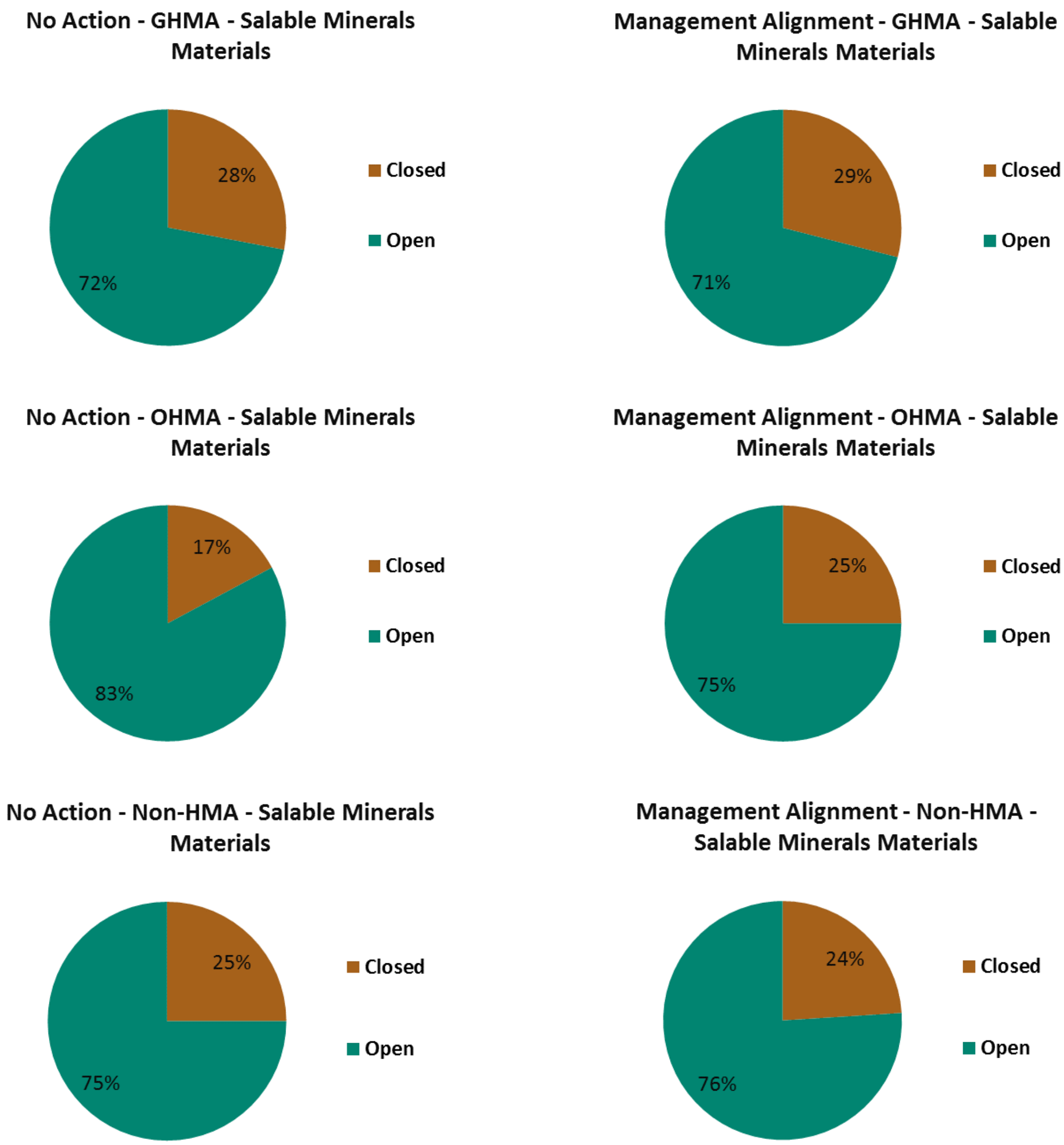


Figure 58 (cont'd) – Salable Minerals Materials Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

X. Solar Energy

Table 60 – Solar Energy Decisions within MZ V

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Solar Energy Decisions in MZ V by Habitat Management Area Type

Solar Energy	No Action				
	PHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	3,932,000	1,466,000	897,000	2,191,000	**8,487,000**
Avoidance	750,000	3,438,000	1,000	348,000	**4,537,000**
Open	0	0	4,000	1,032,000	**1,036,000**
Total	**4,683,000**	**4,904,000**	**903,000**	**3,571,000**	**14,060,000**

Solar Energy	Management Alignment				
	PHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	4,088,000	1,373,000	564,000	2,457,000	**8,483,000**
Avoidance	750,000	3,438,000	0	349,000	**4,537,000**
Open	0	0	0	1,034,000	**1,035,000**
Total	**4,838,000**	**4,810,000**	**564,000**	**3,841,000**	**14,054,000**

Approximate % of Habitat Management Area by Solar Energy Decision in MZ V

Solar Energy	No Action				
	PHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	84%	30%	99%	61%	**60%**
Avoidance	16%	70%	<1%	10%	**32%**
Open	0%	0%	<1%	29%	**7%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Solar Energy	Management Alignment				
	PHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	84%	29%	100%	64%	**60%**
Avoidance	16%	71%	0%	9%	**32%**
Open	0%	0%	0%	27%	**7%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

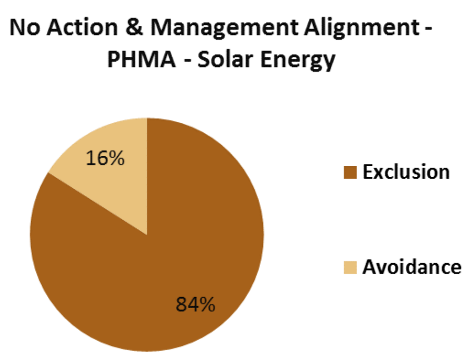


Figure 59 – Solar Energy Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

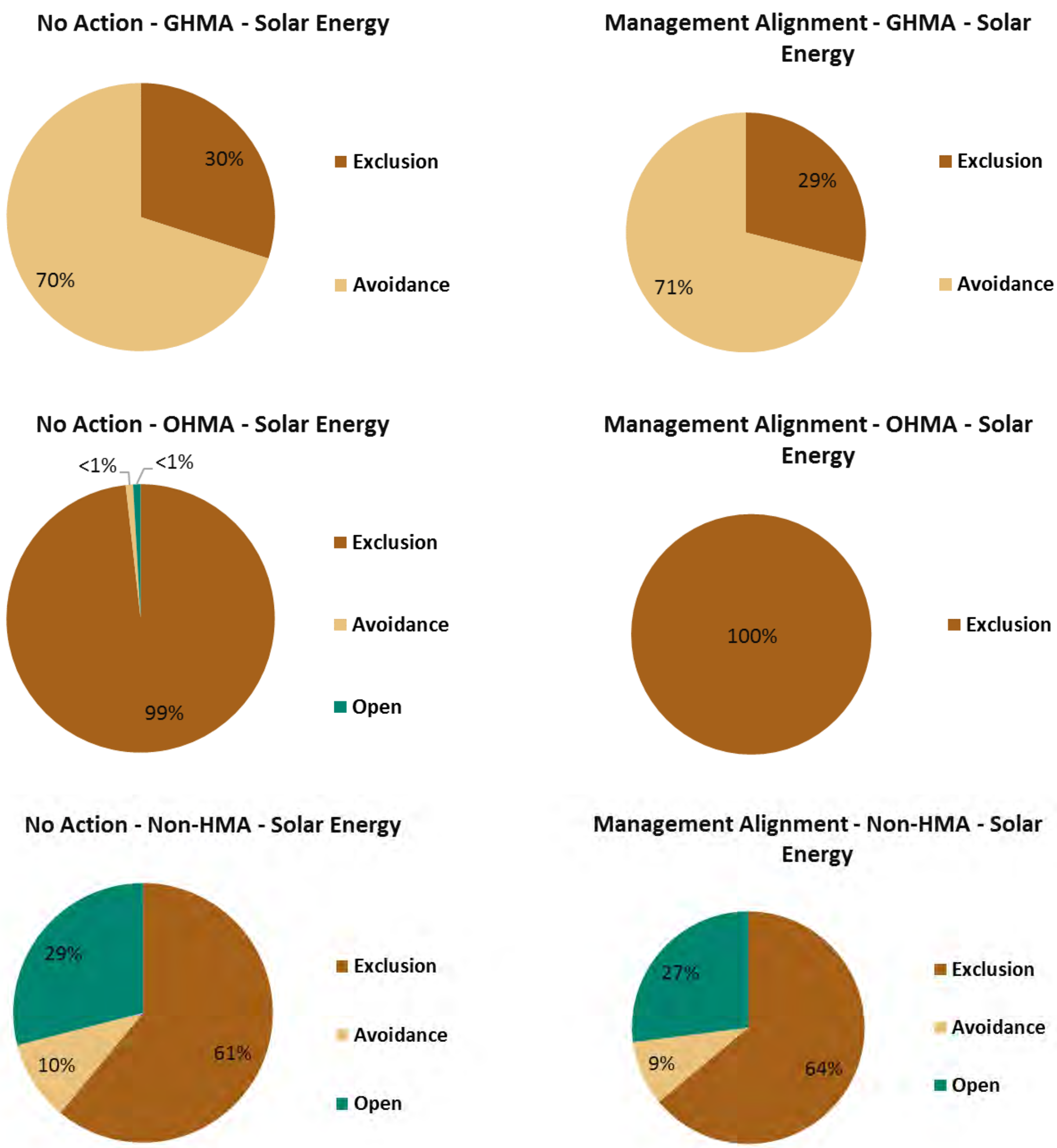


Figure 59 (cont'd) – Solar Energy Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

XI. Trails and Travel Management

Table 61 – Trails and Travel Management Decisions within MZ V

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Trails and Travel Management Decisions in MZ V by Habitat Management Area Type					
Trails and Travel Management Decisions	**No Action**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	220,000	215,000	59,000	423,000	**917,000**
Limited	4,452,000	4,681,000	428,000	1,257,000	**10,818,000**
Open	0	2,000	414,000	1,888,000	**2,304,000**
Total	**4,672,000**	**4,897,000**	**901,000**	**3,568,000**	**14,038,000**

Trails and Travel Management Decisions	**Management Alignment**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	215,000	214,000	64,000	424,000	**917,000**
Limited	4,613,000	4,591,000	290,000	1,280,000	**10,774,000**
Open	0	2,000	209,000	2,131,000	**2,342,000**
Total	**4,828,000**	**4,807,000**	**562,000**	**3,836,000**	**14,032,000**

Approximate % of Habitat Management Area by Trails and Travel Management Decisions Decision in MZ V					
Trails and Travel Management Decisions	**No Action**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	5%	4%	7%	12%	**7%**
Limited	95%	96%	48%	35%	**77%**
Open	0%	<1%	46%	53%	**16%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Trails and Travel Management Decisions	**Management Alignment**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	4%	4%	11%	11%	**7%**
Limited	96%	96%	52%	33%	**77%**
Open	0%	<1%	37%	56%	**17%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

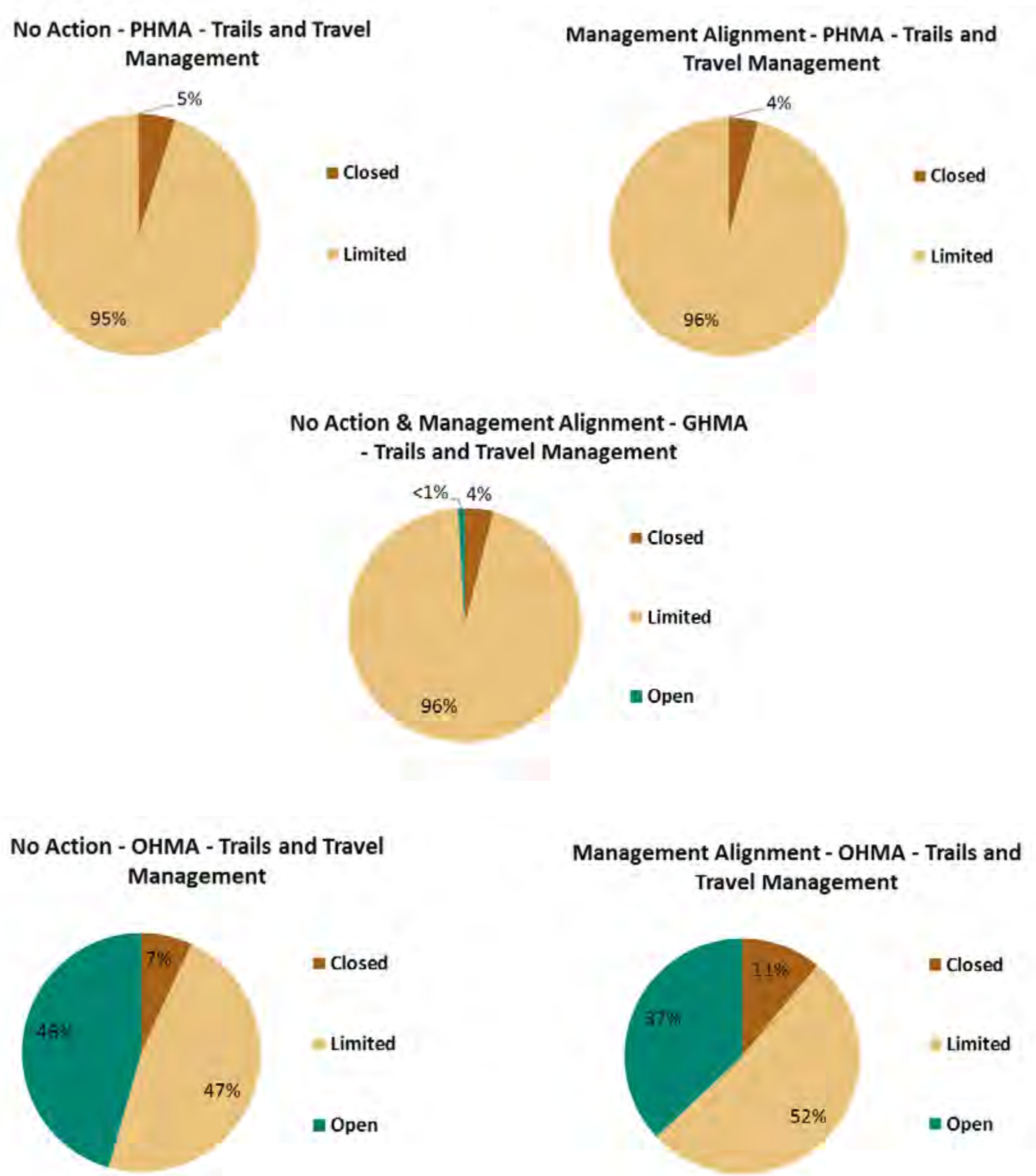
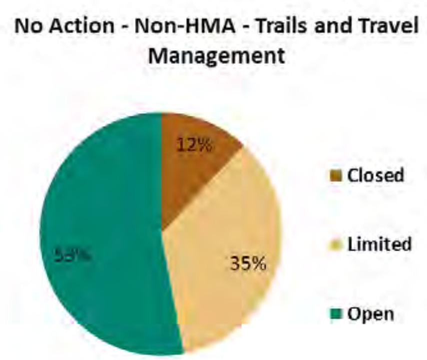


Figure 60 – Trails and Travel Management Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.



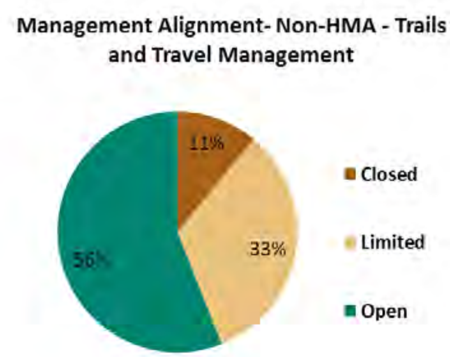


Figure 60 (cont'd) – Trails and Travel Management Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

XII. Wind Energy

Table 62 – Wind Energy Decisions within MZ V

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Approximate Acres of Wind Energy Decisions in MZ V by Habitat Management Area Type

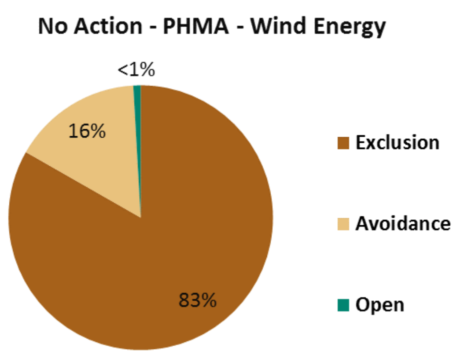
Wind Energy	No Action				
	PHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	3,927,000	454,000	158,000	792,000	**5,330,000**
Avoidance	750,000	4,445,000	0	321,000	**5,516,000**
Open	1,000	0	744,000	2,456,000	**3,201,000**
Total	**4,678,000**	**4,900,000**	**903,000**	**3,568,000**	**14,048,000**

Wind Energy	Management Alignment				
	PHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	4,083,000	467,000	141,000	829,000	**5,520,000**
Avoidance	750,000	4,341,000	0	321,000	**5,412,000**
Open	0	0	423,000	2,686,000	**3,110,000**
Total	**4,833,000**	**4,809,000**	**564,000**	**3,836,000**	**14,042,000**

Approximate % of Habitat Management Area by Wind Energy Decision in MZ V

Wind Energy	No Action				
	PHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	84%	9%	17%	22%	**38%**
Avoidance	16%	91%	0%	9%	**39%**
Open	<1%	0%	82%	69%	**23%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Wind Energy	Management Alignment				
	PHMA	GHMA	OHMA	Non-HMA	Total
Exclusion	84%	10%	25%	22%	**39%**
Avoidance	16%	90%	0%	8%	**39%**
Open	0%	0%	75%	70%	**22%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**



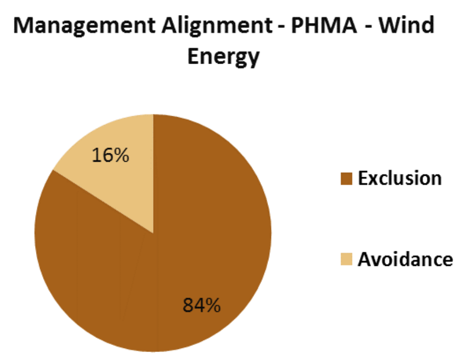


Figure 61 – Wind Energy Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

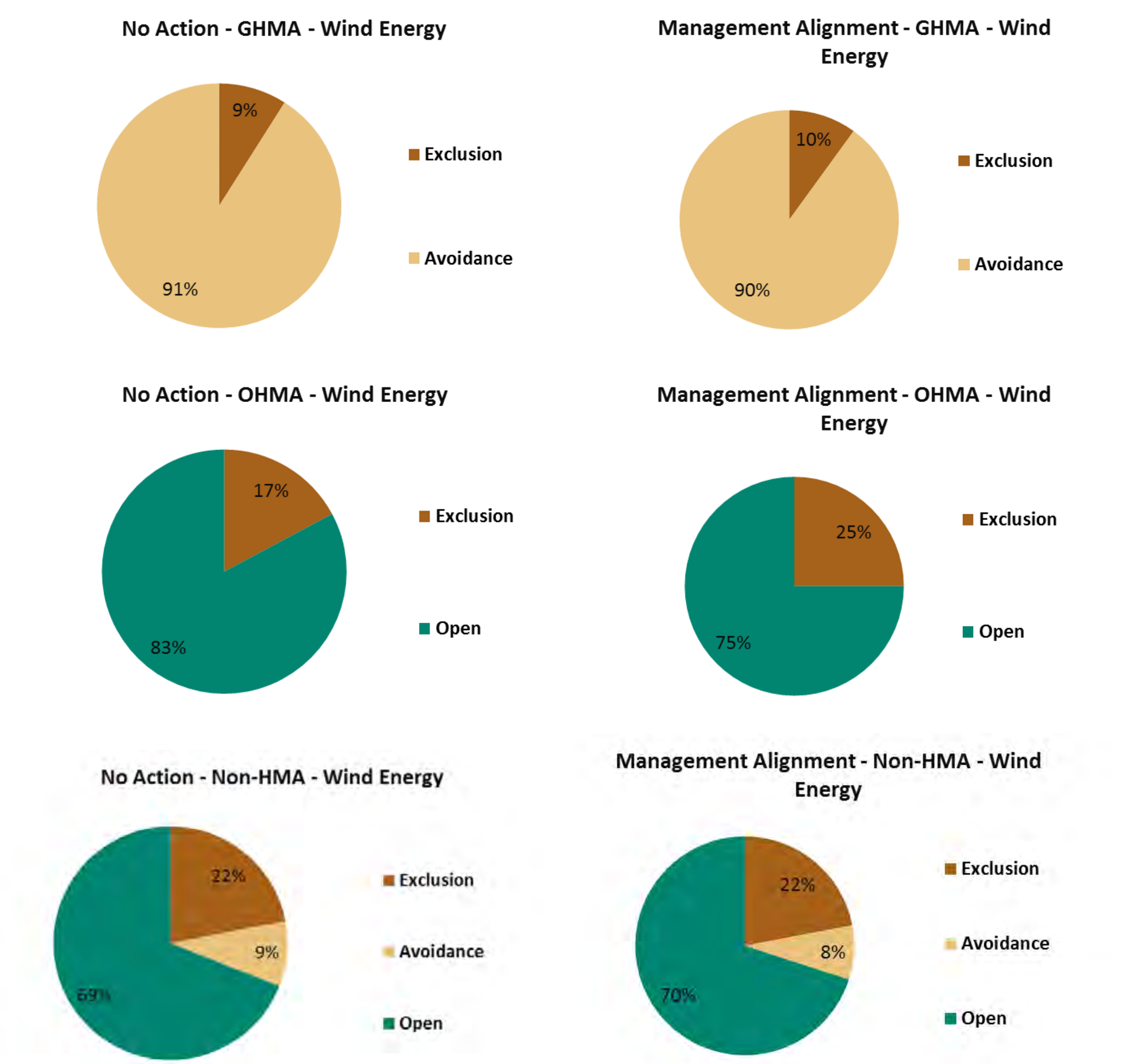


Figure 61 (cont'd) – Wind Energy Decisions within MZ V

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Management Zone summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized. Consult each individual EIS for final/official acreages.

Triggers Tripped by State:

Plan	2015	2016	2017	2018	2019
NWCO	-	None	None	None	-
ID	**West Owyhee IHMA** - Hard Habitat	**West Owyhee IHMA** - Hard Habitat REMAINS	**West Owyhee IHMA** - Hard Habitat REMAINS	**West Owyhee IHMA** - Hard Habitat REMAINS	**West Owyhee IHMA** - Hard Habitat REMAINS
	-	-	**Mountain Valley PHMA** - Hard Population	**Mountain Valley** PHMA - Hard Population REMAINS	**Mountain Valley** PHMA - Hard Population REMAINS
	-	-	-	**Desert PHMA** - Soft Population	**Desert PHMA** - Soft Population
	-	-	**Desert IHMA** - Hard Population	**Desert IHMA** - Hard Population REMAINS	**Desert IHMA** - Hard Population REMAINS
	-	-	**Mountain Valleys IHMA** - Soft Habitat	**Mountain Valleys IHMA** - Soft Habitat REMAINS	**Mountain Valleys IHMA** - Soft Habitat REMAINS
	-	-	-	-	**Desert PHMA –** Hard Population
	-	-	-	-	**Southern PHMA -**Hard Population
MT /DKs	None	None		None	-
NV/NECA	N/A	N/A	N/A	N/A	-
OR - Updated 4/28/19	**Baker -** Hard Population	**Baker -** Hard Population REMAINS	**Baker -** Hard Population REMAINS	**Baker -** Hard Population REMAINS	-
	Cow Valley - Soft Population	**Cow Valley** - Not enough data, removed from analysis	-	-	-
	Bully Creek - Hard Habitat	**Bully Creek** - Hard Habitat reanalyzed - **NOT TRIPPED**	-	-	-
	-	**Crowley** - Soft Population	**Crowley** - Soft Population REMAINS	**Crowley** - Soft Population REMAINS	-
	Cow Lakes - Soft Habitat & Population = Hard Trigger Tripped	Cow Lakes - Soft Habitat & Population = Hard Trigger Tripped	**Cow Lakes** - Soft Habitat & Population = Hard Trigger Tripped	**Cow Lakes** - Soft Habitat & Population = Hard Trigger Tripped REMAINS	-
	Louse - Soft Population	**Louse** - Not enough data, removed from analysis	-	-	-
	Trout Creeks - Soft Habitat	**Trout Creeks -** Soft Habitat REMIANS	**Trout Creeks -** Soft Habitat REMIANS	**Trout Creeks -** Soft Habitat REMIANS	-

Plan	2015	2016	2017	2018	2019
OR - Updated 4/28/19 *(continued)*	**Pueblo / S. Steens -** Soft Population	**Pueblo / S. Steens -** Change in threshold per ODFW recommendation. NOT TRIPPED. Calculation method revised in 2016 using ODFW method resulted in PAC not being tripped.	-	-	-
	Steens - Soft Habitat (w/o treatments included)	**Steens -** Soft Habitat REMAINS (w/o treatments included)	**Steens -** Soft Habitat **reanalyzed - NOT TRIPPED (treatments included)**	-	-
	Dry Valley / Jack Mountain - Soft Population	**Dry Valley / Jack Mountain** - Soft Population REMAINS	**Dry Valley / Jack Mountain -** Hard Population	**Dry Valley / Jack Mountain -** Hard Population REMAINS	-
	Picture Rock - Soft Population	**Picture Rock -** Soft Population REMAINS	**Picture Rock -** Hard Population	**Picture Rock -** Hard Population REMAINS	-
	-	**Warners -** Soft Population	**Warners -** Soft Population	**Warners -** Soft Population	-
	-	**Brothers / N. Wagontire -** Soft Population	**Brothers / N. Wagontire -** Soft Population REMAINS	**Brothers / N. Wagontire -** Hard Population	-
	12-Mile / Paulina / Misery Flat - Soft Population	**12-Mile / Paulina / Misery Flat -** Soft Population REMAINS	**12-Mile / Paulina / Misery Flat -** Soft Population UNTRIPPED	-	-
UT	-	**Sheeprocks -** Soft & Hard Population	**Sheeprocks -** Soft & Hard Population REMAINS	**Sheeprocks -** Soft & Hard Population REMAINS	-
WY	-	None	**Buffalo Connectivity -** Soft Habitat	**Buffalo Connectivity -** Soft Habitat Remains	**Jackson Hole PHMA –** Soft PHMA
	-	-	-	**Bear River -** Soft Habitat	-

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Appendix H
VDDT Methodology

APPENDIX H
VDDT METHODOLOGY

GREATER SAGE-GROUSE HABITAT CHARACTERIZATION FOR USE IN NON-SPATIAL VEGETATION MODELING ACROSS THE GREAT BASIN

Don Major[1], Rob Mickelsen[2], Craig Morris[3]

Introduction

Numerous factors influence sagebrush dynamics in the Great Basin. Each year acres of sagebrush increase in density, or are burned, grazed, converted to invasive annual grass, damaged by insects and disease, encroached by conifers, or altered by various management treatments. Due to the importance of sagebrush cover for greater sage-grouse, a process to account for all of these changes in sagebrush communities is important in evaluating trends of greater sage-grouse habitat. The greater sage-grouse land use plan amendments being developed and analyzed in each sub-regional EIS in the Great Basin each have different alternative approaches to management of greater sage-grouse habitat. Alternatives propose actions that will influence the extent and distribution of sagebrush. In order to evaluate and compare the estimated effects of each alternative, a team of vegetation ecologists representing each sub-regional EIS in the Great Basin was assembled. The team used the Vegetation Dynamics Development Tool (VDDT, copyright 1995-2003, ESSA Technologies, Vancouver, BC) to accomplish this task. This modeling effort does not include changes in habitat conditions associated with permitted activities such as infrastructure development, travel management, or mineral development.

Vegetation Data

We evaluated available vegetation information developed for the Greater Sage-grouse Regional and Sub-regional efforts to identify the sagebrush habitat types and associated vegetation cover classes required in our modeling effort. We determined the most effective approach would incorporate the following criteria: 1) dataset covers the entire western region, 2) the vegetation data has an associated accuracy assessment, and 3) data provides appropriate resolution of sagebrush habitat types and associated cover classes for the VDDT models. The baseline vegetation data sets developed for the region-wide

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[1] Sundance Consulting Inc., Boise, Idaho
[2] USFS
[3] USFS

Disturbance Monitoring and Vegetation Basemap Team (**) met these criteria. The datasets were developed using Landfire v12 (updated through 2010) data products and consisted of 1) existing sagebrush base, 2) conifer base, 3) potential sagebrush base (for details on methodology see Appendix – Vegetation Basemap in Disturbance Monitoring Report). In addition, we used Landfire v12 Existing Vegetation Type to identify Invasive Annual grass and Introduced Crested Seedings. Existing Vegetation Cover was used to identify sage-grouse cover class characteristics required for the modeling effort. The above datasets were combined and clipped to BLM and USFS ownership within each Sub-regional Area (Oregon, Idaho/Montana, Utah, Nevada/California) to serve as our sagebrush modeling basemaps for subsequent analysis.

GSG Habitat Characterization for Vegetation Models

We modified the sagebrush modeling basemap to facilitate characterization of sage-grouse habitat and associated development classes identified in our models. We modified the Soil Moisture and Temperature Regime data (Chambers et al 2014, Fire and Invasives Team Report, 2014) to identify 4 Vegetation Model Types – Warm/Dry sagebrush, Mixed sagebrush, Mountain sagebrush w/conifer, and Mountain sagebrush no conifer (Table 1). In addition we identified the need for a Low Sagebrush Group. We used the Landfire v12 Biophysical Settings dataset and selected low sagebrush vegetation groups (Table 2). The resulting Model Group raster was combined (raster calculator) with the Landfire Existing Vegetation Cover data to categorize the following cover classes within the Low sage [LOW], Warm/Dry Sage[WARM/DRY], Mixed Sage[MIX], Mountain Sage w/ conifer[MTN7], and Mountain sage no conifer[MTN8] (Class A = herbaceous cover 0-100%; Class B = shrub cover 10 – 30%; Class C = shrub cover >30%).To identify Annual Grass and Crested Seeding, we assigned any Landfire Introduced Upland Vegetation -Annual Grassland (evt code 3181) or – Perennial Grassland Forbland (evt code 3182) that had a sagebrush site potential to Class Invasive Annual and Class CWG Seeding, respectively. Conifer encroachment (Class D = tree cover >10%) was determined using the Conifer base dataset subset to areas with sagebrush site potential. The resulting rasters were combined, reclassified and added back to the base Model Group raster.

Soil Moisture Temperature information was limited in some higher elevation areas or shrubland-forest transitional areas. Therefore we incorporated 30 year average annual precipitation data (PRISM ppt 30yr normal 800m2 annual) to inform any unclassified sagebrush pixels in our Model Group dataset. Specifically, we set the following criteria: Average annual precipitation 14 – 28 inches = MTN7; Average annual precipitation ≥ 28 inches = MTN8. Results were reclassified and added back to the base Model Group raster.

Additional Filters

To provide a biologically meaningful geographic extent, we filtered the final sagebrush modeling basemap to Greater sage-grouse population Areas and associated Priority Areas for Conservation (PACs) from the Conservation Objectives Team Report (USFWS, 2014). The above datasets were combined and clipped to BLM and USFS ownership within each Sub-regional Area (Oregon, Idaho/Montana, Utah, Nevada/California) to serve as our sagebrush modeling basemaps for subsequent acreage reporting and analysis.

Literature Cited

Chambers, Jeanne C.; Pyke, David A.; Maestas, Jeremy D.; Pellant, Mike; Boyd, Chad S.; Campbell, Steven B.; Espinosa, Shawn; Havlina, Douglas W.; Mayer, Kenneth E.; Wuenschel, Amarina. 2014. Using resistance and resilience concepts to reduce impacts of invasive annual grasses and altered fire regimes on the sagebrush ecosystem and greater sage-grouse: A strategic multi-scale approach. Gen. Tech. Rep. RMRS-GTR-000. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Greater Sage-grouse Disturbance Monitoring and Vegetation Basemap Assessment Team Report. 2014 Greater Sage-grouse Wildfire, Invasive Annual Grasses and Conifer Expansion Assessment FIAT Report. 2014.

Miller R. F; Chambers, J. C.; Pellant, M. 2014a. A field guide to selecting the most appropriate treatments in sagebrush and pinyon-juniper ecosystems in the Great Basin: Evaluating resilience to disturbance and resistance to invasive annual grasses and predicting vegetation response. Gen. Tech. Rep. RMRS-GTR-322. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Miller R. F.; Chambers, J. C.; Pellant, M.[In press]. A field guide for rapid assessment of post-wildfire recovery potential in sagebrush and pinon-juniper ecosystems in the Great Basin: Evaluating resilience to disturbance and resistance to invasive annual grasses and predicting vegetation response. Gen. Tech. Rep. RMRS-GTR-###. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

U.S. Fish and Wildlife Service [USFWS]. 2013. Greater sage-grouse (*Centrocercus urophasianus*) conservation objectives: Final Report. Denver, CO: U.S. Fish and Wildlife Service. 91 p.

U.S. Geological Survey (USGS). 2013: LANDFIRE 1.2.0 Existing Vegetation Type layer. Updated 3/13/2013. Washington, DC: U.S. Department of the Interior, Geological Survey. Online: http://landfire.cr.usgs.gov/viewer/. [Accessed 10 July 2014].

Table 1 – VDDT Model Groups associated with predominant sagebrush ecological types in Sage-Grouse Management Zones III, IV, V, and VI based on soil temperature and soil moisture regimes, typical characteristics, and resilience to disturbance and resistance to invasive annual grasses (modified from Chambers et al. 2014, Miller et al. 2014 a,b).

Ecological Type	Characteristics	VDDT Model
Cold and Moist (Cryic/Xeric)	Ppt: 14 inches + Typical shrubs: *Mountain big sagebrush, snowfield sagebrush, snowberry, serviceberry, silver sagebrush, and/or low sagebrushes*	MTN8, LOW
Cool and Moist (Frigid/Xeric)	Ppt: 12-22 inches Typical shrubs: *Mountain big sagebrush, antelope bitterbrush, snowberry, and/or low sagebrushes* Piñon pine and juniper potential in some areas	MTN7, LOW
Warm and Moist (Mesic/Xeric)	Ppt: 12-16 inches Typical shrubs: *Wyoming big sagebrush, mountain big sagebrush, Bonneville big sagebrush, and/or low sagebrushes* Piñon pine and juniper potential in some areas	MIX, LOW
Cool and Dry (Frigid/Aridic)	Ppt: 6-12 inches Typical shrubs: *Wyoming big sagebrush, black sagebrush, and/or low sagebrushes*	WARM/DRY, LOW
Warm and Dry (Mesic/Aridic, bordering on Xeric)	Precipitation: 8-12 inches Typical shrubs: *Wyoming big sagebrush, black sagebrush and/or low sagebrushes*	WARM/DRY, LOW

Table 2 – Landfire 120 Potential Vegetation Types identified for the Greater Sage-grouse LOW Sagebrush model.

BPS Value	Landfire Potential Vegetation Type
10640	Colorado Plateau Mixed Low Sagebrush Shrubland
10650	Columbia Plateau Scabland Shrubland
10790	Great Basin Xeric Mixed Sagebrush Steppe
11240	Columbia Plateau Low Sagebrush Steppe
11262	Inter-Mountain Basins Montane Sagebrush Steppe - Low

Datasets Used in the Vegetation Analysis
From Disturbance Monitoring and Baseline Vegetation Teams (Spring 2014)

Landfire 18 Class EVT (Current) related to sagebrush systems [dataset: lf_evt_v12_sagebrush_recode]

Landfire BPS (Potential) Associated with the 18 Class EVT above [dataset: lf_bps_v12_sagebrush_recode]

Binary Landfire 18 Class informed w Dev/Ag/Fires/Conif-sage [dataset: 2010_existing_sagebrush_base]

Binary Conifer in Sage (near neighbor analysis w/ State bio acceptance) [dataset: lf_evt_v12_conifers_binary]

Data from Fire/Invasives (FIAT) Team
SSURGO Soil Temperature/Moisture Regimes (Chambers et al 2014)

[dataset: SGMZ_SSURGO_temp_moist_regimes_v2.gdb]

Additional Spatial Data
Landfire Annual Grass Only [dataset:]

Landfire EVC (Cover) associated w/ the above Landfire Binary Sagebrush Basemap [dataset: US_120_EVC]

PRISM [dataset: PRISM_ppt_30yr_normal_800mM2_annual_bil]

Management Scale Information Filters
GSG PAC Boundaries [dataset: GSGCOT_ALL_PAC_Atts_Albers_Dis_2014]

GSG Population boundaries [dataset: COT_SG_Populations_2014_WAFWA_UT]

Subregional EIS Boundaries [dataset: EISSubmittedBoundaries_mrg_dis]

State Boundaries [dataset: States5_ESRI_2008_Albers]

Surface Mgmt Boundaries (including FS Forests/Districts; BLM District/Field Offices) [dataset: SMA_Dec2013_Monitoring_AOI_cli]

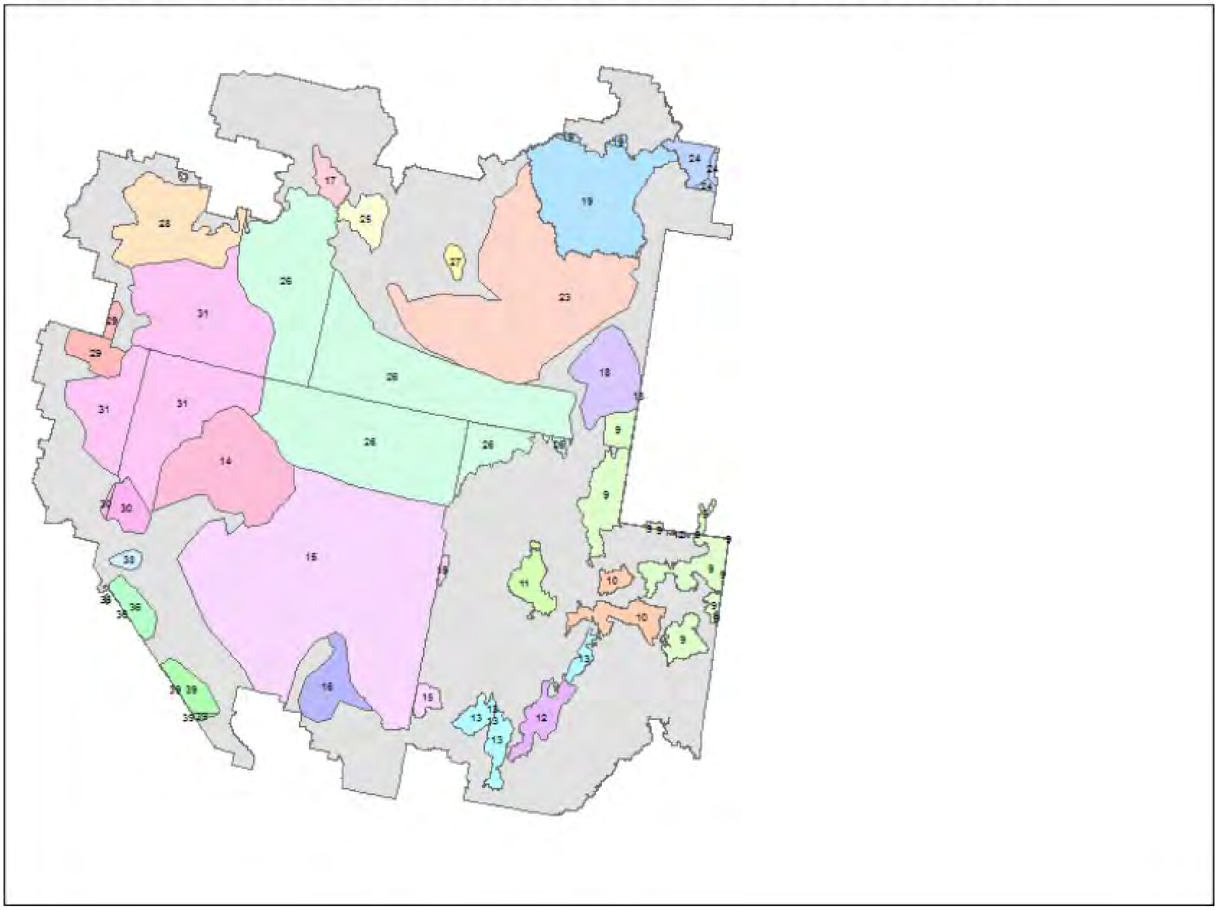
BLM – Subset: Agency: BLM, DOE, DOI, OTHFE

USFS – Subset: Agency: FS, USDA

USFS – For USFS Forest Name [dataset: USFS_GRSG_FS_Boundaries_Aug262013_Dissolved]

Utah specific to inform COT PAC and COT POP [dataset: UT_AltF_VDDT]

COT Population Unit Number - (ver. 07232014) for GSG VDDT Analysis



Appendix I

Fluid Mineral Stipulations, Waivers, Modifications, and Exceptions

APPENDIX I
FLUID MINERAL STIPULATIONS, WAIVERS, MODIFICATIONS, AND EXCEPTIONS

This appendix lists surface use stipulations for new fluid mineral (oil and gas and geothermal) leases referred to throughout the 2015 Final EIS that have been updated under the 2019 Approved RMP Amendment. In addition to fluid mineral leases, these surface use stipulations would also apply, where appropriate and practical, to other surface-disturbing activities (and occupancy) associated with land use authorizations, permits, and leases issued on BLM-administered lands. Subject to valid existing rights and applicable law and policy, the stipulations would apply to uses and activities other than fluid mineral leasing. The intent is to manage other activities and uses in the same manner as fluid mineral leasing.

Surface-disturbing activities are those that normally result in more than negligible disturbance to public lands. These activities normally involve disturbance to soils and vegetation to the extent that reclamation is required. They include the following:

- The use of mechanized earth-moving and truck-mounted drilling equipment;
- Certain geophysical exploration activities;
- Off-road vehicle travel in areas designated as limited or closed to Off Highway Vehicle (OHV) use;
- Placement of surface facilities, such as utilities, pipelines, structures, and geothermal and oil and gas wells;
- New road construction; and
- Use of pyrotechnics, explosives, and hazardous chemicals.

Surface-disturbing activities do not include livestock grazing, cross-country hiking, driving on designated routes, and minimum-impact filming.

DESCRIPTION OF SURFACE STIPULATIONS

Table I-1 shows the stipulations that will be carried forward or amended under the 2019 Approved RMP Amendment, including exceptions, modifications, and waivers. All stipulations for other resources, besides Greater Sage-Grouse (GRSG), included in the existing land use plans would still be applicable.

Areas identified as No Surface Occupancy (NSO) would not allow surface-disturbing activities.

Areas identified as Controlled Surface Use (CSU) would require proposed actions to be authorized in accordance with the controls or constraints specified. The controls would be applicable to all surface-disturbing activities.

Areas identified as Timing Limitation (TL) would not allow surface-disturbing activities during identified timeframes. TL areas would remain open to operations and maintenance, including associated vehicle travel, during the restricted period, unless otherwise specified in the stipulation.

RELIEF FROM STIPULATIONS

With regards to fluid minerals, surface use stipulations could have exceptions, modifications, or waivers applied with approval by the authorized officer (e.g., BLM State Director). **Table I-1** specifies the types of habitats where these stipulations would or would not apply:

Exception

An exception to stipulations associated with GRSG Habitat Management Areas (HMAs) may be granted by the authorized officer (State Director), in coordination with the appropriate state agency (NDOW, SETT, and/or CDFW), if one the following conditions are met:

i. The location of the proposed authorization is determined to be unsuitable (by a biologist with GRSG experience using methods such as Stiver et al 2015) and lacks the ecological potential to become marginal or suitable habitat; and would not result in direct, indirect, or cumulative impacts on GRSG and its habitat. Management allocation decisions would not apply to those areas determined to be unsuitable because the area lacks the ecological potential to become marginal or suitable habitat; and/or
ii. The proposed activity's impacts could be offset to result in no adverse impacts on GRSG or its habitat, through use of the mitigation hierarchy consistent with Federal law and the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations developed to implement this order). In cases where exceptions may be granted for projects with a residual impact, voluntary compensatory mitigation consistent with the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations developed to implement this order) would be one mechanism by which a proponent achieves the Approved RMP Amendment goals, objectives, and exception criteria. When a proponent volunteers compensatory mitigation as their chosen approach to address residual impacts, the BLM can incorporate those actions into the rationale used to grant an exception. The final decision to grant a waiver, exception, or modification would be based, in part, on criteria consistent with the State's GRSG management plans and policies.

Modification

The authorized officer, in coordination with the appropriate state wildlife agency (NDOW, and/or CDFW), can modify and/or waive dates for seasonal timing restrictions based on the criteria described below, based on site-specific information that indicates:

i. A project proposal's NEPA analysis and/or project record, and correspondence from NDOW and/or CDFW, demonstrates that any modification (shortening/extending seasonal timeframes or waiving the seasonal timing restrictions all together) 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:
   a) A proposed authorization would 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 (e.g., higher/lower elevations) and/or annual climatic fluctuations (e.g., early/late spring, long/heavy winter) that indicate the seasonal life cycle periods are different than presented, or that GRSG are not using the area during a given seasonal life cycle period.

ii. Modifications are needed to address an immediate public health and safety concern in a timely manner (e.g., maintaining a road impacted by flooding).

Waiver

The stipulation may be waived if the authorized officer, in consultation with the appropriate state agency (NDOW, SETT, and/or CDFW), determines that the entire leasehold is within unsuitable habitat (see exceptions above) and would not result in direct, indirect, or cumulative impacts to GRSG and/or its habitat.

Inclusion in Environmental Analysis

The environmental analysis document prepared for site-specific proposals such as for fluid minerals (oil and gas and geothermal) development (i.e., operations plans for geothermal drilling permit or master development plans for applications for permit to drill or sundry notices) would need to address proposals to exempt, modify, or waive a surface use stipulation.

In order to exempt, modify, or waive a stipulation on BLM-administered lands, the environmental analysis would have to demonstrate that criteria from above apply; such that: (1) the circumstances or relative resource values in the area had changed following issuance of the lease, (2) less restrictive requirements could be developed to protect the resource of concern, and (3) operations could be conducted without causing direct, indirect, or cumulative impacts.

With respect to granting relief from stipulations on other types of authorizations, such as solid mineral leases and land use authorizations, any changes to the contractual nature of these instruments would require environmental review and coordination with the lessee, permittee, or authorization holder. This would be the case when specific surface-disturbing activities are proposed via an operation plan, permitting action, or similar instrument.

STANDARD TERMS AND CONDITIONS

All surface-disturbing activities are subject to standard terms and conditions. These include the stipulations that are required for proposed actions in order to comply with the Endangered Species Act. Standard terms and conditions for fluid mineral leasing provide for relocating proposed operations up to 200 meters and for prohibiting surface-disturbing operations for a period not to exceed 60 days. The stipulations addressed in **Table I-1** that are within the parameters of 200 meters and 60 days are considered open to fluid mineral leasing, subject to standard terms and conditions.

Table I-1
Fluid Mineral Stipulations for Greater Sage-Grouse Habitat

Language from land use plan amendment	**Stipulation SG-01-NV-OG-NSO:** This stipulation is herein rescinded because Sagebrush Focal Areas (SFA) are not included in the 2019 Approved RMP Amendment. SFA—Managed as No Surface Occupancy (NSO), without waiver, exception, or modification, for fluid mineral leasing (oil, gas, and geothermal).
Objective	To protect GRSG habitat within the SFA
Stipulation type	Major constraint
Stipulation	NSO
Exception	
Modification	
Waiver	
Language from land use plan amendment	**Stipulation SG-02-NV-OG-NSO:** Priority Habitat Management Areas (PHMA)—Manage oil and gas resources in Nevada as NSO, with the following exceptions.
Objective	To protect GRSG in PHMA
Stipulation Type	Major constraint
Stipulation	NSO
Exception	The State Director may grant an exception to the allocations and stipulations if one of the following applies (in coordination with NDOW, SETT, and/or CDFW): i. The location of the proposed authorization is determined to be unsuitable (by a biologist with GRSG experience using methods such as Stiver et al 2015) and lacks the ecological potential to become marginal or suitable habitat; and would not result in direct, indirect, or cumulative impacts on GRSG and its habitat. Management allocation decisions would not apply to those areas determined to be unsuitable because the area lacks the ecological potential to become marginal or suitable habitat, and/or ii. The proposed activity's impacts could be offset to result in no adverse impacts on GRSG or its habitat, through use of the mitigation hierarchy consistent with Federal law and the state's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations developed to implement this order). In cases where exceptions may be granted for projects with a residual impact, voluntary compensatory mitigation consistent with the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations developed to implement this order) would be one mechanism by which a proponent achieves the Approved RMP Amendment goals, objectives, and exception criteria. When a proponent volunteers compensatory mitigation as their chosen approach to address residual impacts, the BLM can incorporate those actions into the rationale used to grant an exception. The final decision to grant a waiver, exception, or modification would be based, in part, on criteria consistent with the State's GRSG management plans and policies.

Modification	i. A project proposal's NEPA analysis and/or project record, and correspondence from NDOW and/or CDFW, demonstrates that any modification (shortening/extending seasonal timeframes or waiving the seasonal timing restrictions all together) 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: a) A proposed authorization would 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 (e.g., higher/lower elevations) and/or annual climatic fluctuations (e.g., early/late spring, long/heavy winter) that indicate the seasonal life cycle periods are different than presented, or that GRSG are not using the area during a given seasonal life cycle period. ii. Modifications are needed to address an immediate public health and safety concern in a timely manner (e.g., maintaining a road impacted by flooding).
Waiver	The stipulation may be waived if the authorized officer, in consultation with the appropriate state wildlife agency (NDOW, and/or CDFW), determines that the entire leasehold is within unsuitable habitat (see exceptions above) and would not result in direct, indirect, or cumulative impacts to GRSG and/or its habitat.
Language from land use plan amendment	**Stipulation SG-02-CA-NSO:** PHMA—Manage fluid mineral resources (oil, gas, and geothermal) in California as NSO, with the following exceptions.
Objective	To protect GRSG habitat in PHMA
Stipulation Type	Major constraint
Stipulation	NSO
Exception	Same as described above in **Stipulation SG-02-NV-OG-NSO**
Modification	Same as described above in **Stipulation SG-02-NV-OG-NSO**
Waiver	Same as described above in **Stipulation SG-02-NV-OG-NSO**
Language from land use plan amendment	**Stipulation SG-02-NV-GEOT-NSO:** PHMA—Manage Nevada geothermal resources as NSO, with the following exceptions.
Objective	To protect GRSG habitat in PHMA
Stipulation type	Major constraint
Stipulation	NSO
Exception	Same as described above in **Stipulation SG-02-NV-OG-NSO**
Modification	Same as described above in **Stipulation SG-02-NV-OG-NSO**
Waiver	Same as described above in **Stipulation SG-02-NV-OG-NSO**
Language from land use plan amendment	In PHMA in California only, limit the density of energy and mining facilities during project authorization to an average of one type of energy per mineral facility per 640 acres.
Objective	To protect PHMA and the life history needs of GRSG from habitat loss and GRSG populations from disturbance and limit fragmentation in PHMA. This would be implemented as a lease notice associated with new leases, in addition to the NSO stipulations. This would be applicable only to new oil and gas leases if the exception criteria identified for the NSO stipulation above were granted.
Stipulation type	Lease notice
Stipulation	Lease notice
Exception	Same as described above in **Stipulation SG-02-NV-OG-NSO**

Modification	Same as described above in **<u>Stipulation SG-02-NV-OG-NSO</u>**
Waiver	Same as described above in **<u>Stipulation SG-02-NV-OG-NSO</u>**
Language from land use plan amendment	**<u>Stipulation SG-03-TL:</u>** Seasonal protection within 4.0 miles of active or pending GRSG leks in General Management Habitat Areas (GHMA)—Manage fluid mineral resources with timing limitations.
Objective	To protect GRSG lekking habitat
Stipulation Type	Timing limitation
Stipulation	NSO would be allowed within 4.0 miles of active or pending GRSG leks from March 1 through May 15.
Exception	Same as described above in **<u>Stipulation SG-02-NV-OG-NSO</u>**
Modification	Same as described above in **<u>Stipulation SG-02-NV-OG-NSO</u>**
Waiver	Same as described above in **<u>Stipulation SG-02-NV-OG-NSO</u>**
Language from land use plan amendment	**<u>Stipulation SG-04-TL:</u>** Seasonal protection of GRSG winter habitat from November 1 through February 28 in GHMA.
Objective	To protect GRSG winter habitat
Stipulation Type	Timing limitation
Stipulation	NSO would be allowed in GRSG winter habitat from November 1 through February 28.
Exception	Same as described above in **<u>Stipulation SG-02-NV-OG-NSO</u>**
Modification	Same as described above in **<u>Stipulation SG-02-NV-OG-NSO</u>**
Waiver	Same as described above in **<u>Stipulation SG-02-NV-OG-NSO</u>**
Language from land use plan amendment	**<u>Stipulation SG-05-TL:</u>** Seasonal protection of GRSG early brood-rearing habitat from May 15 through June 15 in GHMA.
Objective	To protect GRSG early brood-rearing habitat
Stipulation type	Timing Limitation
Stipulation	NSO would be allowed in GRSG early brood-rearing habitat from May 15 through June15.
Exception	Same as described above in **<u>Stipulation SG-02-NV-OG-NSO</u>**
Modification	Same as described above in **<u>Stipulation SG-02-NV-OG-NSO</u>**
Waiver	Same as described above in **<u>Stipulation SG-02-NV-OG-NSO</u>**
Language from land use plan amendment	**<u>Stipulation SG-06-TL:</u>** Seasonal protection of GRSG late brood-rearing habitat from June 15 through September 15 in GHMA.
Objective	To protect GRSG late brood-rearing habitat
Stipulation type	Timing Limitation
Stipulation	NSO would be allowed in GRSG late brood-rearing habitat from June 15 through September 15.
Exception	Same as described above in **<u>Stipulation SG-02-NV-OG-NSO</u>**
Modification	Same as described above in **<u>Stipulation SG-02-NV-OG-NSO</u>**
Waiver	Same as described above in **<u>Stipulation SG-02-NV-OG-NSO</u>**
Language from land use plan amendment	**<u>Stipulation SG-08-CSU:</u>** Authorizations/permits would limit noise from discretionary activities (during construction, operation, or maintenance) to not exceed 10 decibels above ambient sound levels at least 0.25 mile from active and/or pending leks from 2 hours before to 2 hours after sunrise and sunset during the breeding season from March 1 through May 15.
Objective	To protect GRSG lek sites
Stipulation type	Controlled Surface Use (CSU)

Stipulation	Authorizations/permits would limit noise from discretionary activities (during construction, operation, or maintenance) to not exceed 10 decibels above ambient sound levels at least 0.25 mile from active and pending leks from 2 hours before to 2 hours after sunrise and sunset during the breeding season from March 1 through May 15.
Exception	Same as described above in **Stipulation SG-02-NV-OG-NSO**
Modification	Same as described above in **Stipulation SG-02-NV-OG-NSO**
Waiver	Same as described above in **Stipulation SG-02-NV-OG-NSO**
Language from Land Use Plan Amendment	**Stipulation SG-9-CSU:** In all GRSG HMAs, the BLM would apply lek buffer distances, as recommended in the United States Geological Service Report Conservation Buffer Distance estimates for Greater Sage Grouse—A Review Open File- Report 2014-1239 (Manier et al. 2014; see Appendix B).
Objective	To protect GRSG seasonal habitats
Stipulation type	CSU
Stipulation	The BLM, through project specific NEPA analysis, would assess and address impacts from the following activities using the lower end of the interpreted range of lek buffer-distances and guidance identified in the USGS Report, *"Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review",* Open File Report 2014-1239 (Mainer et al. 2014). Project specific analysis should use the lower end of the interpreted range in the report as a guideline for effects determination unless justifiable departures are determined to be appropriate (see below). The lower end of the interpreted range of the lek[1] buffer-distances is as follows: • linear features (roads) 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) within 1.2 miles of leks in flat or rolling terrain; • surface disturbance (continuing human activities that alter or remove the natural vegetation, excluding livestock grazing) within 3.1 miles of leks; and • 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.
Exception	Same as described above in **Stipulation SG-02-NV-OG-NSO**
Modification	Same as described above in **Stipulation SG-02-NV-OG-NSO**
Waiver	Same as described above in **Stipulation SG-02-NV-OG-NSO**
Language from land use plan amendment	**Stipulation SG-NV-10-CSU:** New development/activity would not exceed the 3% disturbance cap protocol at the project scale in PHMA, except in situations where a net conservation gain to the species is achieved as a component of compliance with a state mitigation plan, program, or authority, such as required by the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law).
Objective	To achieve a net conservation gain at the project level, as a component of compliance with a state mitigation plan, program, or authority, such as required by the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law).
Stipulation type	CSU

[1] Applicable to Active and Pending leks as defined by NDOW and CDFW

Stipulation	New development/activity would not exceed the 3% disturbance cap protocol at the project scale in PHMA, except in situations where a net conservation gain to the species is achieved as a component of compliance with a state mitigation plan, program, or authority, such as required by the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law).
Exception	New development/activity would not exceed the 3% disturbance cap protocol at the project scale in PHMA, except in situations where a net conservation gain to the species is achieved as a component of compliance with a state mitigation plan, program, or authority, such as required by the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law).
Modification	None
Waiver	None
Language from land use plan amendment	**Stipulation SG-CA-11-CSU:** New development/activity would not exceed the 3% disturbance cap protocol at the project scale in PHMA, except in situations where a net conservation gain to the species is achieved as a component of compliance with a state mitigation plan, program, or authority.
Objective	To achieve a net conservation gain at the project level, as a component of compliance with a state mitigation plan, program, or authority
Stipulation type	CSU
Stipulation	New development/activity would not exceed the 3% disturbance cap protocol at the project scale in PHMA, except in situations where a net conservation gain to the species is achieved as a component of compliance with a state mitigation plan, program, or authority.
Exception	New development/activity would not exceed the 3% disturbance cap protocol at the project scale in PHMA, except in situations where a net conservation gain to the species is achieved as a component of compliance with a state mitigation plan, program, or authority.
Modification	None
Waiver	None

Appendix J

Disturbance Cap Guidance

APPENDIX J
DISTURBANCE CAP GUIDANCE

Greater Sage-Grouse (GRSG) Disturbance Caps

In the USFWS's 2010 listing decision for sage-grouse, the USFWS identified 18 threats contributing to the destruction, modification, or curtailment of the sage-grouse's habitat or range (75 FR 13910 2010. The 18 threats have been aggregated into three measures:

- Sagebrush Availability (percent of sagebrush per unit area)
- Habitat Degradation (percent of human activity per unit area)
- Density of Energy and Mining (facilities and locations per unit area)

Habitat Degradation and Density of Energy and Mining will be evaluated under the Disturbance Cap and Density Cap respectively and are further described in this appendix. The three measures, in conjunction with other information, will be considered during the NEPA process for projects authorized or undertaken by the BLM.

Disturbance Cap for Northeastern California

For lands in California, this land use plan has incorporated a 3% disturbance cap within Greater Sage-Grouse (GRSG) Priority Habitat Management Areas (PHMAs) and the subsequent land use planning actions if the cap is met:

> *If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG Priority Habitat Management Areas (PHMA)in any given Biologically Significant Unit (BSU), then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 hard rock mining law, valid existing rights, etc.) will be permitted by BLM within GRSG PHMAs in any given BSU until the disturbance has been reduced to less than the cap.*
>
> *If the 3% disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in a PHMA, then no further anthropogenic disturbance will be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as the 1872 hard rock mining law, valid existing rights, etc.).*

Disturbance Cap for Nevada

In Nevada, this Approved RMP Amendment has incorporated a 3% disturbance management protocol for lands within the State of Nevada for Greater Sage-Grouse (GRSG) Priority Habitat Management Areas (PHMAs), except in situations where a net conservation gain to the species can be achieved, as a component of compliance with a state mitigation plan, program, or authority, such as required by State of Nevada Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law).

The disturbance cap applies to the PHMA within both the Biologically Significant Units (BSU) and at the project authorization scale. For the BSUs, west-wide habitat degradation (disturbance) data layers (**Table E-1**) will be used at a minimum to calculate the amount of disturbance and to determine if the disturbance cap has been exceeded as the land use plans (LUP) are being implemented. Locally collected disturbance data will be used to determine if the disturbance cap has been exceeded for project authorizations, and may also be used to calculate the amount of disturbance in the BSUs.

Although locatable mine sites are included in the degradation calculation, mining activities under the 1872 mining law may not be subject to the 3% disturbance cap. Details about locatable mining activities will be fully disclosed and analyzed in the NEPA process to assess impacts to sage-grouse and their habitat as well as to BLM goals and objectives, and other BLM programs and activities.

Formulas for calculations of the amount of disturbance in the PHMA in a BSU and or in a proposed project area are as follows:

- For the BSUs:

  % Degradation Disturbance = (combined acres of the 12 degradation threats[1]) ÷ (acres of all lands within the PHMAs in a BSU) x 100.

- For the Project Analysis Area:

  % Degradation Disturbance = (combined acres of the 12 degradation threats[1] plus the 7 site scale threats[2]) ÷ (acres of all lands within the PHMA in the project analysis area) x 100.

The denominator in the disturbance calculation formula consists of all acres of lands classified as PHMA within the analysis area (BSU or project area). Areas that are not sage-grouse seasonal habitats, or are not currently supporting sagebrush cover (e.g., due to wildfire), are not excluded from the acres of PHMA in the denominator of the formula. Information regarding sage-grouse seasonal habitats, sagebrush availability, and areas with the potential to support sage-grouse populations will be considered along with other local conditions that may affect sage-grouse during the analysis of the proposed project area.

[1] See **Table K-1**.
[2] See **Table K-2**.

Project Analysis Area Method for Permitting Surface Disturbance Activities

- Determine potentially affected occupied leks by placing a four mile boundary around the proposed area of physical disturbance related to the project. All occupied leks located within the four mile project boundary and within PHMA will be considered affected by the project.
- Next, place a four mile boundary around each of the affected occupied leks.
- The PHMA within the four mile lek boundary and the four mile project boundary creates the project analysis area for each individual project. If there are no occupied leks within the four-mile project boundary, the project analysis area will be that portion of the four-mile project boundary within the PHMA.
- Digitize all existing anthropogenic disturbances identified in **Table J-1** and the 7 additional features that are considered threats to sage-grouse (**Table J-2**). Using 1 meter resolution NAIP imagery is recommended. Use existing local data if available.
- Calculate percent existing disturbance using the formula above. If existing disturbance is less than 3%, proceed to next step. If existing disturbance is greater than 3%, defer the project in California, and apply the disturbance management protocol in Nevada.
- Add proposed project disturbance footprint area and recalculate the percent disturbance. If disturbance is less than 3%, proceed to next step. If disturbance is greater than 3%, defer project in California, and apply the disturbance management protocol in Nevada.
- For BLM-administered lands in Northeastern California, calculate the disturbance density of energy and mining facilities (listed above). If the disturbance density is less than 1 facility per 640 acres, averaged across project analysis area, proceed to the NEPA analysis incorporating mitigation measures into an alternative. If the disturbance density is greater than 1 facility per 640 acres, averaged across the project analysis area, either defer the proposed project or co-locate it into existing disturbed area.
- If a project that would exceed the degradation cap or density cap cannot be deferred due to valid existing rights or other existing laws and regulations, fully disclose the local and regional impacts of the proposed action in the associated NEPA.

DENSITY CAP FOR NORTHEASTERN CALIFORNIA

For BLM land in the state of California only, this land use plan has also incorporated a cap on the density of energy and mining facilities at an average of 1 facility per 640 acres in PHMA in a project authorization area. If the disturbance density in the PHMA in a proposed project area is on average less than 1 facility per 640 acres, the analysis will proceed through the NEPA process incorporating mitigation measures into an alternative. If the disturbance density is greater than an average of 1 facility per 640 acres, the proposed project will either be deferred until the density of energy and mining facilities is less than the cap or co-located it into existing disturbed area (subject to applicable laws and regulations, such as the General Mining Law of 1872, as amended, valid existing rights, etc.). Facilities included in the density calculation (**Table J-3**) are:

- Energy (oil and gas wells and development facilities)
- Energy (coal mines)
- Energy (wind towers)
- Energy (solar fields)
- Energy (geothermal)
- Mining (active locatable, leasable, and saleable developments)

Table J-1
Anthropogenic Disturbance Types for Disturbance Calculations
Data Sources are Described for the West-Wide Habitat Degradation Estimates

Degradation Type	Subcategory	Data Source	Direct Area of Influence	Area Source
Energy (oil & gas)	Wells	IHS; BLM (AFMSS)	5.0ac (2.0ha)	BLM WO-300
	Power Plants	Platts (power plants)	5.0ac (2.0ha)	BLM WO-300
Energy (coal)	Mines	BLM; USFS; Office of Surface Mining Reclamation and Enforcement; USGS Mineral Resources Data System	Polygon area (digitized)	Esri/Google Imagery
	Power Plants	Platts (power plants)	Polygon area (digitized)	Esri Imagery
Energy (wind)	Wind Turbines	Federal Aviation Administration	3.0ac (1.2ha)	BLM WO-300
	Power Plants	Platts (power plants)	3.0ac (1.2ha)	BLM WO-300
Energy (solar)	Fields/Power Plants	Platts (power plants)	7.3ac (3.0ha)/MW	NREL
Energy (geothermal)	Wells	IHS	3.0ac (1.2ha)	BLM WO-300
	Power Plants	Platts (power plants)	Polygon area (digitized)	Esri Imagery
Mining	Locatable Developments	InfoMine	Polygon area (digitized)	Esri Imagery
Infrastructure (roads)	Surface Streets (Minor Roads)	Esri StreetMap Premium	40.7ft (12.4m)	USGS
	Major Roads	Esri StreetMap Premium	84.0ft (25.6m)	USGS
	Interstate Highways	Esri StreetMap Premium	240.2ft (73.2m)	USGS
Infrastructure (railroads)	Active Lines	Federal Railroad Administration	30.8ft (9.4m)	USGS
Infrastructure (power lines)	1-199kV Lines	Platts (transmission lines)	100ft (30.5m)	BLM WO-300
	200-399 kV Lines	Platts (transmission lines)	150ft (45.7m)	BLM WO-300
	400-699kV Lines	Platts (transmission lines)	200ft (61.0m)	BLM WO-300
	700+kV Lines	Platts (transmission lines)	250ft (76.2m)	BLM WO-300
Infrastructure (communication)	Towers	Federal Communications Commission	2.5ac (1.0ha)	BLM WO-300

Table J-2
The Seven Site Scale Features Considered Threats to Sage-Grouse Included in the Disturbance Calculation for Project Authorizations

1. Coalbed Methane Ponds
2. Meteorological Towers
3. Nuclear Energy Facilities
4. Airport Facilities and Infrastructure
5. Military Range Facilities & Infrastructure
6. Hydroelectric Plants
7. Recreation Areas Facilities and Infrastructure
Definitions:
1. Coalbed Methane and other Energy-related Retention Ponds – The footprint boundary will follow the fenceline and includes the area within the fenceline surrounding the impoundment. If the pond is not fenced, the impoundment itself is the footprint. Other infrastructure associated with the containment ponds (roads, well pads, etc.) will be captured in other disturbance categories.
2. Meteorological Towers – This feature includes long-term weather monitoring and temporary meteorological towers associated with short-term wind testing. The footprint boundary includes the area underneath the guy wires.
3. Nuclear Energy Facilities – The footprint boundary includes visible facilities (fence, road, etc.) and undisturbed areas within the facility's perimeter.
4. Airport Facilities and Infrastructure (public and private) – The footprint boundary will follow the boundary of the airport or heliport and includes mowed areas, parking lots, hangers, taxiways, driveways, terminals, maintenance facilities, beacons and related features. Indicators of the boundary, such as distinct land cover changes, fences and perimeter roads, will be used to encompass the entire airport or heliport.
5. Military Range Facilities & Infrastructure – The footprint boundary will follow the outer edge of the disturbed areas around buildings and includes undisturbed areas within the facility's perimeter.
6. Hydroelectric Plants – The footprint boundary includes visible facilities (fence, road, etc.) and undisturbed areas within the facility's perimeter.
7. Recreation Areas & Facilities – This feature includes all sites/facilities larger than 0.25 acres in size. The footprint boundary will include any undisturbed areas within the site/facility.

Table J-3
Relationship Between the 18 Threats and the Three Habitat Disturbance Measures for Monitoring and Disturbance Calculations

USFWS Listing Decision Threat	Sagebrush Availability	Habitat Degradation	Energy and Mining Density
Agriculture	X		
Urbanization	X		
Wildfire	X		
Conifer encroachment	X		
Treatments	X		
Invasive Species	X		
Energy (oil and gas wells and development facilities)		X	X
Energy (coal mines)		X	X
Energy (wind towers)		X	X
Energy (solar fields)		X	X
Energy (geothermal)		X	X
Mining (active locatable, leasable, and saleable developments)		X	X
Infrastructure (roads)		X	
Infrastructure (railroads)		X	
Infrastructure (power lines)		X	
Infrastructure (communication towers)		X	
Infrastructure (other vertical structures)		X	
Other developed rights-of-way		X	

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Appendix K
Noise Protocol

APPENDIX K
NOISE PROTOCOL

The following recommendations are intended to serve as a general protocol for collection of noise measurements in areas of existing and proposed development. The intent is to provide guidelines to experienced personnel so that measurements are made in a consistent and accurate manner and to highlight areas where specialized training and equipment is required. The goal is to develop a protocol that is efficient, effective, and produces consistent results. The protocol was written to facilitate the gathering of noise measurements relevant to stipulations for GRSG protection. Use of a standard protocol for noise monitoring will ensure that future measurements are comparable across locations, times, and surveyors. This protocol should be considered a work in progress and should be updated, in coordination with appropriate entities as data needs and availability change (Blickley and Patricelli 2013).

SUMMARY OF NOISE-MONITORING RECOMMENDATIONS

- Measurements should be made by qualified personnel experienced in acoustical monitoring.
- Measurements should be made with a high quality, calibrated Type I (noise floor < 25 dB) sound level meter (SLM) with a microphone windscreen and (where applicable) environmental housing.
- Measurements should be collected during times when noise exposure is most likely to affect greater sage-grouse— nights and mornings (i.e. 6 pm – 9 am) and should be taken for ≥1 hour at each site, ideally over multiple days with suitable climactic conditions. To capture typical variability in noise level at the site of interest, deployment of SLM units for multiple days is preferred.
- Environmental conditions should be measured throughout noise measurement periods so that measurements made during unsuitable conditions can be excluded.
- Measurements should be made at multiple (3-4) locations between each noise source and the edge of the protected area. On-lek measurements should exclude time periods when birds are lekking.
- Accurate location data should be collected for each measurement location. Surveyors also should catalog the type and location of all nearby sources of anthropogenic noise.

- Critical metrics should be collected: L50, L90, L10, Leq, and Lmax. All measurements should be collected in A-weighted decibels (dBA) and, if possible, also collected in unweighted (dBF) and C-weighted (dBC) decibels. If possible, SLM should log 1/3-octave band levels throughout the measurement period. Additional metrics may be collected, depending on the goals of the study.
- Due to the difficulty of measuring ambient noise levels in quiet conditions, we recommend the use of both empirical sampling and ambient noise modeling to establish baseline ambient values.

References

See the following studies for complete protocols and methods:

Blickley, J. L, and G. L. Patricelli. 2013. Noise monitoring recommendations for Greater Sage-Grouse habitat in Wyoming. Prepared for the PAPA, Pinedale, WY.

Ambrose, S., and C. Florian. 2013. Sound Levels of Gas Field Activities at Greater Sage-Grouse Leks, Pinedale Anticline Project Area, Wyoming. Prepared for Wyoming Game and Fish Department Cheyenne, WY.

Appendix L
Monitoring Framework

THE GREATER SAGE-GROUSE MONITORING FRAMEWORK

Bureau of Land Management
U.S. Forest Service

Developed by the Interagency Greater Sage-Grouse Disturbance and Monitoring Subteam

May 30, 2014

The Greater Sage-Grouse Monitoring Framework

Developed by the Interagency Greater Sage-Grouse Disturbance and Monitoring Subteam

INTRODUCTION

The purpose of this U.S. Bureau of Land Management (BLM) and U.S. Forest Service (USFS) Greater Sage-Grouse Monitoring Framework (hereafter, monitoring framework) is to describe the methods to monitor habitats and evaluate the implementation and effectiveness of the BLM's national planning strategy (attachment to BLM Instruction Memorandum 2012-044), the BLM resource management plans (RMPs), and the USFS's land management plans (LMPs) to conserve the species and its habitat. The regulations for the BLM (43 CFR 1610.4-9) and the USFS (36 CFR part 209, published July 1, 2010) require that land use plans establish intervals and standards, as appropriate, for monitoring and evaluations based on the sensitivity of the resource to the decisions involved. Therefore, the BLM and the USFS will use the methods described herein to collect monitoring data and to evaluate implementation and effectiveness of the Greater Sage-Grouse (GRSG) (hereafter, sage-grouse) planning strategy and the conservation measures contained in their respective land use plans (LUPs). A monitoring plan specific to the Environmental Impact Statement, land use plan, or field office will be developed after the Record of Decision is signed. For a summary of the frequency of reporting, see Attachment A, An Overview of Monitoring Commitments. Adaptive management will be informed by data collected at any and all scales.

To ensure that the BLM and the USFS are able to make consistent assessments about sage-grouse habitats across the range of the species, this framework lays out the methodology—at multiple scales—for monitoring of implementation and disturbance and for evaluating the effectiveness of BLM and USFS actions to conserve the species and its habitat. Monitoring efforts will include data for measurable quantitative indicators of sagebrush availability, anthropogenic disturbance levels, and sagebrush conditions. Implementation monitoring results will allow the BLM and the USFS to evaluate the extent that decisions from their LUPs to conserve sage-grouse and their habitat have been implemented. State fish and wildlife agencies will collect population monitoring information, which will be incorporated into effectiveness monitoring as it is made available.

This multiscale monitoring approach is necessary, as sage-grouse are a landscape species and conservation is scale-dependent to the extent that conservation actions are implemented within seasonal habitats to benefit populations. The four orders of habitat selection (Johnson 1980) used in this monitoring framework are described by Connelly et al. (2003) and were applied specifically to the scales of sage-grouse habitat selection by Stiver et al. (*in press)* as first order (broad scale), second order (mid scale), third order (fine scale), and fourth order (site scale). Habitat selection and habitat use by sage-grouse occur at multiple scales and are driven by multiple environmental and behavioral factors. Managing and monitoring sage-grouse habitats are complicated by the differences in habitat selection across the range and habitat use by individual birds within a given season. Therefore, the tendency to look at a single indicator of habitat suitability or only one scale limits managers' ability to identify the threats to sage-grouse and to respond at the appropriate scale. For descriptions of these habitat suitability indicators for each scale, see “Sage-Grouse Habitat Assessment Framework: Multiscale Habitat Assessment Tool” (HAF; Stiver et al. *in press*).

Monitoring methods and indicators in this monitoring framework are derived from the current peer-reviewed science. Rangewide, best available datasets for broad- and mid-scale monitoring will be acquired. If these existing datasets are not readily available or are inadequate, but they are necessary to inform the indicators of sagebrush availability, anthropogenic disturbance levels, and sagebrush conditions, the BLM and the USFS will strive to develop datasets or obtain information to fill these data gaps. Datasets that are not readily available to inform the fine- and site-scale indicators will be developed. These data will be used to generate monitoring reports at the appropriate and applicable geographic scales, boundaries, and analysis units: across the range of sage-grouse as defined by Schroeder et al. (2004), and clipped by Western Association of Fish and Wildlife Agencies (WAFWA) Management Zone (MZ) (Stiver et al. 2006) boundaries and other areas as appropriate for size (e.g., populations based on Connelly et al. 2004). (See Figure 1, Map of Greater Sage-Grouse range, populations, subpopulations, and Priority Areas for Conservation as of 2013.) This broad- and mid-scale monitoring data and analysis will provide context for RMP/LMP areas; states; GRSG Priority Habitat, General Habitat, and other sage-grouse designated management areas; and Priority Areas for Conservation (PACs), as defined in “Greater Sage-grouse *(Centrocercus urophasianus)* Conservation Objectives: Final Report” (Conservation Objectives Team [COT] 2013). Hereafter, all of these areas will be referred to as “sage-grouse areas.”

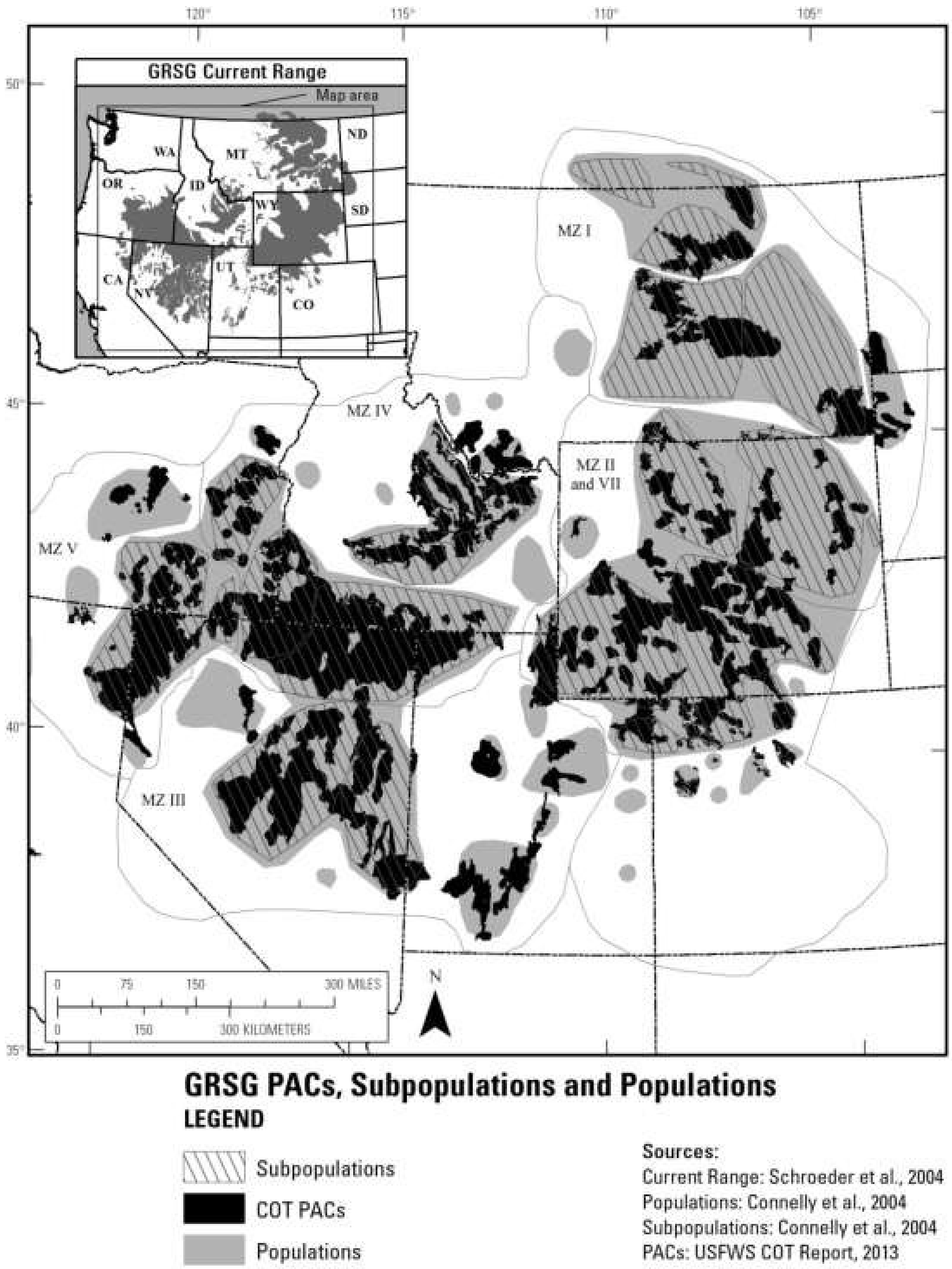

Figure 1. Map of Greater Sage-Grouse range, populations, subpopulations, and Priority Areas for Conservation as of 2013.

This monitoring framework is divided into two sections. The broad- and mid-scale methods , described in Section I, provide a consistent approach across the range of the species to monitor implementation decisions and actions, mid-scale habitat attributes (e.g., sagebrush availability and habitat degradation), and population changes to determine the effectiveness of the planning strategy and management decisions. (See Table 1, Indicators for monitoring implementation of the national planning strategy, RMP/LMP decisions, sage-grouse habitat, and sage-grouse populations at the broad and mid scales.) For sage-grouse habitat at the fine and site scales, described in Section II, this monitoring framework describes a consistent approach (e.g., indicators and methods) for monitoring sage-grouse seasonal habitats. Funding , support, and dedicated personnel for broad- and mid-scale monitoring will be renewed annually through the normal budget process. For an overview of BLM and USFS multiscale monitoring commitments, see Attachment A.

Table 1. Indicators for monitoring implementation of the national planning strategy, RMP/LMP decisions , sage-grouse habitat , and sage-grouse populations at the broad and mid scales.

	Implementation	Habitat		Population (State Wildlife Agencies)
Geographic Scales		Availability	Degradation	Demographics
Broad Scale: From the range of sage-grouse to WAFWA Management Zones	BLM/USFS National planning strategy goal and objectives	Distribution and amount of sagebrush within the range	Distribution and amount of energy, mmmg, and infrastructure facilities	WAFWA Management Zone population trend
Mid Scale: From WAFWA Management Zone to populations; PACs	RMP/LMP decisions	Mid-scale habitat indicators (HAF; Table 2 herein, e.g., percent of sagebrush per unit area)	Distribution and amount of energy, mmmg, and infrastructure facilities (Table 2 herein)	Individual population trend

I. BROAD AND MID SCALES

First-order habitat selection, the broad scale, describes the physical or geographical range of a species. The first-order habitat of the sage-grouse is defined by populations of sage-grouse associated with sagebrush landscapes, based on Schroeder et al. 2004, and Connelly et al. 2004, and on population or habitat surveys since 2004. An intermediate scale between the broad and mid scales was delineated by WAFWA from floristic provinces within which similar environmental factors influence vegetation communities. This scale is referred to as the WAFWA Sage-Grouse Management Zones (MZs). Although no indicators are specific to this scale, these MZs are biologically meaningful as reporting units.

Second-order habitat selection, the mid-scale, includes sage-grouse populations and PACs. The second order includes at least 40 discrete populations and subpopulations (Connelly et al. 2004). Populations range in area from 150 to 60,000 mi^2 and are nested within MZs. PACs range from 20 to 20,400 mi^2 and are nested within population areas.

Other mid-scale landscape indicators, such as patch size and number, patch connectivity, linkage areas, and landscape matrix and edge effects (Stiver et al. *in press*) will also be assessed. The methods used to calculate these metrics will be derived from existing literature (Knick et al. 2011, Leu and Hanser 2011, Knick and Hanser 2011).

A. Implementation (Decision) Monitoring

Implementation monitoring is the process of tracking and documenting the implementation (or the progress toward implementation) of RMP/LMP decisions. The BLM and the USFS will monitor implementation of project-level and/or site-specific actions and authorizations, with their associated conditions of approval/stipulations for sage-grouse, spatially (as appropriate) within Priority Habitat, General Habitat, and other sage-grouse designated management areas, at a minimum, for the planning area. These actions and authorizations, as well as progress toward completing and implementing activity-level plans, will be monitored consistently across all planning units and will be reported to BLM and USFS headquarters annually, with a summary report every 5 years, for the planning area. A national-level GRSG Land Use Plan Decision Monitoring and Reporting Tool is being developed to describe how the BLM and the USFS will consistently and systematically monitor and report implementation-level activity plans and implementation actions for all plans within the range of sage-grouse. A description of this tool for collection and reporting of tabular and spatially explicit data will be included in the Record of Decision or approved plan. The BLM and the USFS will provide data that can be integrated with other conservation efforts conducted by state and federal partners.

B. Habitat Monitoring

The U.S. Fish and Wildlife Service (USFWS), in its 2010 listing decision for the sage-grouse, identified 18 threats contributing to the destruction, modification, or curtailment of sage-grouse habitat or range (75 FR 13910 2010). The BLM and the USFS will, therefore, monitor the relative extent of these threats that remove sagebrush, both spatially and temporally, on all lands within an analysis area, and will report on amount, pattern, and condition at the appropriate and applicable geographic scales and boundaries. These 18 threats have been aggregated into three broad- and mid-scale measures to account for whether the threat predominantly removes sagebrush or degrades habitat. (See Table 2, Relationship between the 18 threats and the three habitat disturbance measures for monitoring.) The three measures are:

Measure 1: Sagebrush Availability (percent of sagebrush per unit area)

Measure 2: Habitat Degradation (percent of human activity per unit area)

Measure 3: Energy and Mining Density (facilities and locations per unit area)

These three habitat disturbance measures will evaluate disturbance on all lands, regardless of land ownership. The direct area of influence will be assessed with the goal of accounting for actual removal of sagebrush on which sage-grouse depend (Connelly et al. 2000) and for habitat degradation as a surrogate for human activity. Measure 1 (sagebrush availability) examines where disturbances have removed plant communities that support sagebrush (or have broadly removed sagebrush from the landscape). Measure 1, therefore, monitors the change in sagebrush availability—or, specifically, where and how much of the sagebrush community is available within the range of sage-grouse. The sagebrush community is defined as the ecological systems that have the capability of supporting sagebrush vegetation and seasonal sage-grouse habitats within the range of sage-grouse (see Section I.B.1., Sagebrush Availability). Measure 2 (see Section I.B.2., Habitat Degradation Monitoring) and Measure 3 (see Section I.B.3., Energy and Mining Density) focus on where habitat degradation is occurring by using the footprint/area of direct disturbance and the number of facilities at the mid scale to identify the relative amount of degradation per geographic area of interest and in areas that have the capability of supporting sagebrush and seasonal sage-grouse use. Measure 2 (habitat degradation) not only quantifies footprint/area of direct disturbance but also establishes a surrogate for those threats most likely to have ongoing activity. Because energy development and mining activities are typically the most intensive activities in sagebrush habitat, Measure 3 (the density of active energy development, production, and mining sites) will help identify areas of particular concern for such factors as noise, dust, traffic, etc. that degrade sage-grouse habitat.

Table 2. Relationship between the 18 threats and the three habitat disturbance measures for monitoring**.**

Note: Data availability may preclude specific analysis of individual layers. See the detailed methodology for more information.

USFWS Listing Decision Threat	Sagebrush Availability	Habitat Degradation	Energy and Mining Density
Agriculture	X		
Urbanization	X		
Wildfire	X		
Conifer encroachment	X		
Treatments	X		
Invasive Species	X		
Energy (oil and gas wells and development facilities)		X	X
Energy (coal mines)		X	X
Energy (wind towers)		X	X
Energy (solar fields)		X	X
Energy (geothermal)		X	X
Mining (active locatable, leasable, and saleable developments)		X	X
Infrastructure (roads)		X	
Infrastructure (railroads)		X	
Infrastructure (power lines)		X	
Infrastructure (communication towers)		X	
Infrastructure (other vertical structures)		X	
Other developed rights-of-way		X	

The methods to monitor disturbance found herein differ slightly from methods used in Manier et al. 2013, which provided a baseline environmental report (BER) of datasets of disturbance across jurisdictions. One difference is that, for some threats, the BER data were for federal lands only. In addition, threats were assessed individually, using different assumptions from those in this monitoring framework about how to quantify the location and magnitude of threats. The methodology herein builds on the BER methodology and identifies datasets and procedures to use the best available data across the range of the sage-grouse and to formulate a consistent approach to quantify impact of the threats through time. This methodology also describes an approach to combine the threats and calculate each of the three habitat disturbance measures.

B.1. Sagebrush Availability (Measure 1)

Sage-grouse populations have been found to be more resilient where a percentage of the landscape is maintained in sagebrush (Knick and Connelly 2011), which will be determined by sagebrush availability. Measure 1 has been divided into two submeasures to describe sagebrush availability on the landscape:

> Measure 1a: the current amount of sagebrush on the geographic area of interest, and
>
> Measure 1b: the amount of sagebrush on the geographic area of interest compared with the amount of sagebrush the landscape of interest could ecologically support.

Measure 1a (the current amount of sagebrush on the landscape) will be calculated using this formula: [the existing updated sagebrush layer] divided by [the geographic area of interest]. The appropriate geographic areas of interest for sagebrush availability include the species' range, WAFWA MZs, populations, and PACs. In some cases these sage-grouse areas will need to be aggregated to provide an estimate of sagebrush availability with an acceptable level of accuracy.

Measure 1b (the amount of sagebrush for context within the geographic area of interest) will be calculated using this formula: [existing sagebrush divided by [pre-EuroAmerican settlement geographic extent of lands that could have supported sagebrush]. This measure will provide information to set the context for a given geographic area of interest during evaluations of monitoring data. The information could also be used to inform management options for restoration or mitigation and to inform effectiveness monitoring.

The sagebrush base layer for Measure 1 will be based on geospatial vegetation data adjusted for the threats listed in Table 2. The following subsections of this monitoring framework describe the methodology for determining both the current availability of sagebrush on the landscape and the context of the amount of sagebrush on the landscape at the broad and mid scales.

a. Establishing the Sagebrush Base Layer

The current geographic extent of sagebrush vegetation within the rangewide distribution of sage-grouse populations will be ascertained using the most recent version of the Existing Vegetation Type (EVT) layer in LANDFIRE (2013). LANDFIRE EVT was selected to serve as the sagebrush base layer for five reasons: 1) it is the only nationally consistent vegetation layer that has been updated multiple times since 2001; 2) the ecological systems classification within LANDFIRE EVT includes multiple sagebrush type classes that, when aggregated, provide a more accurate (compared with individual classes) and seamless sagebrush base layer across jurisdictional boundaries; 3) LANDFIRE performed a rigorous accuracy assessment from which to derive the rangewide uncertainty of the sagebrush base layer; 4) LANDFIRE is consistently used in several recent analyses of sagebrush habitats (Knick et al. 2011, Leu and Hanser 2011, Knick and Hanser 2011); and 5) LANDFIRE EVT can be compared against the geographic extent of lands that are believed to have had the capability of supporting sagebrush vegetation pre-EuroAmerican settlement [LANDFIRE Biophysical Setting (BpS)]. This fifth reason provides a reference point for understanding how much sagebrush currently remains in a defined geographic area of interest compared with how much sagebrush existed historically (Measure 1b). Therefore, the BLM and the USFS have determined that LANDFIRE provides the best available data at broad and mid scales to serve as a sagebrush base layer for monitoring changes in the geographic extent of sagebrush. The BLM and the USFS, in addition to aggregating the sagebrush types into the sagebrush base layer, will aggregate the accuracy assessment reports from LANDFIRE to document the cumulative accuracy for the sagebrush base layer. The BLM—through its Assessment, Inventory, and Monitoring (AIM) program and, specifically, the BLM's landscape monitoring framework (Taylor et al. 2014)—will provide field data to the LANDFIRE program to support continuous quality improvements of the LANDFIRE EVT layer. The sagebrush layer based on LANDFIRE EVT will allow for the mid-scale estimation of the existing percent of sagebrush across a variety of reporting units. This sagebrush base layer will be adjusted by changes in land cover and successful restoration for future calculations of sagebrush availability (Measures 1a and 1b).

This layer will also be used to determine the trend in other landscape indicators, such as patch size and number, patch connectivity, linkage areas, and landscape matrix and edge effects (Stiver et al. *in press*). In the future, changes in sagebrush availability, generated annually, will be included in the sagebrush base layer. The landscape metrics will be recalculated to examine changes in pattern and abundance of sagebrush at the various geographic boundaries. This information will be included in effectiveness monitoring (See Section I.D., Effectiveness Monitoring).

Within the USFS and the BLM, forest-wide and field office–wide existing vegetation classification mapping and inventories are available that provide a much finer level of data than what is provided through LANDFIRE. Where available, these finer-scale products will be useful for additional and complementary mid-scale indicators and local-scale analyses (see Section II, Fine and Site Scales). The fact that these products are not available everywhere limits their utility for monitoring at the broad and mid scale, where consistency of data products is necessary across broader geographies.

Data Sources for Establishing and Monitoring Sagebrush Availability

There were three criteria for selecting the datasets for establishing and monitoring the change in sagebrush availability (Measure 1):

- Nationally consistent dataset available across the range
- Known level of confidence or accuracy in the dataset
- Continual maintenance of dataset and known update interval

Datasets meeting these criteria are listed in Table 3, Datasets for establishing and monitoring changes in sagebrush availability.

LANDFIRE Existing Vegetation Type (EVT) Version 1.2

LANDFIRE EVT represents existing vegetation types on the landscape derived from remote sensing data. Initial mapping was conducted using imagery collected in approximately 2001. Since the initial mapping there have been two update efforts: version 1.1 represents changes before 2008, and version 1.2 reflects changes on the landscape before 2010. Version 1.2 will be used as the starting point to develop the sagebrush base layer.

Sage-grouse subject matter experts determined which of the ecological systems from the LANDFIRE EVT to use in the sagebrush base layer by identifying the ecological systems that have the capability of supporting sagebrush vegetation and that could provide suitable seasonal habitat for the sage-grouse. (See Table 4, Ecological systems in BpS and EVT capable of supporting sagebrush vegetation and capable of providing suitable seasonal habitat for Greater Sage-Grouse.) Two additional vegetation types that are not ecological systems were added to the EVT: *Artemisia tridentata* ssp. *vaseyana* Shrubland Alliance and *Quercus gambelii* Shrubland Alliance. These alliances have species composition directly related to the Rocky Mountain Lower Montane-Foothill Shrubland ecological system and the Rocky Mountain Gambel Oak-Mixed Montane Shrubland ecological system, both of which are ecological systems in LANDFIRE BpS. In LANDFIRE EVT, however, in some map zones, the Rocky Mountain Lower Montane-Foothill Shrubland ecological system and the Rocky Mountain Gambel Oak-Mixed Montane Shrubland ecological system were named *Artemisia tridentata* ssp. *vaseyana* Shrubland Alliance and *Quercus gambelii* Shrubland Alliance, respectively.

Table 3. Datasets for establishing and monitoring changes in sagebrush availability.

Dataset	Source	Update Interval	Most Recent Version Year	Use
BioPhysical Setting v1.1	LANDFIRE	Static	2008	Denominator for sagebrush availability
Existing Vegetation Type v1.2	LANDFIRE	Static	2010	Numerator for sagebrush availability
Cropland Data Layer	National Agricultural Statistics Service	Annual	2012	Agricultural updates; removes existing sagebrush from numerator of sagebrush availability
National Land Cover Dataset Percent Imperviousness	Multi-Resolution Land Characteristics Consortium (MRLC)	5-Year	2011 (next available in 2016)	Urban area updates; removes existing sagebrush from numerator of sagebrush availability
Fire Perimeters	GeoMac	Annual	2013	< 1,000-acre fire updates; removes existing sagebrush from numerator of sagebrush availability
Burn Severity	Monitoring Trends in Burn Severity	Annual	2012 (2-year delay in data availability)	> 1,000-acre fire updates; removes existing sagebrush from numerator of sagebrush availability except for unburned sagebrush islands

Table 4. Ecological systems in BpS and EVT capable of supporting sagebrush vegetation and capable of providing suitable seasonal habitat for Greater Sage-Grouse.

Ecological System	Sagebrush Vegetation that the Ecological System has the Capability of Producing
Colorado Plateau Mixed Low Sagebrush Shrubland	*Artemisia arbuscula* ssp. *longiloba* *Artemisia bigelovii* *Artemisia nova* *Artemisia frigida* *Artemisia tridentata* ssp. *wyomingensis*
Columbia Plateau Low Sagebrush Steppe	*Artemisia arbuscula* *Artemisia arbuscula* ssp. *longiloba* *Artemisia nova*
Columbia Plateau Scabland Shrubland	*Artemisia rigida*

Ecological System	Sagebrush Vegetation that the Ecological System has the Capability of Producing
Columbia Plateau Steppe and Grassland	*Artemisia* spp.
Great Basin Xeric Mixed Sagebrush Shrubland	*Artemisia arbuscula* ssp. *longicaulis* *Artemisia arbuscula* ssp. *longiloba* *Artemisia nova* *Artemisia tridentata* ssp. *wyomingensis*
Inter-Mountain Basins Big Sagebrush Shrubland	*Artemisia tridentata* ssp. *tridentata* *Artemisia tridentata* ssp. *xericensis* *Artemisia tridentata* ssp. *vaseyana* *Artemisia tridentata* ssp. *wyomingensis*
Inter-Mountain Basins Big Sagebrush Steppe	*Artemisia cana* ssp. *cana* *Artemisia tridentata* ssp. *tridentata* *Artemisia tridentata* ssp. *xericensis* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia tripartita* ssp. *tripartita* *Artemisia frigida*
Inter-Mountain Basins Curl-Leaf Mountain Mahogany Woodland and Shrubland	*Artemisia tridentata* ssp. *vaseyana* *Artemisia arbuscula* *Artemisia tridentata*
Inter-Mountain Basins Mixed Salt Desert Scrub	*Artemisia tridentata* ssp. *wyomingensis* *Artemisia spinescens*
Inter-Mountain Basins Montane Sagebrush Steppe	*Artemisia tridentata* ssp. *vaseyana* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia nova* *Artemisia arbuscula* *Artemisia tridentata* ssp. *spiciformis*
Inter-Mountain Basins Semi-Desert Shrub-Steppe	*Artemisia tridentata* *Artemisia bigelovii* *Artemisia tridentata* ssp. *wyomingensis*
Northwestern Great Plains Mixed Grass Prairie	*Artemisia cana* ssp. *cana* *Artemisia tridentata* ssp. *vaseyana* *Artemisia frigida*
Northwestern Great Plains Shrubland	*Artemisia cana* ssp. *cana* *Artemisia tridentata* ssp. *tridentata* *Artemisia tridentata* ssp. *wyomingensis*
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	*Artemisia tridentata*
Rocky Mountain Lower Montane-Foothill Shrubland	*Artemisia nova* *Artemisia tridentata* *Artemisia frigida*
Western Great Plains Floodplain Systems	*Artemisia cana* ssp. *cana*
Western Great Plains Sand Prairie	*Artemisia cana* ssp. *cana*
Wyoming Basins Dwarf Sagebrush Shrubland and Steppe	*Artemisia arbuscula* ssp. *longiloba* *Artemisia nova* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia tripartita* ssp. *rupicola*
Artemisia tridentata ssp. *vaseyana* Shrubland Alliance (EVT only)	*Artemisia tridentata* ssp. *vaseyana*
Quercus gambelii Shrubland Alliance (EVT only)	*Artemisia tridentata*

Accuracy and Appropriate Use of LANDFIRE Datasets

Because of concerns over the thematic accuracy of individual classes mapped by LANDFIRE, all ecological systems listed in Table 4 will be merged into one value that represents the sagebrush base layer. With all ecological systems aggregated, the combined accuracy of the sagebrush base layer (EVT) will be much greater than if all categories were treated separately.

LANDFIRE performed the original accuracy assessment of its EVT product on a map zone basis. There are 20 LANDFIRE map zones that cover the historical range of sage-grouse as defined by Schroeder (2004). (See Attachment B, User and Producer Accuracies for Aggregated Ecological Systems within LANDFIRE Map Zones.) The aggregated sagebrush base layer for monitoring had user accuracies ranging from 57.1% to 85.7% and producer accuracies ranging from 56.7% to 100%.

LANDFIRE EVT data are not designed to be used at a local level. In reports of the percent sagebrush statistic for the various reporting units (Measure 1a), the uncertainty of the percent sagebrush will increase as the size of the reporting unit gets smaller. LANDFIRE data should never be used at the 30m pixel level ($900m^2$ resolution of raster data) for any reporting. The smallest geographic extent for using the data to determine percent sagebrush is at the PAC level; for the smallest PACs, the initial percent sagebrush estimate will have greater uncertainties compared with the much larger PACs.

Agricultural Adjustments for the Sagebrush Base Layer

The dataset for the geographic extent of agricultural lands will come from the National Agricultural Statistics Service (NASS) Cropland Data Layer (CDL) (http://www.nass.usda.gov/research/Cropland/Release/index.htm). CDL data are generated annually, with estimated producer accuracies for “large area row crops ranging from the mid 80% to mid-90%,” depending on the state (http://www.nass.usda.gov/research/Cropland/sarsfaqs2.htm#Section3_18.0). Specific information on accuracy may be found on the NASS metadata website (http://www.nass.usda.gov/research/Cropland/metadata/meta.htm). CDL provided the only dataset that matches the three criteria (nationally consistent, known level of accuracy, and periodically updated) for use in this monitoring framework and represents the best available agricultural lands mapping product.

The CDL data contain both agricultural classes and nonagricultural classes. For this effort, and in the baseline environmental report (Manier et al. 2013), nonagricultural classes were removed from the original dataset. The excluded classes are:

> Barren (65 & 131), Deciduous Forest (141), Developed/High Intensity (124), Developed/Low Intensity (122), Developed/Med Intensity (123), Developed/Open Space (121), Evergreen Forest (142), Grassland Herbaceous (171), Herbaceous Wetlands (195), Mixed Forest (143), Open

Water (83 & 111), Other Hay/Non Alfalfa (37), Pasture/Hay (181), Pasture/Grass (62), Perennial Ice/Snow (112), Shrubland (64 & 152), Woody Wetlands (190).

The rule set for adjusting the sagebrush base layer for agricultural lands (and for updating the base layer for agricultural lands in the future) is that once an area is classified as agriculture in any year of the CDL, those pixels will remain out of the sagebrush base layer even if a new version of the CDL classifies that pixel as one of the nonagricultural classes listed above. The assumption is that even though individual pixels may be classified as a nonagricultural class in any given year, the pixel has not necessarily been restored to a natural sagebrush community that would be included in Table 4. A further assumption is that once an area has moved into agricultural use, it is unlikely that the area would be restored to sagebrush. Should that occur, however, the method and criteria for adding pixels back into the sagebrush base layer would follow those found in the sagebrush restoration monitoring section of this monitoring framework (see Section I.B.1.b., Monitoring Sagebrush Availability).

Urban Adjustments for the Sagebrush Base Layer

The National Land Cover Database (NLCD) (Fry et al. 2011) includes a percent imperviousness dataset that was selected as the best available dataset to be used for urban adjustments and monitoring. These data are generated on a 5-year cycle and are specifically designed to support monitoring efforts. Other datasets were evaluated and lacked the spatial specificity that was captured in the NLCD product. Any new impervious pixel in NLCD will be removed from the sagebrush base layer through the monitoring process. Although the impervious surface layer includes a number of impervious pixels outside of urban areas, this is acceptable for the adjustment and monitoring for two reasons. First, an evaluation of national urban area datasets did not reveal a layer that could be confidently used in conjunction with the NLCD product to screen impervious pixels outside of urban zones. This is because unincorporated urban areas were not being included, thus leaving large chunks of urban pixels unaccounted for in this rule set. Second, experimentation with setting a threshold on the percent imperviousness layer that would isolate rural features proved to be unsuccessful. No combination of values could be identified that would result in the consistent ability to limit impervious pixels outside urban areas. Therefore, to ensure consistency in the monitoring estimates, all impervious pixels will be used.

Fire Adjustments for the Sagebrush Base Layer

Two datasets were selected for performing fire adjustments and updates: GeoMac fire perimeters and Monitoring Trends in Burn Severity (MTBS). An existing data standard in the BLM requires that all fires of more than 10 acres are to be reported to GeoMac; therefore, there will be many small fires of less than 10 acres that will not be accounted for in the adjustment and monitoring attributable to fire. Using fire perimeters from GeoMac, all sagebrush pixels falling within the perimeter of fires less than 1,000 acres will be used to adjust and monitor the sagebrush base layer.

For fires greater than 1,000 acres, MTBS was selected as a means to account for unburned sagebrush islands during the update process of the sagebrush base layer. The MTBS program (http://www.mtbs.gov) is an ongoing, multiyear project to map fire severity and fire perimeters consistently across the United States. One of the burn severity classes within MTBS is an unburned to low-severity class. This burn severity class will be used to represent unburned islands of sagebrush within the fire perimeter for the sagebrush base layer. Areas within the other severity classes within the fire perimeter will be removed from the base sagebrush layer during the update process. Not all wildfires, however, have the same impacts on the recovery of sagebrush habitat, depending largely on soil moisture and temperature regimes. For example, cooler, moister sagebrush habitat has a higher potential for recovery or, if needed, restoration than does the warmer, dryer sagebrush habitat. These cooler, moister areas will likely be detected as sagebrush in future updates to LANDFIRE.

Conifer Encroachment Adjustment for the Sagebrush Base Layer

Conifer encroachment into sagebrush vegetation reduces the spatial extent of sage-grouse habitat (Davies et al. 2011, Baruch-Mordo et al. 2013). Conifer species that show propensity for encroaching into sagebrush vegetation resulting in sage-grouse habitat loss include various juniper species, such as Utah juniper *(Juniperus osteosperma),* western juniper *(Juniperus occidentalis),* Rocky Mountain juniper *(Juniperus scopulorum),* pinyon species, including singleleaf pinyon *(Pinus monophylla)* and pinyon pine *(Pinus edulis),* ponderosa pine *(Pinus ponderosa),* lodgepole pine *(Pinus contorta),* and Douglas fir *(Pseudotsuga menziesii)* (Gruell et al. 1986, Grove et al. 2005, Davies et al. 2011).

A rule set for conifer encroachment was developed to adjust the sagebrush base layer. To capture the geographic extent of sagebrush that is likely to experience conifer encroachment, ecological systems within LANDFIRE EVT version 1.2 (NatureServe 2011) were identified if they had the capability of supporting both the conifer species (listed above) and sagebrush vegetation. Those ecological systems were deemed to be the plant communities with conifers most likely to encroach into sagebrush vegetation. (See Table 5, Ecological systems with conifers most likely to encroach into sagebrush vegetation.) Sagebrush vegetation was defined as including sagebrush species or subspecies that provide habitat for the Greater Sage-Grouse and that are included in the HAF. (See Attachment C, Sagebrush Species and Subspecies Included in the Selection Criteria for Building the EVT and BpS Layers.) An adjacency analysis was conducted to identify all sagebrush pixels that were directly adjacent to these conifer ecological systems, and these pixels were removed from the sagebrush base layer.

Table 5. Ecological systems with conifers most likely to encroach into sagebrush vegetation.

EVT Ecological Systems	Coniferous Species and Sagebrush Vegetation that the Ecological System has the Capability of Producing
Colorado Plateau Pinyon-Juniper Woodland	*Pinus edulis* *Juniperus osteosperma* *Artemisia tridentata* *Artemisia arbuscula* *Artemisia nova* *Artemisia tridentata* ssp. *tridentata* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia tridentata* ssp. *vaseyana* *Artemisia bigelovii* *Artemisia pygmaea*
Columbia Plateau Western Juniper Woodland and Savanna	*Juniperus occidentalis* *Pinus ponderosa* *Artemisia tridentata* *Artemisia arbuscula* *Artemisia rigida* *Artemisia tridentata* ssp. *vaseyana*
East Cascades Oak-Ponderosa Pine Forest and Woodland	*Pinus ponderosa* *Pseudotsuga menziesii* *Artemisia tridentata* *Artemisia nova*
Great Basin Pinyon-Juniper Woodland	*Pinus monophylla* *Juniperus osteosperma* *Artemisia arbuscula* *Artemisia nova* *Artemisia tridentata* *Artemisia tridentata* ssp. *vaseyana*
Northern Rocky Mountain Ponderosa Pine Woodland and Savanna	*Pinus ponderosa* *Artemisia tridentata* *Artemisia arbuscula* *Artemisia tridentata* ssp. *vaseyana*
Rocky Mountain Foothill Limber Pine-Juniper Woodland	*Juniperus osteosperma* *Juniperus scopulorum* *Artemisia nova* *Artemisia tridentata*
Rocky Mountain Poor-Site Lodgepole Pine Forest	*Pinus contorta* *Pseudotsuga menziesii* *Pinus ponderosa* *Artemisia tridentata*
Southern Rocky Mountain Pinyon-Juniper Woodland	*Pinus edulis* *Juniperus monosperma* *Artemisia bigelovii* *Artemisia tridentata* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia tridentata* ssp. *vaseyana*
Southern Rocky Mountain Ponderosa Pine Woodland	*Pinus ponderosa* *Pseudotsuga menziesii*

Pinus edulis *Pinus contorta* *Juniperus* spp. *Artemisia nova* *Artemisia tridentata* *Artemisia arbuscula* *Artemisia tridentata* ssp. *vaseyana*

Invasive Annual Grasses Adjustments for the Sagebrush Base Layer

There are no invasive species datasets from 2010 to the present (beyond the LANDFIRE data) that meet the three criteria (nationally consistent, known level of accuracy, and periodically updated) for use in the determination of the sagebrush base layer. For a description of how invasive species land cover will be incorporated in the sagebrush base layer in the future, see Section I.B.1.b., Monitoring Sagebrush Availability.

Sagebrush Restoration Adjustments for the Sagebrush Base Layer

There are no datasets from 2010 to the present that could provide additions to the sagebrush base layer from restoration treatments that meet the three criteria (nationally consistent, known level of accuracy, and periodically updated); therefore, no adjustments were made to the sagebrush base layer calculated from the LANDFIRE EVT (version 1.2) attributable to restoration activities since 2010. Successful restoration treatments before 2010 are assumed to have been captured in the LANDFIRE refresh.

b. Monitoring Sagebrush Availability

Monitoring Sagebrush Availability

Sagebrush availability will be updated annually by incorporating changes to the sagebrush base layer attributable to agriculture, urbanization, and wildfire. The monitoring schedule for the existing sagebrush base layer updates is as follows:

> ***2010 Existing Sagebrush Base Layer*** = [Sagebrush EVT] minus [2006 Imperviousness Layer] minus [2009 and 2010 CDL] minus [2009/10 GeoMac Fires that are less than 1,000 acres] minus [2009/10 MTBS Fires that are greater than 1,000 acres, excluding unburned sagebrush islands within the perimeter] minus [Conifer Encroachment Layer]
>
> ***2012 Existing Sagebrush Update*** = [2010 Existing Sagebrush Base Layer] minus [2011 Imperviousness Layer] minus [2011 and 2012 CDL] minus [2011/12 GeoMac Fires < 1,000 acres] minus [2011/12 MTBS Fires that are greater than 1,000 acres, excluding unburned sagebrush islands within the perimeter]
>
> ***Monitoring Existing Sagebrush post 2012*** = [Previous Existing Sagebrush Update Layer] minus [Imperviousness Layer (if new data are available)] minus [Next 2 years of CDL] minus [Next 2 years of GeoMac Fires < 1,000 acres] minus [Next 2 years of MTBS Fires that are greater than

1,000 acres, excluding unburned sagebrush islands within the perimeter] plus [restoration/monitoring data provided by the field]

Monitoring Sagebrush Restoration

Restoration after fire, after agricultural conversion, after seedings of introduced grasses, or after treatments of pinyon pine and/or juniper are examples of updates to the sagebrush base layer that can add sagebrush vegetation back into sagebrush availability in the landscape. When restoration has been determined to be successful through rangewide, consistent, interagency fine- and site-scale monitoring, the polygonal data will be used to add sagebrush pixels back into the broad- and mid-scale sagebrush base layer.

Measure 1b: Context for Monitoring the Amount of Sagebrush in a Geographic Area of Interest

Measure 1b describes the amount of sagebrush on the landscape of interest compared with the amount of sagebrush the landscape of interest could ecologically support. Areas with the potential to support sagebrush were derived from the BpS data layer that describes sagebrush pre-EuroAmerican settlement (v1.2 of LANDFIRE).

The identification and spatial locations of natural plant communities (vegetation) that are believed to have existed on the landscape (BpS) were constructed based on an approximation of the historical (pre-EuroAmerican settlement) disturbance regime and how the historical disturbance regime operated on the current biophysical environment. BpS is composed of map units that are based on NatureServe (2011) terrestrial ecological systems classification.

The ecological systems within BpS used for this monitoring framework are those ecological systems that are capable of supporting sagebrush vegetation and of providing seasonal habitat for sage-grouse (Table 4). Ecological systems selected included sagebrush species or subspecies that are included in the HAF and listed in Attachment C.

The BpS layer does not have an associated accuracy assessment, given the lack of any reference data. Visual inspection of the BpS data, however, reveals inconsistencies in the labeling of pixels among LANDFIRE map zones. The reason for these inconsistencies is that the rule sets used to map a given ecological system will vary among map zones based on different physical, biological, disturbance, and atmospheric regimes of the region. These variances can result in artificial edges in the map. Metrics will be calculated, however, at broad spatial scales using BpS potential vegetation type, not small groupings or individual pixels. Therefore, the magnitude of these observable errors in the BpS layer will be minor compared with the size of the reporting units. Since BpS will be used to identify broad landscape patterns of dominant vegetation, these inconsistencies will have only a minor impact on the percent sagebrush availability calculation. *As with the LANDFIRE EVT, LANDFIRE BpS data are not designed to be used at a local level*. LANDFIRE data should never be used at the 30m pixel level for reporting.

In conclusion, sagebrush availability data will be used to inform effectiveness monitoring and initiate adaptive management actions as necessary. The 2010 estimate of sagebrush availability will serve as the base year, and an updated estimate for 2012 will be reported in 2014 after all datasets become available. The 2012 estimate will capture changes attributable to wildfire, agriculture, and urban development. Subsequent updates will always include new fire and agricultural data and new urban data when available. Restoration data that meet the criteria for adding sagebrush areas back into the sagebrush base layer will be factored in as data allow. Given data availability, there will be a 2-year lag (approximately) between when the estimate is generated and when the data used for the estimate become available (e.g., the 2014 sagebrush availability will be included in the 2016 estimate).

Future Plans

Geospatial data used to generate the sagebrush base layer will be available through the BLM's EGIS web portal and geospatial gateway or through the authoritative data source. Legacy datasets will be preserved so that trends may be calculated. Additionally, accuracy assessment data for all source datasets will be provided on the portal either spatially, where applicable, or through the metadata. Accuracy assessment information was deemed vital to help users understand the limitation of the sagebrush estimates; it will be summarized spatially by map zone and will be included in the portal.

LANDFIRE plans to begin a remapping effort in 2015. This remapping has the potential to improve the overall quality of data products greatly, primarily through the use of higher-quality remote sensing datasets. Additionally, the BLM and the Multi-Resolution Land Characteristics Consortium (MRLC) are working to improve the accuracy of vegetation map products for broad- and mid-scale analyses through the Grass/Shrub mapping effort. The Grass/Shrub mapping effort applies the Wyoming multiscale sagebrush habitat methodology (Homer et al. 2009) to depict spatially the fractional percent cover estimates for five components rangewide and West-wide. These five components are percent cover of sagebrush vegetation, percent bare ground, percent herbaceous vegetation (grass and forbs combined), annual vegetation, and percent shrubs. A benefit of the design of these fractional cover maps is that they facilitate monitoring "within" class variation (e.g., examination of declining trend in sagebrush cover for individual pixels). This "within" class variation can serve as one indicator of sagebrush quality that cannot be derived from LANDFIRE's EVT information. The Grass/Shrub mapping effort is not a substitute for fine-scale monitoring but will leverage fine-scale data to support the validation of the mapping products. An evaluation will be conducted to determine if either dataset is of great enough quality to warrant replacing the existing sagebrush layers. At the earliest, this evaluation will occur in 2018 or 2019, depending on data availability.

B.2. Habitat Degradation Monitoring (Measure 2)

The measure of habitat degradation will be calculated by combining the footprints of threats identified in Table 2. The footprint is defined as the direct area of influence of "active" energy and infrastructure; it is used as a surrogate for human activity. Although these analyses will try to summarize results at the aforementioned meaningful geographic areas of interest, some may be too small to report the metrics appropriately and may be combined (smaller populations, PACs within a population, etc.). Data sources for each threat are found in Table 6, Geospatial data sources for habitat degradation. Specific assumptions (inclusion criteria for data, width/area assumptions for point and line features, etc.) and methodology for each threat, and the combined measure, are detailed below. All datasets will be updated annually to monitor broad- and mid-scale year-to-year changes and to calculate trends in habitat degradation to inform adaptive management. A 5-year summary report will be provided to the USFWS.

a. Habitat Degradation Datasets and Assumptions

Energy (oil and gas wells and development facilities)

This dataset will compile information from three oil and gas databases: the proprietary IHS Enerdeq database, the BLM Automated Fluid Minerals Support System (AFMSS) database, and the proprietary Platts (a McGraw-Hill Financial Company) GIS Custom Data (hereafter, Platts) database of power plants. Point data from wells active within the last 10 years from IHS and producing wells from AFMSS will be considered as a 5-acre (2.0ha) direct area of influence centered on the well point, as recommended by the BLM WO-300 (Minerals and Realty Management). Plugged and abandoned wells will be removed if the date of well abandonment was before the first day of the reporting year (i.e., for the 2015 reporting year, a well must have been plugged and abandoned by 12/31/2014 to be removed). Platts oil and gas power plants data (subset to operational power plants) will also be included as a 5-acre (2.0ha) direct area of influence.

> ***Additional Measure: Reclaimed Energy-related Degradation.*** This dataset will include those wells that have been plugged and abandoned. This measure thereby attempts to measure energy-related degradation that has been reclaimed but not necessarily fully restored to sage-grouse habitat. This measure will establish a baseline by using wells that have been plugged and abandoned within the last 10 years from the IHS and AFMSS datasets. Time lags for lek attendance in response to infrastructure have been documented to be delayed 2–10 years from energy development activities (Harju et al. 2010). Reclamation actions may require 2 or more years from the Final Abandonment Notice. Sagebrush seedling establishment may take 6 or more years from the point of seeding, depending on such variables as annual precipitation, annual temperature, and soil type and depth (Pyke 2011). This 10-year period is conservative and assumes some level of habitat improvement 10 years after plugging. Research by Hemstrom et al. (2002), however,

proposes an even longer period—more than 100 years—for recovery of sagebrush habitats, even with active restoration approaches. Direct area of influence will be considered 3 acres (1.2ha) (J. Perry, personal communication, February 12, 2014). This additional layer/measure could be used at the broad and mid scale to identify areas where sagebrush habitat and/or potential sagebrush habitat is likely still degraded. This layer/measure could also be used where further investigation at the fine or site scale would be warranted to: 1) quantify the level of reclamation already conducted, and 2) evaluate the amount of restoration still required for sagebrush habitat recovery. At a particular level (e.g., population, PACs), these areas and the reclamation efforts/success could be used to inform reclamation standards associated with future developments. Once these areas have transitioned from reclamation standards to meeting *restoration* standards, they can be added back into the sagebrush availability layer using the same methodology as described for adding restoration treatment areas lost to wildfire and agriculture conversion (see Monitoring Sagebrush Restoration in Section I.B.1.b., Monitoring Sagebrush Availability). This dataset will be updated annually from the IHS dataset.

Energy (coal mines)

Currently, there is no comprehensive dataset available that identifies the footprint of active coal mining across all jurisdictions. Therefore, point and polygon datasets will be used each year to identify coal mining locations. Data sources will be identified and evaluated annually and will include at a minimum: BLM coal lease polygons, U.S. Energy Information Administration mine occurrence points, U.S. Office of Surface Mining Reclamation and Enforcement coal mining permit polygons (as available), and U.S. Geological Survey (USGS) Mineral Resources Data System mine occurrence points. These data will inform where active coal mining may be occurring. Additionally, coal power plant data from Platts power plants database (subset to operational power plants) will be included. Aerial imagery will then be used to digitize manually the active coal mining and coal power plants surface disturbance in or near these known occurrence areas. While the date of aerial imagery varies by scale, the most current data available from Esri and/or Google will be used to locate (generally at 1:50,000 and below) and digitize (generally at 1:10,000 and below) active coal mine and power plant direct area of influence. Coal mine location data source and imagery date will be documented for each digitized coal polygon at the time of creation. Subsurface facility locations (polygon or point location as available) will also be collected if available, included in density calculations, and added to the active surface activity layer as appropriate (if an actual direct area of influence can be located).

Energy (wind energy facilities)

This dataset will be a subset of the Federal Aviation Administration (FAA) Digital Obstacles point file. Points where “Type_” = “WINDMILL” will be included. Direct area of influence of these point features will be measured by converting to a polygon dataset as a direct area of influence of 3 acres (1.2ha) centered on each tower point. See the BLM's "Wind Energy Development Programmatic Environmental Impact Statement" (BLM 2005). Additionally, Platts power plants database will be used for transformer stations associated with wind energy sites (subset to operational power plants), also with a 3-acre (1.2ha) direct area of influence.

Energy (solar energy facilities)

This dataset will include solar plants as compiled with the Platts power plants database (subset to operational power plants). This database includes an attribute that indicates the operational capacity of each solar power plant. Total capacity at the power plant was based on ratings of the in-service unit(s), in megawatts. Direct area of influence polygons will be centered over each point feature representing 7.3ac (3.0ha) per megawatt of the stated operational capacity, per the report of the National Renewable Energy Laboratory (NREL), "Land-Use Requirements for Solar Power Plants in the United States" (Ong et al. 2013).

Energy (geothermal energy facilities)

This dataset will include geothermal wells in existence or under construction as compiled with the IHS wells database and power plants as compiled with the Platts database (subset to operational power plants). Direct area of influence of these point features will be measured by converting to a polygon dataset of 3 acres (1.2ha) centered on each well or power plant point.

Mining (active developments; locatable, leasable, saleable)

This dataset will include active locatable mining locations as compiled with the proprietary InfoMine database. Aerial imagery will then be used to digitize manually the active mining surface disturbance in or near these known occurrence areas. While the date of aerial imagery varies by scale, the most current data available from Esri and/or Google will be used to locate (generally at 1:50,000 and below) and digitize (generally at 1:10,000 and below) active mine direct area of influence. Mine location data source and imagery date will be documented for each digitized polygon at the time of creation. Currently, there are no known compressive databases available for leasable or saleable mining sites beyond coal mines. Other data sources will be evaluated and used as they are identified or as they become available. Point data may be converted to polygons to represent direct area of influence unless actual surface disturbance is available.

Infrastructure (roads)

This dataset will be compiled from the proprietary Esri StreetMap Premium for ArcGIS. Dataset features that will be used are: Interstate Highways, Major Roads, and Surface Streets to capture most paved and "crowned and ditched" roads while not including "two-track" and 4-wheel-drive routes. These minor roads, while not included in the broad- and mid-scale monitoring, may support a volume of traffic that can have deleterious effects on sage-grouse leks. It may be appropriate to consider the frequency and type of use of roads in a NEPA analysis for a proposed project. This fine- and site-scale analysis will require more site-specific data than is identified in this monitoring framework. The direct area of influence for roads will be represented by 240.2ft, 84.0ft, and 40.7ft (73.2m, 25.6m, and 12.4m) total widths centered on the line feature for Interstate Highways, Major Roads, and Surface Streets, respectively (Knick et al. 2011). The most current dataset will be used for each monitoring update. *Note: This is a related but different dataset than what was used in BER (Manier et al. 2013). Individual BLM/USFS planning units may use different road layers for fine- and site-scale monitoring.*

Infrastructure (railroads)

This dataset will be a compilation from the Federal Railroad Administration Rail Lines of the USA dataset. Non-abandoned rail lines will be used; abandoned rail lines will not be used. The direct are of influence for railroads will be represented by a 30.8ft (9.4m) total width (Knick et al. 2011) centered on the non-abandoned railroad line feature.

Infrastructure (power lines)

This line dataset will be derived from the proprietary Platts transmission lines database. Linear features in the dataset attributed as “buried” will be removed from the disturbance calculation. Only “In Service” lines will be used; “Proposed” lines will not be used. Direct area of influence will be determined by the kV designation: 1–199 kV (100ft/30.5m), 200–399 kV (150ft/45.7m), 400–699 kV (200ft/61.0m), and 700-or greater kV (250ft/76.2m) based on average right-of-way and structure widths, according to BLM WO-300 (Minerals and Realty Management).

Infrastructure (communication towers)

This point dataset will be compiled from the Federal Communications Commission (FCC) communication towers point file; all duplicate points will be removed. It will be converted to a polygon dataset by using a direct area of influence of 2.5 acres (1.0ha) centered on each communication tower point (Knick et al. 2011).

Infrastructure (other vertical structures)

This point dataset will be compiled from the FAA’s Digital Obstacles point file. Points where “Type_” = “WINDMILL” will be removed. Duplicate points from the FCC communication towers point file will be removed. Remaining features will be converted to a polygon dataset using a direct area of influence of 2.5 acres (1.0ha) centered on each vertical structure point (Knick et al. 2011).

Other Developed Rights-of-Way

Currently, no additional data sources for other rights-of-way have been identified; roads, power lines, railroads, pipelines, and other known linear features are represented in the categories described above. The newly purchased IHS data do contain pipeline information; however, this database does not currently distinguish between above-ground and underground pipelines. If additional features representing human activities are identified, they will be added to monitoring reports using similar assumptions to those used with the threats described above.

b. Habitat Degradation Threat Combination and Calculation

The threats targeted for measuring human activity (Table 2) will be converted to direct area of influence polygons as described for each threat above. These threat polygon layers will be combined and features dissolved to create one overall polygon layer representing footprints of active human activity in the range of sage-grouse. Individual datasets, however, will be preserved to indicate which types of threats may be contributing to overall habitat degradation.

This measure has been divided into three submeasures to describe habitat degradation on the landscape. Percentages will be calculated as follows:

> Measure 2a. Footprint by geographic area of interest: Divide area of the active/direct footprint by the total area of the geographic area of interest (% disturbance in geographic area of interest).
>
> Measure 2b. Active/direct footprint by historical sagebrush potential: Divide area of the active footprint that coincides with areas with historical sagebrush potential (BpS calculation from habitat availability) within a given geographic area of interest by the total area with sagebrush potential within the geographic area of interest (% disturbance on potential historical sagebrush in geographic area of interest).
>
> Measure 2c. Active/direct footprint by current sagebrush: Divide area of the active footprint that coincides with areas of existing sagebrush (EVT calculation from habitat availability) within a given geographic area of interest by the total area that is current sagebrush within the geographic area of interest (% disturbance on current sagebrush in geographic area of interest).

B.3. Energy and Mining Density (Measure 3)

The measure of density of energy and mining will be calculated by combining the locations of energy and mining threats identified in Table 2. This measure will provide an estimate of the intensity of human activity or the intensity of habitat degradation. The number of energy facilities and mining locations will be summed and divided by the area of meaningful geographic areas of interest to calculate density of these activities. Data sources for each threat are found in Table 6. Specific assumptions (inclusion criteria for data, width/area assumptions for point and line features, etc.) and methodology for each threat, and the combined measure, are detailed below. All datasets will be updated annually to monitor broad- and mid-scale year-to-year changes and 5-year (or longer) trends in habitat degradation.

Table 6. Geospatial data sources for habitat degradation (Measure 2).

Degradation Type	Subcategory	Data Source	Direct Area of Influence	Area Source
Energy (oil & gas)	Wells	IHS; BLM (AFMSS)	5.0ac (2.0ha)	BLM WO-300
	Power Plants	Platts (power plants)	5.0ac (2.0ha)	BLM WO-300
Energy (coal)	Mines	BLM; USFS; Office of Surface Mining Reclamation and Enforcement; USGS Mineral Resources Data System	Polygon area (digitized)	Esri/ Google Imagery
	Power Plants	Platts (power plants)	Polygon area (digitized)	Esri Imagery
Energy (wind)	Wind Turbines	Federal Aviation Administration	3.0ac (1.2ha)	BLM WO-300
	Power Plants	Platts (power plants)	3.0ac (1.2ha)	BLM WO-300
Energy (solar)	Fields/Power Plants	Platts (power plants)	7.3ac (3.0ha)/MW	NREL
Energy (geothermal)	Wells	IHS	3.0ac (1.2ha)	BLM WO-300
	Power Plants	Platts (power plants)	Polygon area (digitized)	Esri Imagery
Mining	Locatable Developments	InfoMine	Polygon area (digitized)	Esri Imagery
Infrastructure (roads)	Surface Streets (Minor Roads)	Esri StreetMap Premium	40.7ft (12.4m)	USGS
	Major Roads	Esri StreetMap Premium	84.0ft (25.6m)	USGS
	Interstate Highways	Esri StreetMap Premium	240.2ft (73.2m)	USGS
Infrastructure (railroads)	Active Lines	Federal Railroad Administration	30.8ft (9.4m)	USGS
Infrastructure (power lines)	1-199kV Lines	Platts (transmission lines)	100ft (30.5m)	BLM WO-300
	200-399 kV Lines	Platts (transmission lines)	150ft (45.7m)	BLM WO-300
	400-699kV Lines	Platts (transmission lines)	200ft (61.0m)	BLM WO-300
	700+kV Lines	Platts (transmission lines)	250ft (76.2m)	BLM WO-300
Infrastructure (communication)	Towers	Federal Communications Commission	2.5ac (1.0ha)	BLM WO-300

a. Energy and Mining Density Datasets and Assumptions

Energy (oil and gas wells and development facilities)

(See Section I.B.2., Habitat Degradation Monitoring.)

Energy (coal mines)

(See Section I.B.2., Habitat Degradation Monitoring.)

Energy (wind energy facilities)

(See Section I.B.2., Habitat Degradation Monitoring.)

Energy (solar energy facilities)

(See Section I.B.2., Habitat Degradation Monitoring.)

Energy (geothermal energy facilities)

(See Section I.B.2., Habitat Degradation Monitoring.)

Mining (active developments; locatable, leasable, saleable)

(See Section I.B.2., Habitat Degradation Monitoring.)

b. Energy and Mining Density Threat Combination and Calculation

Datasets for energy and mining will be collected in two primary forms: point locations (e.g., wells) and polygon areas (e.g., surface coal mining). The following rule set will be used to calculate density for meaningful geographic areas of interest including standard grids and per polygon:

1) Point locations will be preserved; no additional points will be removed beyond the methodology described above. Energy facilities in close proximity (an oil well close to a wind tower) will be retained.
2) Polygons will not be merged, or features further dissolved. Thus, overlapping facilities will be retained, such that each individual threat will be a separate polygon data input for the density calculation.
3) The analysis unit (polygon or 640-acre section in a grid) will be the basis for counting the number of mining or energy facilities per unit area. Within the analysis unit, all point features will be summed, and any individual polygons will be counted as one (e.g., a coal mine will be counted as one facility within population). Where polygon features overlap multiple units (polygons or pixels), the facility will be counted as one in each unit where the polygon occurs (e.g., a polygon crossing multiple 640-acre

sections would be counted as one in each 640-acre section for a density per 640-acre-section calculation).

4) In methodologies with different-sized units (e.g., MZs, populations, etc.) raw facility counts will be converted to densities by dividing the raw facility counts by the total area of the unit. Typically this will be measured as facilities per 640 acres.
5) For uniform grids, raw facility counts will be reported. Typically this number will also be converted to facilities per 640 acres.
6) Reporting may include summaries beyond the simple ones above. Zonal statistics may be used to smooth smaller grids to help display and convey information about areas within meaningful geographic areas of interest that have high levels of energy and/or mining activity.
7) Additional statistics for each defined unit may also include adjusting the area to include only the area with the historical potential for sagebrush (BpS) or areas currently sagebrush (EVT).

Individual datasets and threat combination datasets for habitat degradation will be available through the BLM’s EGIS web portal and geospatial gateway. Legacy datasets will be preserved so that trends may be calculated.

C. Population (Demographics) Monitoring

State wildlife management agencies are responsible for monitoring sage-grouse populations within their respective states. WAFWA will coordinate this collection of annual population data by state agencies. These data will be made available to the BLM according to the terms of the forthcoming Greater Sage-Grouse Population Monitoring Memorandum of Understanding (MOU) (2014) between WAFWA and the BLM. The MOU outlines a process, timeline, and responsibilities for regular data sharing of sage-grouse population and/or habitat information for the purposes of implementing sage-grouse LUPs/amendments and subsequent effectiveness monitoring. Population areas were refined from the “Greater Sage-grouse *(Centrocercus urophasianus)* Conservation Objectives: Final Report” (COT 2013) by individual state wildlife agencies to create a consistent naming nomenclature for future data analyses. These population data will be used for analysis at the applicable scale to supplement habitat effectiveness monitoring of management actions and to inform the adaptive management responses.

D. Effectiveness Monitoring

Effectiveness monitoring will provide the data needed to evaluate BLM and USFS actions toward reaching the objective of the national planning strategy (BLM IM 2012-044)—to conserve sage-grouse populations and their habitat—and the objectives for the land use planning area. Effectiveness monitoring methods described here will encompass multiple larger scales, from areas as large as the WAFWA MZ to the scale of this LUP. Effectiveness data used for these larger-scale evaluations will include all lands in the area of interest, regardless of surface ownership/management, and will help inform where finer-scale evaluations are needed, such as population areas smaller than an LUP or PACs within an LUP (described in Section II, Fine and Site Scales). Data will also include the trend of disturbance within these areas of interest to inform the need to initiate adaptive management responses as described in the land use plan.

Effectiveness monitoring reported for these larger areas provides the context to conduct effectiveness monitoring at finer scales. This approach also helps focus scarce resources to areas experiencing habitat loss, degradation, or population declines, without excluding the possibility of concurrent, finer-scale evaluations as needed where habitat or population anomalies have been identified through some other means.

To determine the effectiveness of the sage-grouse national planning strategy, the BLM and the USFS will evaluate the answers to the following questions and prepare a broad- and mid-scale effectiveness report:

1) Sagebrush Availability and Condition:
    a. What is the amount of sagebrush availability and the change in the amount and condition of sagebrush?
    b. What is the existing amount of sagebrush on the landscape and the change in the amount relative to the pre-EuroAmerican historical distribution of sagebrush (BpS)?
    c. What is the trend and condition of the indicators describing sagebrush characteristics important to sage-grouse?
2) Habitat Degradation and Intensity of Activities:
    a. What is the amount of habitat degradation and the change in that amount?
    b. What is the intensity of activities and the change in the intensity?
    c. What is the amount of reclaimed energy-related degradation and the change in the amount?
3) What is the population estimation of sage-grouse and the change in the population estimation?
4) How are the BLM and the USFS contributing to changes in the amount of sagebrush?
5) How are the BLM and the USFS contributing to disturbance?

The compilation of broad- and mid-scale data (and population trends as available) into an effectiveness monitoring report will occur on a 5-year reporting schedule (see Attachment A), which may be accelerated to respond to critical emerging issues (in consultation with the USFWS and state wildlife agencies). In addition, effectiveness monitoring results will be used to identify emerging issues and research needs and inform the BLM and the USFS adaptive management strategy (see the adaptive management section of this Environmental Impact Statement).

To determine the effectiveness of the sage-grouse objectives of the land use plan, the BLM and the USFS will evaluate the answers to the following questions and prepare a plan effectiveness report:

1) Is this plan meeting the sage-grouse habitat objectives?
2) Are sage-grouse areas within the LUP meeting, or making progress toward meeting, land health standards, including the Special Status Species/wildlife habitat standard?
3) Is the plan meeting the disturbance objective(s) within sage-grouse areas?
4) Are the sage-grouse populations within this plan boundary and within the sage-grouse areas increasing, stable, or declining?

The effectiveness monitoring report for this LUP will occur on a 5-year reporting schedule (see Attachment A) or more often if habitat or population anomalies indicate the need for an evaluation to facilitate adaptive management or respond to critical emerging issues. Data will be made available through the BLM's EGIS web portal and the geospatial gateway.

Methods

At the broad and mid scales (PACs and above) the BLM and the USFS will summarize the vegetation, disturbance, and (when available) population data. Although the analysis will try to summarize results for PACs within each sage-grouse population, some populations may be too small to report the metrics appropriately and may need to be combined to provide an estimate with an acceptable level of accuracy. Otherwise, they will be flagged for more intensive monitoring by the appropriate landowner or agency. The BLM and the USFS will then analyze monitoring data to detect the trend in the amount of sagebrush; the condition of the vegetation in the sage-grouse areas (MacKinnon et al. 2011); the trend in the amount of disturbance; the change in disturbed areas owing to successful restoration; and the amount of new disturbance the BLM and/or the USFS has permitted. These data could be supplemented with population data (when available) to inform an understanding of the correlation between habitat and PACs within a population. This overall effectiveness evaluation must consider the lag effect response of populations to habitat changes (Garton et al. 2011).

Calculating Question 1, National Planning Strategy Effectiveness: The amount of sagebrush available in the large area of interest will use the information from Measure 1a (I.B.1., Sagebrush Availability) and calculate the change from the 2012 baseline to the end date of the reporting period. To calculate the change in the amount of sagebrush on the landscape to compare with the historical areas with potential to support sagebrush, the information from Measure 1b (I.B.1., Sagebrush Availability) will be used. To calculate the trend in the condition of sagebrush at the mid scale, three sources of data will be used: the BLM's Grass/Shrub mapping effort (Future Plans in Section I.B.1., Sagebrush Availability); the results from the calculation of the landscape indicators, such as patch size (described below); and the BLM's Landscape Monitoring Framework (LMF) and sage-grouse intensification effort (also described below). The LMF and sage-grouse intensification effort data are collected in a statistical sampling framework that allows calculation of indicator values at multiple scales.

Beyond the importance of sagebrush availability to sage-grouse, the mix of sagebrush patches on the landscape at the broad and mid scale provides the life requisite of space for sage-grouse dispersal needs (see the HAF). The configuration of sagebrush habitat patches and the land cover or land use between the habitat patches at the broad and mid scales also defines suitability. There are three significant habitat indicators that influence habitat use, dispersal, and movement across populations: the size and number of habitat patches, the connectivity of habitat patches (linkage areas), and habitat fragmentation (scope of unsuitable and non-habitats between habitat patches). The most appropriate commercial software to measure patch dynamics, connectivity, and fragmentation at the broad and mid scales will be used, along with the same data layers derived for sagebrush availability.

The BLM initiated the LMF in 2011 in cooperation with the Natural Resources Conservation Service (NRCS). The objective of the LMF effort is to provide unbiased estimates of vegetation and soil condition and trend using a statistically balanced sample design across BLM lands. Recognizing that sage-grouse populations are more resilient where the sagebrush plant community has certain characteristics unique to a particular life stage of sage-grouse (Knick and Connelly 2011, Stiver et al. *in press*), a group of sage-grouse habitat and sagebrush plant community subject matter experts identified those vegetation indicators collected at LMF sampling points that inform sage-grouse habitat needs. The experts represented the Agricultural Research Service, BLM, NRCS, USFWS, WAFWA, state wildlife agencies, and academia. The common indicators identified include: species composition, foliar cover, height of the tallest sagebrush and herbaceous plant, intercanopy gap, percent of invasive species, sagebrush shape, and bare ground. To increase the precision of estimates of sagebrush conditions within the range of sage-grouse, additional plot locations in occupied sage-grouse habitat (Sage-Grouse Intensification) were added in 2013. The common indicators are also collected on sampling locations in the NRCS National Resources Inventory Rangeland Resource Assessment (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/nri/?&cid=stelprdb1041620).

The sage-grouse intensification baseline data will be collected over a 5-year period, and an annual sage-grouse intensification report will be prepared describing the status of the indicators. Beginning in year 6, the annual status report will be accompanied with a trend report, which will be available on an annual basis thereafter, contingent on continuation of the current monitoring budget. This information, in combination with the Grass/Shrub mapping information, the mid-scale habitat suitability indicator measures, and the sagebrush availability information will be used to answer Question 1 of the National Planning Strategy Effectiveness Report.

Calculating Question 2, National Planning Strategy Effectiveness: Evaluations of the amount of habitat degradation and the intensity of the activities in the area of interest will use the information from Measure 2 (Section I.B.2., Habitat Degradation Monitoring) and Measure 3 (Section I.B.3., Energy and Mining Density). The field office will collect data on the amount of reclaimed energy-related degradation on plugged and abandoned and oil/gas well sites. The data are expected to demonstrate that the reclaimed sites have yet to meet the habitat restoration objectives for sage-grouse habitat. This information, in combination with the amount of habitat degradation, will be used to answer Question 2 of the National Planning Strategy Effectiveness Report.

Calculating Question 3, National Planning Strategy Effectiveness: The change in sage-grouse estimated populations will be calculated from data provided by the state wildlife agencies, when available. This population data (Section I.C., Population [Demographics] Monitoring) will be used to answer Question 3 of the National Planning Strategy Effectiveness Report.

Calculating Question 4, National Planning Strategy Effectiveness: The estimated contribution by the BLM or the USFS to the change in the amount of sagebrush in the area of interest will use the information from Measure 1a (Section I.B.1., Sagebrush Availability). This measure is derived from the national datasets that remove sagebrush (Table 3). To determine the relative contribution of BLM and USFS management, the current Surface Management Agency geospatial data layer will be used to differentiate the amount of change for each management agency for this measure in the geographic areas of interest. This information will be used to answer Question 4 of the National Planning Strategy Effectiveness Report.

Calculating Question 5, National Planning Strategy Effectiveness: The estimated contribution by the BLM or the USFS to the change in the amount of disturbance in the area of interest will use the information from Measure 2a (Section I.B.2., Monitoring Habitat Degradation) and Measure 3 (Section I.B.3., Energy and Mining Density). These measures are all derived from the national disturbance datasets that degrade habitat (Table 6). To determine the relative contribution of BLM and USFS management, the current Surface Management Agency geospatial data layer will be used to differentiate the amount of change for each management agency for these two measures in the geographic areas of interest. This information will be used to answer Question 5 of the National Planning Strategy Effectiveness Report.

Answers to the five questions for determining the effectiveness of the national planning strategy will identify areas that appear to be meeting the objectives of the strategy and will facilitate identification of population areas for more detailed analysis. Conceptually, if the broad-scale monitoring identifies increasing sagebrush availability and improving vegetation conditions, decreasing disturbance, and a stable or increasing population for the area of interest, there is evidence that the objectives of the national planning strategy to maintain populations and their habitats have been met. Conversely, where information indicates that sagebrush is decreasing and vegetation conditions are degrading, disturbance in sage-grouse areas is increasing, and/or populations are declining relative to the baseline, there is evidence that the objectives of the national planning strategy are not being achieved. Such a determination would likely result in a more detailed analysis and could be the basis for implementing more restrictive adaptive management measures.

With respect to the land use plan area, the BLM and the USFS will summarize the vegetation, disturbance, and population data to determine if the LUP is meeting the plan objectives. Effectiveness information used for these evaluations includes BLM/USFS surface management areas and will help inform where finer-scale evaluations are needed, such as seasonal habitats, corridors, or linkage areas. Data will also include the trend of disturbance within the sage-grouse areas, which will inform the need to initiate adaptive management responses as described in the land use plan.

Calculating Question 1, Land Use Plan Effectiveness: The condition of vegetation and the allotments meeting land health standards (as articulated in “BLM Handbook 4180-1, Rangeland Health Standards”) in sage-grouse areas will be used to determine the LUP’s effectiveness in meeting the vegetation objectives for sage-grouse habitat set forth in the plan. The field office/ranger district will be responsible for collecting this data. In order for this data to be consistent and comparable, common indicators, consistent methods, and an unbiased sampling framework will be implemented following the principles in the BLM’s AIM strategy (Taylor et al. 2014; Toevs et al. 2011; MacKinnon et al. 2011), in the BLM’s Technical Reference “Interpreting Indicators of Rangeland Health” (Pellant et al. 2005), and in the HAF (Stiver et al. *in press*) or other approved WAFWA MZ–consistent guidance to measure and monitor sage-grouse habitats. This information will be used to answer Question 1 of the Land Use Plan Effectiveness Report.

Calculating Question 2, Land Use Plan Effectiveness: Sage-grouse areas within the LUP that are achieving land health stands (or, if trend data are available, that are making progress toward achieving them)—particularly the Special Status Species/wildlife habitat land health standard—will be used to determine the LUP’s effectiveness in achieving the habitat objectives set forth in the plan. Field offices will follow directions in “BLM Handbook 4180-1, Rangeland Health Standards,” to ascertain if sage-grouse areas are achieving or making progress toward achieving land health standards. One of the recommended criteria for evaluating this land health standard is the HAF indicators.

Calculating Question 3, Land Use Plan Effectiveness: The amount of habitat disturbance in sage-grouse areas identified in this LUP will be used to determine the LUP’s effectiveness in meeting the plan’s disturbance objectives. National datasets can be used to calculate the amount of disturbance, but field office data will likely increase the accuracy of this estimate. This information will be used to answer Question 3 of the Land Use Plan Effectiveness Report.

Calculating Question 4, Land Use Plan Effectiveness: The change in estimated sage-grouse populations will be calculated from data provided by the state wildlife agencies, when available, and will be used to determine LUP effectiveness. This population data (Section I.C., Population [Demographics] Monitoring) will be used to answer Question 4 of the Land Use Plan Effectiveness Report.

Results of the effectiveness monitoring process for the LUP will be used to inform the need for finer-scale investigations, initiate adaptive management actions as described in the land use plan, initiate causation determination, and/or determine if changes to management decisions are warranted. The measures used at the broad and mid scales will provide a suite of characteristics for evaluating the effectiveness of the adaptive management strategy.

II. FINE AND SITE SCALES

Fine-scale (third-order) habitat selected by sage-grouse is described as the physical and geographic area within home ranges during breeding, summer, and winter periods. At this level, habitat suitability monitoring should address factors that affect sage-grouse use of, and movements between, seasonal use areas. The habitat monitoring at the fine and site scale (fourth order) should focus on indicators to describe seasonal home ranges for sage-grouse associated with a lek or lek group within a population or subpopulation area. Fine- and site-scale monitoring will inform LUP effectiveness monitoring (see Section I.D., Effectiveness Monitoring) and the hard and soft triggers identified in the LUP's adaptive management section.

Site-scale habitat selected by sage-grouse is described as the more detailed vegetation characteristics of seasonal habitats. Habitat suitability characteristics include canopy cover and height of sagebrush and the associated understory vegetation. They also include vegetation associated with riparian areas, wet meadows, and other mesic habitats adjacent to sagebrush that may support sage-grouse habitat needs during different stages in their annual cycle.

As described in the Conclusion (Section III), details and application of monitoring at the fine and site scales will be described in the implementation-level monitoring plan for the land use plan. The need for fine- and site-scale-specific habitat monitoring will vary by area, depending on proposed projects, existing conditions, habitat variability, threats, and land health. Examples of fine- and site-scale monitoring include: habitat vegetation monitoring to assess current habitat conditions; monitoring and evaluation of the success of projects targeting sage-grouse habitat enhancement and/or restoration; and habitat disturbance monitoring to provide localized disturbance measures to inform proposed project review and potential mitigation for project impacts. Monitoring plans should incorporate the principles outlined in the BLM's AIM strategy (Toevs et al. 2011) and in "AIM-Monitoring: A Component of the Assessment, Inventory, and Monitoring Strategy" (Taylor et al. 2014). Approved monitoring methods are:

- “BLM Core Terrestrial Indicators and Methods” (MacKinnon et al. 2011);
- The BLM’s Technical Reference “Interpreting Indicators of Rangeland Health” (Pellant et al. 2005); and,
- “Sage-Grouse Habitat Assessment Framework: Multiscale Assessment Tool” (Stiver et al. *in press*).

Other state-specific disturbance tracking models include: the BLM’s Wyoming Density and Disturbance Calculation Tool (http://ddct.wygisc.org/) and the BLM’s White River Data Management System in development with the USGS. Population monitoring data (in cooperation with state wildlife agencies) should be included during evaluation of the effectiveness of actions taken at the fine and site scales.

Fine- and site-scale sage-grouse habitat suitability indicators for seasonal habitats are identified in the HAF. The HAF has incorporated the Connelly et al. (2000) sage-grouse guidelines as well as many of the core indicators in the AIM strategy (Toevs et al. 2011). There may be a need to develop adjustments to height and cover or other site suitability values described in the HAF; any such adjustments should be ecologically defensible. To foster consistency, however, adjustments to site suitability values at the local scale should be avoided unless there is strong, scientific justification for making those adjustments. That justification should be provided. WAFWA MZ adjustments must be supported by regional plant productivity and habitat data for the floristic province. If adjustments are made to the site-scale indicators, they must be made using data from the appropriate seasonal habitat designation (breeding/nesting, brood-rearing, winter) collected from sage-grouse studies found in the relevant area and peer-reviewed by the appropriate wildlife management agency(ies) and researchers.

When conducting land heath assessments, the BLM should follow, at a minimum, “Interpreting Indicators of Rangeland Health” (Pellant et. al. 2005) and the “BLM Core Terrestrial Indicators and Methods” (MacKinnon et al. 2011). For assessments being conducted in sage-grouse designated management areas, the BLM should collect additional data to inform the HAF indicators that have not been collected using the above methods. Implementation of the principles outlined in the AIM strategy will allow the data to be used to generate unbiased estimates of condition across the area of interest; facilitate consistent data collection and rollup analysis among management units; help provide consistent data to inform the classification and interpretation of imagery; and provide condition and trend of the indicators describing sagebrush characteristics important to sage-grouse habitat (see Section I.D., Effectiveness Monitoring).

III. CONCLUSION

This Greater Sage-Grouse Monitoring Framework was developed for all of the Final Environmental Impact Statements involved in the sage-grouse planning effort. As such, it describes the monitoring activities at the broad and mid scales and provides a guide for the BLM and the USFS to collaborate with partners/other agencies to develop the land use plan- specific monitoring plan.

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Attachment A. An Overview of Monitoring Commitments

	Broad and Mid Scales					Fine and Site Scales
	Impiementation	Sagebrush Availability	Habitat Degradation	Population	Effectiveness	
How will the data be used?	Track and document implementation ofland use plan decisions and inform adaptive management	Track changes in land cover (sagebrush) and inform adaptive management	Track changes in disturbance (threats) to sage-grouse habitat and inform adaptive management	Track trends in sage-grouse populations (and/or leks; as determined by state wildlife agencies) and inform adaptive management	Characterize the relationship among disturbance, implementation actions, and sagebrush metrics and inform adaptive management	Measure seasonal habitat, connectivity at the fine scale, and habitat conditions at the site scale, calculate disturbance, and inform adaptive management
Who is collecting the data?	BLMFOand USFS Forest	NOC and NIFC	National datasets (NOC), BLM FOs, and USFS Forests as applicable	State wildlife agencies through WAFWA	Comes from other broad- and mid-scale monitoring types ,analyzed by the NOC	BLM FO and SO, USFS Forests and RO (with partners)
How often are the data collected, reported, and made available to USFWS?	Collected and reported annually; summary report every 5 years	Updated and changes reported annually; summary report every 5 years	Collected and changes reported annua lly; summary report every 5 years	State data reported annually per WAFWA MOU; summary report every 5 years	Collected and reported every 5 years (coincident with LUP evaluations)	Collection and trend analysis ongoing, reported every 5 years or as needed to inform adaptive management
What is the spatial scale?	Summarized by LUP with flexibility for reporting by other units	Summarized by PACs (size dependent) with flexibility for reporting by other units	Summarized by PACs (size dependent) with flexibility for reporting by other units	Summarized by PACs (size dependent) with flexibility for reporting by other units	Summarized by MZ and LUP with flexibility for reporting by other units (e.g., PAC)	Variable (e.g., projects and seasonal habitats)
What are the potential personnel and budget impacts?	Additional capacity or re-prioritization of ongoing monitoring work and budget realignment	At a minimum, current skills and capacity must be maintained ; data management costs are TBD	At a minimum, current skills and capacity must be maintained ; data management and data layer purchase cost are TBD	No additional personnel or budget impacts for the BLM or the USFS	Additional capacity or re-prioritization of ongoing monitoring work and budget realignment	Additional capacity or re-prioritization of ongoing monitoring work and budget realignment

Who has primary and secondary responsi-bilities for reporting?	1) BLMFO & SO; USFS Forest & RO 2) BLM & USFS Planning	1) NOC 2) WO	1) NOC 2) BLM SO, USFS RO, & appropriate programs	1) WAFWA & state wildlife agencies 2) BLM SO, USFS RO, NOC	1) Broad and mid scale at the NOC, LUPat BLM SO, USFSRO	1) BLMFO& USFS Forests 2) BLMSO& USFS RO
What new processes/ tools are needed?	National implementation datasets and analysis tools	Updates to national land cover data	Data standards and rollup methods for these data	Standards in population monitoring (WAFWA)	Reporting methodologies	Data standards data storage; and reporting

FO (field office); NIFC (National Interagency Fire Center); NOC (National Operations Center); RO (regional office) ; SO (state office) ; TBD (to be determined) ; WO (Washington Office)

Attachment B. User and Producer Accuracies for Aggregated Ecological Systems within LANDFIRE Map Zones

LANDFIRE Map Zone Name	User Accuracy	Producer Accuracy	% of Map Zone within Historical Schroeder
Wyoming Basin	76.9%	90.9%	98.5%
Snake River Plain	68.8%	85.2%	98.4%
Missouri River Plateau	57.7%	100.0%	91.3%
Grand Coulee Basin of the Columbia Plateau	80.0%	80.0%	89.3%
Wyoming Highlands	75.3%	85.9%	88.1%
Western Great Basin	69.3%	75.4%	72.9%
Blue Mountain Region of the Columbia Plateau	85.7%	88.7%	72.7%
Eastern Great Basin	62.7%	80.0%	62.8%
Northwestern Great Plains	76.5%	92.9%	46.3%
Northern Rocky Mountains	72.5%	89.2%	42.5%
Utah High Plateaus	81.8%	78.3%	41.5%
Colorado Plateau	65.3%	76.2%	28.8%
Middle Rocky Mountains	78.6%	73.3%	26.4%
Cascade Mountain Range	57.1%	88.9%	17.3%
Sierra Nevada Mountain Range	0.0%	0.0%	12.3%
Northwestern Rocky Mountains	66.7%	60.0%	7.3%
Southern Rocky Mountains	58.6%	56.7%	7.0%
Northern Cascades	75.0%	75.0%	2.6%
Mogollon Rim	66.7%	100.0%	1.7%
Death Valley Basin	0.0%	0.0%	1.2%

There are two anomalous map zones with 0% user and producer accuracies, attributable to no available reference data for the ecological systems of interest.

User accuracy is a map-based accuracy that is computed by looking at the reference data for a class and determining the percentage of correct predictions for these samples. For example, if I select any sagebrush pixel on the classified map, what is the probability that I'll be standing in a sagebrush stand when I visit that pixel location in the field? ***Commission Error*** equates to including a pixel in a class when it should have been excluded (i.e., commission error = 1 – user's accuracy).

Producer accuracy is a reference-based accuracy that is computed by looking at the predictions produced for a class and determining the percentage of correct predictions. In other words, if I know that a particular area is sagebrush (I've been out on the ground to check), what is the probability that the digital map will correctly identify that pixel as sagebrush? ***Omission Error*** equates to excluding a pixel that should have been included in the class (i.e., omission error = 1 – producer's accuracy).

Attachment C. Sagebrush Species and Subspecies Included in the Selection Criteria for Building the EVT and BpS Layers

- *Artemisia arbuscula* subspecies *longicaulis*
- *Artemisia arbuscula* subspecies *longiloba*
- *Artemisia bigelovii*
- *Artemisia nova*
- *Artemisia papposa*
- *Artemisia pygmaea*
- *Artemisia rigida*
- *Artemisia spinescens*
- *Artemisia tripartita* subspecies *rupicola*
- *Artemisia tripartita* subspecies *tripartita*
- *Tanacetum nuttallii*
- *Artemisia cana* subspecies *bolanderi*
- *Artemisia cana* subspecies *cana*
- *Artemisia cana* subspecies *viscidula*
- *Artemisia tridentata* subspecies *wyomingensis*
- *Artemisia tridentata* subspecies *tridentata*
- *Artemisia tridentata* subspecies *vaseyana*
- *Artemisia tridentata* subspecies *spiciformis*
- *Artemisia tridentata* subspecies *xericensis*
- *Artemisia tridentata* variety *pauciflora*
- *Artemisia frigida*
- *Artemisia pedatifida*

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Appendix M

Responses to Substantive Public Comments on the 2020 Draft Supplemental EIS

Appendix M. Responses to Substantive Public Comments on the 2020 Draft Supplemental EIS

INTRODUCTION

The Notice of Availability (NOA) for the Nevada and Northeastern California Draft Supplemental Environmental Impact Statement (DSEIS) was published in the *Federal Register* on February 21, 2020 (85 Federal Register 10183, February 21, 2020), followed by a 90-day public comment period ending on May 21, 2020.

The Bureau of Land Management (BLM) received comments primarily through the online comment form that was provided on the project website[1]. The BLM recognizes that commenters invested considerable time and effort to submit comments on the DSEIS; as such, the BLM developed a comment analysis method to ensure that all comments were considered, as directed by National Environmental Policy Act (NEPA) regulations.

The BLM developed a systematic process for responding to comments to ensure all comments were tracked and considered. On receipt, each comment letter was assigned an identification number and logged into a tracking database that allowed the BLM to organize, categorize, and summarize comments. Comments were coded by appropriate categories based on content of the comment.

Comments similar to each other were grouped under a topic heading. The BLM then drafted a statement summarizing the issues contained in each group of comments. Responses to all substantive comments submitted on the DSEIS will be provided in the Final Supplemental Environmental Impact Statement (FSEIS) in accordance with 40 CFR 1503.4 – Response to Comments[2].

Across all six Draft SEISs that were published on February 21, 2020, a total of 125,840 submissions were received; 222 of these were considered unique submissions (41 of these unique submissions were specific to the Nevada and Northeastern California DSEIS). Some of the comments received throughout the public comment period expressed personal opinions or preferences, had little relevance to the adequacy or accuracy of the DSEIS, or represented commentary on resource management that is outside the scope of this planning process. These commenters did not provide specific information to assist the planning team in making a change to the DSEIS, did not suggest other alternatives, and did not take issue with methods used in the DSEIS; these comments are not addressed further in this comment summary report. Copies of all substantive comment letter submissions are available upon request.

Several organizations and groups held standardized letter campaigns to submit comments during the public comment period for the DSEIS. Through this process, their constituents were able to submit the standard letter or a modified version of the letter indicating support for the group's position on the

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[1] https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=105596&dctmId=0b0003e88110d407

[2] https://www.govinfo.gov/content/pkg/CFR-2012-title40-vol34/pdf/CFR-2012-title40-vol34-sec1503-4.pdf

DSEIS. Individuals who submitted a modified standard letter generally added new comments or information to the letter or edited it to reflect their main concerns. The BLM received 125,840 campaign letters from two separate organizations, most of which were identical to the master letter.

The BLM read, analyzed, and considered all comments of a personal or philosophical nature and all opinions, feelings, and preferences for one element or one alternative over another. Because such comments were not substantive, the BLM is not responding to them. It is also important to note that, while the BLM reviewed and considered all comments, none were counted as votes. The NEPA public comment period is neither an election nor does it result in a representative sampling of the population. Therefore, public comments are not appropriate to be used as a democratic decision-making tool or as a scientific sampling mechanism.

The BLM received substantive comments regarding best available science and information considered while preparing the DSEIS. These included peer reviewed articles, references, and requests for new studies. The BLM will review the full text citations outlined in these comments and will consider information presented when determining if plan modifications are necessary.

Summaries of Issue Topics

This appendix is split up into four sections: Rangewide Comment Responses; Nevada and Northeastern California-Specific Comment Responses; Rangewide Comments; and Nevada and Northeastern California-Specific Comments. The Rangewide Comment Responses section contains a summary of comments received that apply mostly rangewide. The BLM recognizes that not all of these comments apply to all states, but they do apply across multiple states. This section also contains a response to the summaries of comments. The Nevada and Northeastern California-Specific Comment Responses section contains a summary of comments received specific to Nevada and Northeastern California and responses to those comments. The full text of parsed comments received both rangewide and Nevada and Northeastern California-specific can be found in the respective sections.

M.1 Rangewide Summary of Public Comments and Responses

M.1.1 Rangewide

Summary: Commenters felt that the DSEIS is lacking in that there is no assessment of broad-scale applicability of these plans to meet the management goals BLM has established.

Response: Each BLM State Office is undergoing a 5-year monitoring reporting process regarding the progress of implementing Greater Sage-Grouse management. Based on the 2015 EIS monitoring plans, the BLM is producing a National Greater Sage-Grouse 5-Year Implementation Monitoring Report that it will submit to WAFWA for its Greater Sage-Grouse 2020 Conservation Assessment. The WAFWA-led team will review multiple reports from state and federal agencies, including BLM's Monitoring Report, to assess the implementation of the conservation commitments that resulted in the not warranted determination in 2015. The WAFWA team will review the Conservation Efforts Database as well. These additional steps are an assessment of the broad-scale applicability of the plans over a subregion.

M.1.2 Purpose and Need

Summary: Commenters asserted that the purpose and need in the DSEIS should reflect the need to address the new circumstances, science, and environmental concerns of the proposed action in the 2018 FEIS allowing for informed decision-making.

Response: The purpose and need was defined specifically to address a preliminary injunction order by the US District Court, which preliminarily found that the 2018 EISs likely needed to be supplemented to address the range of alternatives, a hard look at environmental impacts, cumulative effects analysis, and the BLM's approach to compensatory mitigation. The BLM continues to review new science related to Greater Sage-Grouse, and the plan allows for flexibility to consider new science, based on each state's needs and circumstances.

Summary: Commenters noted that the purpose and need in the DSEIS is different from the 2015 EIS and should consider a new range of alternatives.

Response: The purpose and need for this SEIS does differ from the 2015 EISs' purpose and need. In the 2018 FEISs, the BLM analyzed the Management Alignment Alternative and the Proposed Plan Amendment, incorporating the full range of alternatives considered in the 2015 EISs. The purpose and need for the SEIS is solely to address the preliminary injunction order by the US District Court, which preliminarily found that the 2018 EISs likely needed to be supplemented to address the range of alternatives, a hard look at environmental impacts, cumulative effects analysis, and the BLM's approach to compensatory mitigation. No new alternatives are needed to satisfy the purpose and need of the SEIS.

M.1.3 Issues

Summary: Commenters requested that the BLM provide additional new analysis in the FSEIS and not just refer to previous analysis.

Response: The purpose and need for this SEIS is solely to address the preliminary injunction order by the US District Court, which preliminarily found that the 2018 EISs likely needed to be supplemented to address the range of alternatives, a hard look at environmental impacts, cumulative effects analysis, and the BLM's approach to compensatory mitigation. Only that analysis needed to respond to the purpose and need is included in the SEIS. For example, the cumulative analysis section was updated in the SEIS to account for additional past, present, and reasonably foreseeable projects; there is an updated assessment of habitat and population triggers tripped; and there is an update to the number of acres of habitat treated.

Summary: Commenters expressed concern about dismissing the issue of predators from detailed analysis in the DSEIS.

Response: The issue was not carried forward for additional analysis in the 2019 planning process because predation was not an issue specifically raised by the Governors for consistency and alignment of the BLM's plans with state Greater Sage-Grouse management plans and policies. As such, there was no need to re-evaluate decisions related to predation from the 2015 plans in the DSEIS. The purpose and need for the SEIS is solely to address the preliminary injunction order by the US District Court, which preliminarily found that the 2018 EISs likely needed to be supplemented to address the range of alternatives, a hard look at environmental impacts, cumulative effects analysis, and the BLM's approach to compensatory mitigation.

Summary: Commenters asserted that the FSEIS should analyze the magnitude of predation as a factor in causing the decline in Greater Sage-Grouse populations.

Response: Under the approved plans, when population triggers are tripped, the BLM does a causal factor analysis to determine the factors in declining populations in an area, which may include predation. The BLM acknowledges the multitude of factors that potentially contribute to population declines, as reflected in the adaptive management strategy.

M.1.4 Range of Alternatives

Summary: Commenters felt that the DSEIS does not explore the differences in the range of alternatives between the 2015 and 2019 plans, and only analyzes two alternatives: a No Action Alternative and the Management Alignment Alternative. Commenters felt that this is an inadequate range of alternatives.

Response: In the 2018 FEISs, the BLM analyzed the Management Alignment Alternative and the Proposed Plan Amendment, while also incorporating the full range of alternatives considered in the 2015 plans. The DSEIS carries this full range of alternatives forward, as described in detail in Section 2.1 of each DSEIS.

M.1.5 New Alternative

Summary: Commenters felt that the BLM should consider a new alternative that withdraws the 2019 ROD and that rejects the 2015 protection measures for Greater Sage-Grouse.

Response: Such a proposal would be the No Action Alternative analyzed in the 2015 EISs and part of the full range of alternatives analyzed in the 2018 FEISs.

M.1.6 Alternatives–Other

M.1.7 Data and Science

Summary: The public submitted studies published since the 2018 USGS synthesis for consideration by the BLM. Additionally, the public submitted reviews of scientific literature for the BLM to consider in the FSEISs.

Response: The BLM partnered with USGS in 2018 to review new information since the 2015 RODs. The BLM subsequently incorporated the management implications of that information into the 2018 EISs. The report from USGS is available here and referenced throughout the SEIS.

The BLM places great import on the best available information, including new scientific studies and government reports that indicate a potential change in BLM's assumptions or conditions related to a land use planning effort. The BLM has to balance reviewing new information with determining what information is relevant to a decision in light of the BLM's purpose and need. Many commenters highlighted information and studies for the BLM to consider, and the BLM has reviewed each source submitted.

Upon review, the BLM found that the most up-to-date Greater Sage-Grouse science and other information has incrementally increased, and built upon, the knowledgebase of Greater Sage-Grouse management evaluated by the BLM most recently in its 2019 land use plan amendments, but does not change the scope or direction of the BLM's management. While the NTT, the COT and this new science and information remain thus consistent with the scope of the 2019 planning decisions, new science does suggest adaptations to management may be warranted at site-specific scales. This is precisely the approach envisioned by the NTT and COT reports as well as the BLM's decades long planning efforts to address local actions that may affect Greater Sage-Grouse.

The scientists and managers that authored the COT and NTT reports could not have anticipated all the variables that would affect sage grouse into the future when they provided their recommendations. Varying topographic factors, ecological site potential, changes in methodologies, technological advances, variation in vegetation types, and anthropogenic disturbance, to name a few, make it difficult to adequately address all factors that affect sage grouse populations and habitat. Therefore, where appropriate, the BLM will consider this science and information through implementation-level NEPA analysis, consistent with its approved land use plans, policies, and regulatory frameworks.

Summary: The DSEIS inadequately addresses best available science on anthropogenic climate change.

Response: The BLM has analyzed climate change, including by addressing changes in fire frequency, changes in frequency of drought conditions, and the spread of invasive species. All of these factors can contribute to impacts on Greater Sage-Grouse and its habitat, regardless of the cause. Climate is one factor that affects populations and habitat, but not the only factor.

Summary: The DSEIS neglects the advances in technology that reduce the potential disturbance to Greater-Sage Grouse.

Response: The 2019 plans sought maximum alignment with state management plans for Greater Sage-Grouse within the BLM's management authority. BLM anticipated advances in technology and built in increased flexibility in implementation through things like exceptions, modifications, and waivers for fluid minerals stipulations. This increased flexibility would allow for oil and gas development in instances where impacts on Greater Sage-Grouse can be reduced to acceptable levels, such as through technology advancement.

Summary: The BLM should coordinate and consult with other federal or state agencies that maintain scientific expertise on both sage-grouse and sagebrush habitat to ensure that the conclusions in the FSEIS are scientifically credible.

Response: The BLM places great import on the best available information, including scientific studies and government reports that indicate a potential change in our assumptions or conditions related to a land use planning effort. The BLM acknowledges that states have management responsibility for managing Greater Sage-Grouse populations. In managing Greater Sage-Grouse, the BLM works closely with the states to determine population trends, and coordinates with other federal agencies such as USGS, USFWS, and NRCS on interpreting scientific information related to the species. The BLM has to balance reviewing new information with determining what information is relevant to a decision in light of the BLM's purpose and need. The BLM will continue to coordinate and, as applicable, consult with its partners on Greater Sage-Grouse management.

Summary: A commenter suggests that the need to address and correct the scientific flaws that originated in the 2015 plans and were carried forward to the 2019 plans has become even more urgent. The 2015 plans ignored the full spectrum of on-point, more recent science currently available, and instead relied upon biased and outdated science. BLM should consider usage of a stage-based population dynamic model. The reports erroneously ignore accurate population data and adopt methodologically flawed modeling approaches that have consistently failed to accurately predict populations. The reports ignore natural population fluctuations and land use plans must consider large-scale climatic fluctuations and Greater Sage-Grouse population responses.

Response: The BLM partnered with USGS in 2018 to review new information since the 2015 RODs and the BLM subsequently incorporated the management implications of that information into the 2018 EISs. The report from USGS is available here and referenced throughout the SEIS.

The BLM places great import on the best available information, including new scientific studies and government reports that indicate a potential change in our assumptions or conditions related to a land use planning effort. The BLM has to balance reviewing new information with determining what information is relevant to a decision in light of the BLM's purpose and need. Many commenters highlighted information and studies for the BLM to consider, and the BLM has reviewed each source submitted. The BLM will continue to consider new science at the project phase of plan implementation as standard practice, as new science is constantly being published. Amending the plans to incorporate new science is not necessary because authorized officers use best available information to inform their decisions during plan implementation.

The Purpose and Need statement for the 2019 plans included a goal of aligning the BLM's management of Greater Sage-Grouse habitat with state plans. There were several instances during the 2019 planning process where states brought new science to BLM's attention that was used to formulate the Management Alignment Alternative. For example, the BLM incorporated new science on residual grass height, habitat mapping, and effects of oil and gas drilling.

Summary: Declining Greater Sage-Grouse populations in recent years should be considered in the analysis.

Response: Population declines are tracked in the land use plan through the adaptive management strategy. The trigger sensitivity accounts for the cyclical nature of Greater Sage-Grouse population levels. The SEISs address population declines through the disclosure of tripped triggers in Chapter 3 of each state's SEIS. The BLM acknowledges that states have management responsibility for managing Greater Sage-Grouse populations. In managing Greater Sage-Grouse, the BLM works closely with the states to determine population trends, and coordinates with other federal agencies such as USGS, USFWS, and NRCS on interpreting scientific information related to the species. There is a fresh look each year when the BLM receives the annual population data from the states, which, taken with the habitat data collected annually by the BLM, informs any adaptive management needed. If the data indicate that a trigger has been tripped, the BLM works with state and local partners to determine the causal factors and propose management changes.

In areas where triggers have been tripped, as disclosed in Chapter 3 of each state's SEIS, adaptive management has been implemented to prevent new disturbance that would impact Greater Sage-Grouse habitat on BLM-administered lands. The adaptive management framework was set up so that the BLM could respond to population and habitat dynamics without a plan amendment.

Summary: BLM should clarify the shortcomings of the NTT and COT reports.

Response: This was clarified in an appendix to each of the DSEISs titled *Review of the NTT and COT Report's Relevance to the Planning Process; Incorporation of the NTT, COT, and USGS Summary of Science into the [Subregion] Planning Process*.

M.1.8 Direct/Indirect Impacts

Summary: The BLM should include robust assessments of Greater Sage-Grouse population-level response to direct, indirect, and cumulative impacts associated with the alternatives.

Response: The SEISs address population declines through the disclosure of tripped triggers in Chapter 3 of each state's SEIS. In areas where triggers have been tripped, adaptive management has been implemented to prevent new disturbance that would impact Greater Sage-Grouse habitat on BLM-administered lands. The adaptive management framework was set up so that the BLM could respond to population and habitat dynamics without a plan amendment.

M.1.9 Assumptions and Methodology

Summary: Commenter argues that the proposed changes to the 2015 plan contradict scientific recommendations for conserving Greater Sage-Grouse, and the supplemental environmental impact statement fails to analyze and acknowledge the negative impacts that will result from the agency's proposed change in management direction.

Response: No changes were proposed in the 2020 SEISs.

M.1.10 Cumulative Impacts

Summary: The CEA failed to account for a number of relevant activities.

Response: The BLM has updated the past, present, and reasonably foreseeable actions as needed to reflect all current projects in the FSEIS.

Summary: The BLM should clarify in the FSEIS whether the cumulative effects analysis was done at the rangewide level organized by the WAFWA management zones.

Response: The BLM considered cumulative impacts on a rangewide basis, organizing that analysis at the geographic scale of each WAFWA management zone.

M.1.11 Adaptive Management

Summary: Flexibility should be added to adjustments in "Land Tenure," to "Rights-of-Way," and to "Travel Management" relative to site conditions in any FSEIS and plan amendments.

Response: The 2019 plans sought maximum alignment with state management plans for Greater Sage-Grouse within the BLM's management authority. Where such flexibility was needed to align with state plans, it was included in the 2019 Approved Plans. Additional flexibility or changes to decisions from the 2019 Approved Plans is outside the scope of these SEISs.

Summary: BLM should explain how ARMPA's adaptive management will work without monitoring the plan.

Response: BLM's ARMPA adaptive management strategy is based on population data from the states and habitat data collected by the BLM. These data are evaluated annually to determine the need for adaptive management changes as a result of tripped triggers. In addition, the BLM's 5-year monitoring report (completed in 2020) will be used in the WAFWA Greater Sage-Grouse 2020 Conservation Assessment.

M.1.12 Burial of Transmission Lines

Summary: The public submitted studies for consideration by the BLM regarding mitigation to transmission lines.

Response: Mitigation measures will be considered during project design and implementation and will be based on best available science and site-specific conditions.

Summary: Transmission line projects should not be exempt from abiding by the avoidance areas. All high-voltage related projects should comply with the proposed LUPA conservation measures. Alternative routes for these transmission projects exist, and more can be suggested to avoid interference with PHMA and GHMA. Flexibility in these projects to find a balance in interests is still possible to reap the benefits of energy for human use, while also preventing degradation of Greater Sage-Grouse habitat in PHMA and GHMA.

Response: Mitigation measures, including alternative routes, will be considered during project design and implementation and will be based on best available science and site-specific conditions.

M.1.13 Disturbance and Density Caps

Summary: The DSEIS fails to explain why Greater Sage-Grouse in Wyoming are more tolerant of disturbance than other states, or indeed, more tolerant than the best available science demonstrates.

Response: Wyoming BLM's 5 percent disturbance cap includes additional disturbance types (e.g., burned areas) not included in the list of disturbance types in other states, where the disturbance cap was set at 3 percent.

M.1.14 Habitat Management Area

Summary: The spatial extent of habitat management areas should not be modified.

Response: HMAs reflect habitat that is mapped based on best available information. If BLM and the states find that habitat was not reflected correctly in light of new information, plan maintenance or an amendment can be used to update boundaries to reflect the change in information.

Summary: The management prescriptions associated with habitat management areas should not be modified.

Response: The purpose of these plan amendments is to increase consistency with state management. In some cases that resulted in changes to management within the HMAs.

Summary: Restoration targets for Priority Habitat Management Areas (PHMA) should be developed and incorporated into the plans.

Response: While BLM has not developed specific restoration targets, the BLM has committed to significant restoration and recovery actions. The BLM spent considerable time and energy on the development of the FIATs that identify specific areas for specific types of actions and used that as a basis for requesting funding from Congress. Some targets have been developed but are not included in the plans for reasons such as uncertainty of funding to implement the actions to reach the targets.

Summary: The DSEIS fails to take a hard look at tripped triggers and fails to provide a full and clear listing of tripped triggers.

Response: The SEISs address population declines through the disclosure of tripped triggers in Chapter 3 of each state's SEIS. In areas where triggers have been tripped, adaptive management has been implemented to prevent new disturbance that would impact Greater Sage-Grouse habitat on BLM-administered lands. The adaptive management framework was set up so that the BLM could respond to population and habitat dynamics without a plan amendment.

Summary: Commenters state that the 2018 FEIS and DSEIS continue to fail to disclose the basis by which private lands can be considered in a federal land management planning document, and that the BLM has no authority under FLPMA to apply land use plan restrictions on private land. Other commenters request that the BLM apply Greater Sage-Grouse habitat management area definitions to private land.

Response: The BLM acknowledges that this planning effort does not apply land use plan restrictions on private land. However, when calculating disturbance either at the project or BSU level, the BLM does consider the cumulative disturbance in the area, which may include private, state, or other federal land. Based on the total disturbance in the area, the BLM has the authority to apply the management prescribed in the plan on BLM-administered lands. Furthermore, during cumulative effects analysis, the BLM considers past, present, and reasonably foreseeable projects on all lands in the impact area, regardless of jurisdiction.

M.1.15 Habitat Objectives

Summary: The BLM has neglected to acknowledge the habitat conditions and trends across Greater-Sage Grouse range in the DSEISs, despite that trends are currently declining.

Response: The BLM acknowledged habitat changes for Greater Sage-Grouse when in 2010 it undertook a planning action to provide regulatory certainty for the species. Prior to that effort, the BLM partnered with the WAFWA, state wildlife agencies, and others, to manage habitat for Greater Sage-Grouse. Habitat conditions are assessed using the Habitat Assessment Framework. Habitat availability is tracked according to the Monitoring Framework or by the adaptive management strategy described in each land use plan. The adaptive management strategy is designed to respond to changing habitat conditions when triggers are tripped. The BLM considered cumulative impacts on a rangewide basis, organizing that analysis at the geographic scale of each WAFWA management zone.

Summary: The DSEIS inadequately addresses fragmentation within management areas on an individual scale.

Response: Fragmentation was addressed during the 2015 planning process. The analysis was incorporated by reference in the 2019 planning process. Additional information regarding habitat fragmentation was not needed to meet the purpose and need of the SEIS.

M.1.16 Lek Buffers

Summary: Lek buffers should be maintained to protect leks.

Response: The BLM agrees that lek buffers are one of many important conservation tools available to manage sagebrush habitat and protect Greater Sage-Grouse. The BLM is retaining, and in some instances modifying or clarifying, the application of lek buffers as a management tool.

Summary: Lek buffers should be larger than prescribed in the plan amendments.

Response: As applicable, each RMPA has an appendix that addresses lek buffers and allows the BLM to adjust lek buffers based on the best available science, which would allow the BLM to adjust the buffers based on new information as well. Further, some states are clarifying the approach in this RMPA effort, or adjusting to better align with their individual state's management. For more specific information, please refer to the individual plans and their associated lek buffer appendix.

Summary: The 2011 NTT and 2013 COT report have a substantive number of flaws that need to be revised.

Response: The role of the NTT and COT reports is discussed in an appendix to each of the DSEISs titled *Review of the NTT and COT Report's Relevance to the Planning Process; Incorporation of the NTT, COT, and USGS Summary of Science into the [Subregion] Planning Process*. These reports are static reviews of scientific literature. The USGS did an updated review of scientific literature prior to the 2019 planning process. The BLM will continue to take into account best available science for Greater Sage-Grouse management.

Summary: Use of lek buffers and associated modifications must be included for analysis in this SEIS, not left for clarification through plan maintenance, because lek buffers were not fully analyzed in the previous EIS nor provided for public review and consideration.

Response: Lek buffers were part of the 2015 planning process and the public was provided an opportunity to comment during that process. As part of the 2019 planning process, the intent of lek buffers was clarified for some states, which is a maintenance action. For other states, the lek buffers were modified and the intent was clarified. In both cases, the public was provided an opportunity to comment on the 2018 DEIS and this DSEIS.

M.1.17 Livestock Grazing Management

Summary: Rangeland health assessments do not adequately ensure protection and restoration of sage-grouse habitat. The BLM should include a discussion about how changes to scale and timeframe for rangeland health assessments will impact sage-grouse habitat management and agency land managers to adjust grazing practices when standards are not met.

Response: Rangeland health assessments are used to assess whether the rangelands are meeting standards and are not intended to protect or restore Greater Sage-Grouse habitat, although there is a standard for wildlife/special status species habitat, which would include Greater Sage-Grouse habitat. The analysis of any future changes to the grazing regulations is outside the scope of this analysis and will be disclosed during other decision-making processes.

Summary: The DSEIS inadequately addresses the plan for closure of sage-grouse allotments upon receipt of waived or retired grazing permits.

Response: As explained in the DSEISs, the 2019 planning process incorporated the full range of alternatives from the 2015 planning process. Therefore, neither the 2019 planning process nor these SEISs expressly address this issue because there was no change proposed to the decision in the 2019 process. However, as the commenter acknowledges, the BLM did consider this within the range of alternatives for Greater Sage-Grouse management.

Summary: The DSEIS inadequately addresses the potential impact of livestock grazing on Greater Sage-Grouse habitat.

Response: The impacts of livestock grazing were disclosed in the 2015 plans. The 2019 plans did not change decisions that change the impacts previously disclosed, as described in Chapter 1 of the 2018 FEISs. Therefore, it was neither a subject of analysis in 2019 nor one in the SEISs. Furthermore, the purpose and need for the SEISs is solely to address the preliminary injunction order by the US District Court, which preliminarily found that the EISs likely needed to be supplemented to address the range of alternatives, a hard look at environmental impacts, cumulative effects analysis, and the BLM's approach to compensatory mitigation. No new alternatives are needed to satisfy the purpose and need of the SEISs.

M.1.18 Withdrawal Recommendation and SFAs (Sagebrush Focal Areas)

Summary: Sagebrush focal areas (SFAs) should not be removed from the plans. Inconsistency in retention and removal of SFA across states is arbitrary and capricious. BLM is not legally required to remove SFA. Justifications for eliminating SFAs are inadequate.

Response: BLM is focused on aligning its management with state management. BLM's goal is to promote consistency and alignment with each state's management for Greater Sage-Grouse. Where BLM has increased its management flexibility, it has done so to improve alignment with the state plans and based on local information. In 2019, the BLM determined that SFA designations provided a redundant layer of resource protection and land use prioritization within PHMA and is acting within its discretion to remove SFA designation. Further, the BLM canceled the proposed withdrawal of SFAs through a publication in the *Federal Register* on October 11, 2017 (82 Fed. Reg. 47,248) after findings in the Sagebrush Focal Area Draft EIS noted that there was broadly low potential for locatable minerals within the recommended withdrawal area.

Summary: BLM should remove all reference to SFAs. SFAs are an overreach and unnecessary as priority habitat designations provide adequate habitat protection.

Response: SFAs and associated management direction specific to the SFAs were removed through the 2019 plans, except for in Oregon where they retained the SFA designation.

M.1.19 Mitigation

Summary: A mandatory net-gain compensatory mitigation standard is supported by some commenters and objected to by others.

Response: Following extensive review of FLPMA, including existing regulations, orders, policies, and guidance, the BLM concluded that FLPMA does not explicitly mandate or authorize the BLM to require public land users to implement compensatory mitigation as a condition of obtaining authorization for the use of the public lands (Instruction Memorandum No. 2018-093, *Compensatory Mitigation*, July 24, 2018). Under FLPMA, the BLM has an obligation to ensure that its actions do not result in "unnecessary or undue degradation." Preventing unnecessary or undue degradation does not mean preventing all adverse impacts upon the land. The negative inference of the words "unnecessary" and "undue" is that a certain level of impairment may be necessary and due under a multiple use mandate. See Theodore Roosevelt Conservation Partnership v. Salazar, 661 F.3d 66, 78 (D.C. Cir. 2011) ("FLPMA prohibits only unnecessary or undue degradation, not all degradation.") (emphasis in the original); see also BLM, Instructional Memorandum No. 92-67 (Dec. 3, 1991) ("'Unnecessary and undue degradation' implies that there is also necessary and due degradation. For example, if there is only one route of access possible for development of an existing oil and gas lease, and that route presents the likelihood of some degradation of public lands or resources, such degradation may be considered necessary for the management of the oil and gas resource. . . . As another example, the RMP/EIS or site-specific environmental document may identify mitigation which would result in excessive expenditures of money or unusual technological requirements to achieve compliance. Otherwise there would be some degree of degradation of public lands or resources. If the mitigation would render the proposed operation uneconomic or technologically infeasible so that a prudent operator would not proceed, such degradation may also be considered necessary for the management of the oil and gas resource.") (emphasis in the original). Accordingly, FLPMA does not require and implicitly counsels against a net-gain standard, which would be inconsistent with the negative inference of the phrase "unnecessary or undue degradation." Even if the BLM has authority to use compensatory mitigation, the BLM has – consistent with its multiple-use mission – determined that exercise of that authority to meet a net conservation gain mitigation standard is unwarranted. Moreover, as described in the FEIS, the goal of the RMP amendments to– improve the condition of sage grouse habitat – remains as a planning-level objective for sage grouse conservation.. As a practical matter, it is too speculative to analyze the impacts of the shift back to a "no net loss" standard from a "net-gain" standard at the programmatic level. First, the BLM continues to identify ways to avoid, minimize, and rectify the impact of specific projects at the project-specific level. Second, it is impossible to predict the amount of compensatory mitigation that might voluntarily occur in the future and the environmental consequences of that compensatory mitigation. Therefore, analysis of the environmental impact of compensatory mitigation (or lack thereof) is more appropriate for future project-specific NEPA, where it is possible to assess any project-specific compensatory mitigation that is offered voluntarily or as part of a state approach, including avoidance, minimization, and rectification measures applicable to the specific project and site. The BLM is committed to working with the project proponents and States to ensure that those actions are reasonable, effective, and implemented according to best management practices, to the extent that federal law allows.

Summary: Various commenters argued that the "net conservation gain" standard should be retained, modified, or eliminated. Many commenters requested clarification of the BLM's authority to impose compensatory mitigation.

Response: Following extensive review of FLPMA, including existing regulations, orders, policies, and guidance, the BLM concluded that FLPMA does not explicitly mandate or authorize the BLM to require public land users to implement compensatory mitigation as a condition of obtaining authorization for the use of the public lands (Instruction Memorandum No. 2018-093, Compensatory Mitigation, July 24, 2018). Under FLPMA, the BLM has an obligation to ensure that its actions do not result in "unnecessary or undue degradation." Preventing unnecessary or undue degradation does not mean preventing all adverse impacts upon the land. The negative inference of the words "unnecessary" and "undue" is that a certain level of impairment may be necessary and due under a multiple use mandate. See Theodore Roosevelt Conservation Partnership v. Salazar, 661 F.3d 66, 78 (D.C. Cir. 2011) ("FLPMA prohibits only unnecessary or undue degradation, not all degradation.") (emphasis in the original); see also BLM, Instructional Memorandum No. 92-67 (Dec. 3, 1991) ("'Unnecessary and undue degradation' implies that there is also necessary and due degradation. For example, if there is only one route of access possible for development of an existing oil and gas lease, and that route presents the likelihood of some degradation of public lands or resources, such degradation may be considered necessary for the management of the oil and gas resource. . . . As another example, the RMP/EIS or site-specific environmental document may identify mitigation which would result in excessive expenditures of money or unusual technological requirements to achieve compliance. Otherwise there would be some degree of degradation of public lands or resources. If the mitigation would render the proposed operation uneconomic or technologically infeasible so that a prudent operator would not proceed, such degradation may also be considered necessary for the management of the oil and gas resource.") (emphasis in the original). Accordingly, FLPMA does not require and implicitly counsels against a net-gain standard, which would be inconsistent with the negative inference of the phrase "unnecessary or undue degradation." Even if the BLM has authority to use compensatory mitigation, the BLM has – consistent with its multiple-use mission – determined that exercise of that authority to meet a net conservation gain mitigation standard is unwarranted. Moreover, as described in the FEIS, the goal of the RMP amendments to– improve the condition of sage grouse habitat – remains as a planning-level objective for sage grouse conservation.. As a practical matter, it is too speculative to analyze the impacts of the shift back to a "no net loss" standard from a "net-gain" standard at the programmatic level. First, the BLM continues to identify ways to avoid, minimize, and rectify the impact of specific projects at the project-specific level. Second, it is impossible to predict the amount of compensatory mitigation that might voluntarily occur in the future and the environmental consequences of that compensatory mitigation. Therefore, analysis of the environmental impact of compensatory mitigation (or lack thereof) is more appropriate for future project-specific NEPA, where it is possible to assess any project-specific compensatory mitigation that is offered voluntarily or as part of a state approach, including avoidance, minimization, and rectification measures applicable to the specific project and site. The BLM is committed to working with the project proponents and States to ensure that those actions are reasonable, effective, and implemented according to best management practices, to the extent that federal law allows.

Summary: Various commenters argued that recent changes in mitigation policy and the applicability to sage-grouse warrant additional analysis, public review, or an SEIS.

Response: The BLM has prepared this SEIS with the explicit intention of providing commenters and the public at large with an additional opportunity to review and analyze the BLM's approach to mitigation policy. To wit, the BLM received approximately 70 discreet public comments referencing the BLM's approach to mitigation and the applicability to Greater Sage-Grouse. These comments build upon and supplement public input on the 2018 DEISs, which requested comment on implementing mitigation, "including alternative approaches to requiring compensatory mitigation in BLM land use plans.". The 2018 FEISs clarified how voluntary compensatory mitigation should be considered in the management of Greater Sage-Grouse habitat and how BLM will work with each state management agency to implement its compensatory mitigation strategy. This clarification aligned the 2019 ARMPAs with BLM policy and with the scope of compensatory mitigation authority expressly provided by FLPMA. Further, in many cases, the public will have additional opportunity to comment on specific mitigation approaches at the project-specific level.

Summary: Many commenters stated the BLM should clarify how it will implement compensatory mitigation.

Response: The BLM entered into agreements with the States of Colorado, Idaho, Nevada, Oregon, Utah, and Wyoming to clarify how BLM, project proponents, and state management agencies will collaborate to implement a state's compensatory mitigation plan. The BLM will defer to a state methodology for habitat quantification if such a tool exists and incorporate the state's assessment into the appropriate NEPA documentation. The Proposed Plan Amendment clarified that the BLM will consider compensatory mitigation only as a component of compliance with a state mitigation plan, program, or authority, or when offered voluntarily by a project proponent. The Proposed Plan Amendment further clarified the application of the mitigation standard as a planning-level goal and objective for Greater Sage-Grouse habitat conservation. BLM commits to cooperating with the states to analyze applicant-proffered or state-imposed compensatory mitigation to offset residual impacts. BLM may then authorize such actions consistent with NEPA analysis and the governing land use plan.

Summary: The BLM should work with the states to recommend compensatory mitigation actions.

Response: The BLM follows the memoranda of understanding with the states regarding compensatory mitigation which, as clarified in the 2019 plans, generally states that the states are to recommend compensatory mitigation actions and the BLM is to analyze them in the appropriate NEPA document. Although the states recommend compensatory mitigation, there is close coordination between the BLM and the state wildlife agencies when discussing site conditions and the mitigation hierarchy.

Summary: To be effective, mitigation should be required by the BLM and not left to the states.

Response: Following extensive review of FLPMA, including existing regulations, orders, policies, and guidance, the BLM has concluded that FLPMA does not explicitly mandate or authorize the BLM to require public land users to implement compensatory mitigation as a condition of obtaining authorization for the use of the public lands (Instruction Memorandum No. 2018-093, *Compensatory Mitigation*, July 24, 2018). However, the BLM is committed to applying and enforcing the mitigation hierarchy of actions to avoid, minimize, and otherwise mitigate impacts to the extent that federal law allows. A principal component of Greater Sage-Grouse management is the implementation of mitigation actions to ameliorate the threats and impacts to Greater Sage-Grouse and its habitats. The 2019 Proposed Plans clarified how voluntary compensatory mitigation should be considered in the management of Greater Sage-Grouse habitat and how BLM will work with each state management agency to implement its compensatory mitigation strategy. Additionally, compensatory mitigation was one of many tools used in the 2015 plans to balance uses of public land. However, the mechanism for implementing compensatory mitigation has changed since the 2015 plans as the BLM clarified its mitigation policy. Furthermore, since the 2015 plans were implemented, many states have established their own compensatory mitigation programs and increased their own investment in restoring and improving Greater Sage-Grouse habitat. The BLM sought comment on compensatory mitigation again as part of this SEIS.

M.1.20 Modifying Waivers, Exceptions, and Modifications of Fluid Minerals

Summary: The uncertainty with how waivers, exceptions, and modifications will be used introduces uncertainty to protections that are not fully analyzed. Criteria for the use of waivers, exceptions, and modifications should be more narrowly prescribed.

Response: Under the 2019 ARMPAs, waivers, exemptions, and modifications would be granted only when meeting specific criteria designed to advance the management goals and objectives in the RMPs. BLM's Approved Plan Amendment balanced the risk of uncertainty against the benefits of management flexibility when considering whether to grant a waiver, exception, or modification. Planning criteria identified for that amendment include consideration of how planning decisions may impact future listing determinations under the Endangered Species Act.

Summary: BLM should monitor the use of waivers, exceptions, and modifications.

Response: Some BLM State Offices, through the fluid minerals program, track waivers, exceptions, and modifications. The BLM is currently reviewing whether and how to apply these practices at the national level. It should be noted that waivers, exceptions, and modifications would only be authorized upon meeting the criteria in the Approved Plans, which demonstrate that Greater Sage-Grouse and its habitat would not be adversely impacted.

M.1.21 Prioritization of Mineral Leasing

Summary: The BLM does not address the elimination of prioritizing project-level development outside PHMA, which is required under the 2015 ARMPAs but eliminated under the 2018/2020 EISs.

Response: The BLM has implemented the plans in conformance with its regulations and policies. IM 2018-026 explicitly states that "BLM does not need to lease and develop outside of Greater Sage-Grouse habitat management areas before considering any leasing and development within Greater Sage-Grouse habitat." Prioritization of oil and gas leasing outside of PHMA and GHMA is included as an objective in the 2015 plans, not an allocation. The 2018 plan continues restrictive stipulations in PHMA and may serve to encourage leasing and development outside of PHMAs but does not represent a prohibition on doing so and is consistent with IM 2018-026. The BLM will continue to work with states in determining appropriate prioritization of leasing outside of PHMA.

M.1.22 Greater Sage-Grouse

Summary: Regulatory changes and regulatory uncertainty increase the likelihood of listing of the species under the Endangered Species Act. The impacts analysis is deficient. Protections afforded by the plans are not sufficient to prevent listing of the species.

Response: The BLM's 2018 proposed plans balance the risk of uncertainty against the benefits of management flexibility and alignment when considering changes to the 2015 plans. Planning criteria identified for the 2019 amendments include consideration of how planning decisions may impact future listing determinations under the Endangered Species Act.

Summary: The FSEIS needs to evaluate current population status and trends and disclose how the various alternatives would impact future population trends, which directly affect the risk that Greater Sage-Grouse may face "potential listing" under the Endangered Species Act.

Response: Population declines are tracked in the land use plan through the adaptive management strategy. The trigger sensitivity accounts for the cyclical nature of Greater Sage-Grouse population levels. The SEISs address population declines through the disclosure of tripped triggers in Chapter 3 of each state's SEIS. The BLM acknowledges that states have management responsibility for managing Greater Sage-Grouse populations. In managing Greater Sage-Grouse, the BLM works closely with the states to determine population trends, and coordinates with other federal agencies such as USGS, USFWS, and NRCS on interpreting scientific information related to the species. There is a fresh look each year when the BLM receives the annual population data from the states, which, taken with the habitat data collected annually by the BLM, informs any adaptive management needed. If the data indicate that a trigger is tripped, the BLM works with state and local partners to determine the causal factors and propose management changes.

In areas where triggers have been tripped, as disclosed in Chapter 3 of each state's SEIS, adaptive management has been implemented to prevent new disturbance that would impact Greater Sage-Grouse habitat on BLM-administered lands. The adaptive management framework was set up so that the BLM could respond to population and habitat dynamics without a plan amendment.

Because part of the purpose for the 2015 plans was to provide for regulatory certainty with respect to Greater Sage-Grouse management and prevent the listing of the species, analysis of the alternatives considered in 2015 inherently included a risk assessment regarding the potential for listing. One of the alternatives considered in each of the plans in 2015 was the state management plans. In the 2019 planning process, the BLM again evaluated the state management plans as the management alignment alternatives and agreed-upon changes as the proposed plan amendments. Many factors outside of the BLM's authority contribute to population fluctuations; therefore, BLM management cannot be directly linked to predicting future population trends.

Additionally, while planning criteria identified for the 2019 amendments included consideration of how planning decisions may impact future listing determinations under the Endangered Species Act, it is not within the BLM's authority to determine whether certain actions would be sufficient to avoid listing. NEPA does not require the BLM to disclose whether the proposed changes provide regulatory certainty to support a determination that is within the jurisdiction of the USFWS. The BLM has disclosed the impacts of the changes in management regarding mitigation.

M.1.23 Non-Greater Sage-Grouse

Summary: There is a lack of information in the DSEIS regarding the environmental baseline and information needs to be updated.

Response: The BLM acknowledged that there have been changes to the landscape since 2015; however, due to the scale of the analysis in the 2019 planning process, data collected consistently across the range indicate that the extent of these changes to the landscape are relatively minimal. For example, BLM monitoring data collected and analyzed annually at the BSU scale, as outlined in the Greater Sage-Grouse Monitoring Framework, indicate that there has been a minimal overall increase in estimated disturbance within PHMA. Moreover, there has been an overall minimal decrease in sagebrush availability in PHMA within BSUs. Based on available information, including the USGS reports, the BLM concluded that the existing condition was not substantially different from that which existed in 2015; therefore, the data and information presented in the 2015 FEISs were incorporated by reference into the 2018 RMPAs/EISs. Where notable changes to the baseline condition changed, a discussion was included.

M.1.24 Fluid Minerals

Summary: The BLM does not disclose acreage of oil and gas leasing activities rangewide and must correct this.

Response: Existing oil and gas leases form the affected environment. To the extent detail is needed to support analysis, information has been disclosed through the 2015 and 2019 planning processes. The BLM continues to offer oil and gas leases in conformance with the Greater Sage-Grouse management plans.

M.1.25 Fire and Fuels

Summary: Many commenters requested use of managed livestock grazing as a means of reducing fuel loads and affirmed that restricting grazing will increase vegetative fuel loads and increase wildfires.

Response: Restricting livestock grazing (specific to identifying areas as unavailable to livestock grazing) is not analyzed or incorporated in the RMPA. In addition, use of managed livestock grazing as a means of reducing fuel loads (targeted grazing) is a tool that BLM can implement and would not be prevented based on the provisions in any of the alternatives analyzed in this planning effort.

Summary: The BLM needs to address the threat of invasive plant species as well as sagebrush and other shrub encroachment in fire management considerations. Outcome-based grazing practices could be a tool to control these species.

Response: Management prescriptions associated with reducing invasive species were analyzed and discussed in the 2015 FEIS and were incorporated by reference in the 2018 EIS. Outcome-based grazing is a tool that can be implemented where appropriate and is authorized through 43 CFR 4120.2 of the livestock grazing regulations during permit renewal.

M.1.26 Vegetation

Summary: The BLM did not disclose the effectiveness of treatments in recent years for Greater Sage-Grouse habitat enhancement.

Response: A NEPA analysis of BLM-proposed vegetation treatments is performed at the local level, and post-treatment monitoring is conducted at that level. Treatments are expected to be successful when fully implemented as described in the project NEPA. No national repository of effectiveness of treatments exists. Projects are designed at the field level based on current conditions, past success, recent literature, and the purpose and need for the proposal.

Summary: Commenters caution that juniper-removal projects in Greater Sage-Grouse habitat may result in expansion of cheatgrass. Activities should be limited that cause soil disturbance (grazing, drilling, etc.) in order to prevent the spread of invasive species.

Response: The 2015 plans include RFDs to prevent the spread of invasive species. It is also common practice to implement such measures during project design and implementation.

M.1.27 Guidance and Policy

Summary: As cooperating agencies, the Counties should be involved throughout the NEPA process, including the preparation of this SEIS. BLM should thoroughly consider these plans and alternatives and coordinate with the Counties on the final land use plans.

Response: The BLM values its coordination with local jurisdictions as it does other federal and state agencies. The BLM relied on the special expertise of these entities as cooperating agencies during the 2015 and 2019 planning processes. The SEISs were undertaken solely to respond to the preliminary injunction order. No new decisions are required to be made. Instead, BLM clarified and updated its existing NEPA analysis, highlighting the issues raised in Judge Winmill's order. Although many agencies have special expertise related to Greater Sage-Grouse management, such expertise was not necessary to comply with the purpose and need for these SEISs.

M.1.28 Statutes and Regulations

Summary: The BLM inappropriately tiered to a document of equal scope. The BLM failed to summarize and relate applicability of material incorporated by reference to the new plans.

Response: BLM is using incorporation by reference to streamline its analysis consistent with administrative priorities. Incorporation of the 2015 EIS by reference is allowable under BLM regulations and is appropriate in this circumstance because the purpose of this action builds upon the goals and objectives of the 2015 EIS. Further, the CEQ 40 Questions, Question 24c, states that, "Tiering is a procedure which allows an agency to avoid duplication of paperwork through the incorporation by reference of the general discussions and relevant specific discussions from an environmental impact statement of broader scope into one of lesser scope or vice versa." The BLM summarized and referenced applicable aspects of the 2015 EIS throughout the 2018 EIS, but especially in Chapters 2 and 4.

Summary: The BLM has failed to consult with USFWS about the impacts of the proposed plan.

Response: The BLM coordinated with USFWS in 2018 regarding the changes in the Proposed Plan Amendments to determine if there would be different effects from those referenced in the Biological Opinions. All states received concurrence letters from USFWS that, while the 2019 plans constituted a change to the 2015 plans, the effects described in the 2019 plans were consistent with those analyzed during 2015 consultation efforts and did not consider re-initiation of Endangered Species Act Section 7 consultation necessary. Because no new decisions are being considered in the SEISs, consultation as part of this effort is not necessary.

M.2 NEVADA/NORTHEASTERN CALIFORNIA-SPECIFIC SUMMARY OF PUBLIC COMMENTS AND RESPONSES

M.2.1 Issues Dismissed from Detailed Analysis

Summary: One commenter expressed concern about dismissing the issue of predators from detailed analysis in the DSEIS.

Response: Predation was analyzed in 2015. There were no changes being considered in the 2019 planning process that had a bearing on the impacts of predation; therefore it was not considered. The conclusions from the 2015 FEIS stand.

Summary: Commenters asserted that the habitat condition assessment should be carried forward in the FSEIS given the requirement to use the State of Nevada's Habitat Quantification Tool.

Response: The BLM entered into agreements with the States of Nevada to clarify how the BLM, project proponents, and state management agencies will collaborate to implement a State's compensatory mitigation plan. The BLM will defer to a state methodology for habitat quantification and incorporate the state's assessment into the appropriate NEPA documentation. The Proposed Plan Amendment clarified that BLM will consider compensatory mitigation only as a component of compliance with a state mitigation plan, program, or authority, or when offered voluntarily by a project proponent. The Proposed Plan further clarified the application of the mitigation standard as a planning-level goal and objective for Greater Sage-Grouse habitat conservation. The BLM commits to cooperating with the State to analyze applicant-proffered or state-imposed compensatory mitigation to offset residual impacts. The BLM may then authorize such actions consistent with NEPA analysis and the governing Resource Management Plan.

M.2.2 Habitat Boundary and Habitat Management Area Designations

Summary: Commenters recommended that the FSEIS should discuss how the proposed changes to habitat management areas and boundaries would affect Greater Sage-Grouse and other resources, and how negative effects would be mitigated or how the boundaries would be adjusted in response to these effects.

Response: The habitat management area boundaries were adjusted in the 2019 ARMPA based on updated vegetation and telemetry data which reflects where Greater Sage-Grouse are and the habitats they use. The areas that fall outside of the boundaries in the 2019 ARMPA were not habitat for Greater Sage-Grouse. Therefore, there is no impact on Greater Sage-Grouse from updating the maps based on best available data.

M.2.3 Habitat Objectives

Summary: Commenters felt that the BLM should adjust habitat objectives related to conifer encroachment based on the best available science, and the FSEIS should recognize that conifer encroachment is a higher threat to Greater Sage-Grouse habitat than previously recognized.

Response: Habitat objectives were reviewed with the Governor's offices and updated to align with the State's plans. Habitat Objectives in Table 2-2 were not revised or updated in the 2019 plan or the

DSEIS. Habitat Objectives in the 2015 plan were developed using best available science, and new literature does not indicate a need to change them.

Summary: Commenters called for the FSEIS to include specific, measurable objectives that are enforced in all Greater Sage-Grouse habitats, so that habitat conditions can be improved.

Response: Habitat Objectives in Table 2-2 were not revised or updated in the 2019 plan or the DSEIS. The Habitat Objectives are outlined in Table 2-2 of the 2015 Final EIS.

M.2.4 Adaptive Management

Summary: Commenters asserted that the FSEIS should provide information on exceeded triggers after 2015, and it should discuss the causal factors, how the BLM is implementing its adaptive management strategy, and what steps are being taken to respond to these effects. Commenters recommended that the FSEIS needs to further disclose the difference in the adaptive management plans adopted in 2015 and 2019.

Response: The 2015 Nevada and Northeastern California Sub-regional ARMPA incorporated an adaptive management strategy that included population triggers for leks, lek clusters, and biologically significant units across the sub-regional planning area. Calculating the 2015 adaptive management population triggers required the use of a hierarchical population model that was created by USGS in partnership with the BLM, USFWS, Nevada Department of Wildlife, and the California Department of Fish and Wildlife. Shortly after the signing of the ROD approving the 2015 ARMPA, USGS restructured the model with best available information, which in turn modified the numeric triggers contained in the 2015 ARMPA (see *Centrocercus urophasianus) in Nevada and California—Identifying populations for management at the appropriate spatial scale: U.S. Geological Survey Open-File Report 2017-1089*, https://doi.org/10.3133/ofr20171089)). Therefore, as part of the 2019 plan amendment process, the BLM analyzed and adopted the updated numeric population triggers and the updated USGS model to calculate these triggers on an annual basis.

Given the 2019 preliminary injunction, BLM Nevada and California are unable to implement the 2019 Adaptive Management Strategy. However, the state of Nevada has adopted the same strategy as part of their State's Greater Sage-Grouse Conservation Plan and is moving forward with implementing the strategy in cooperation with BLM Nevada and California, NDOW, local working groups and other partners. The latest run of the model results identified population triggers have been tripped in the Nevada and Northeastern Sub-region[3].

See Chapter 3 of the DSEIS for a discussion of areas where thresholds have been exceeded. The FSEIS will disclose the triggers tripped since 2015. BLM California and Nevada are currently working with the State of Nevada on responses to the triggers that have been tripped. The State of Nevada is finalizing the responses and currently has a draft document completed and available on their website. A final report is due out later this year.

[3]The 2019 Nevada Conservation Credit System Adaptive Management Annual Report is available here: http://sagebrusheco.nv.gov/uploadedFiles/sagebrusheconvgov/content/Adaptive_Management/2019/2019%20Adaptive%20Management%20Introductory%20Material.pdf
For more information on Nevada's conservation credit system, see: http://sagebrusheco.nv.gov/Adaptive_Management/2019/2019/

The 2019 plan, and this SEIS, details the changes in the Adaptive Management strategy (page 2-17 of the DSEIS), and the effects of those changes, from the 2015 plan (Chapter 4).

Summary: The Draft EIS lacks a list of specific actions BLM would take when hard triggers are reached. The EIS should contain metrics by which conservation success can be measured.

Response: The No Action Alternative's adaptive management strategy included a list of hard trigger responses in the form of new land use plan allocation decisions, found in Table J-1 and J-2 of the 2015 ARMPA. The 2018 Management Alignment Alternative and Proposed Plan Amendment would replace these immediate hard trigger responses with a collaborative process (which would include federal, state, and local agencies) to identify population triggers and habitat warnings, identify causal factors, recommend appropriate management responses, and monitor those responses to see if they are effective in responding to the causal factors associated with the population or habitat decline.

Additionally, the purpose and need for the SEISs is solely to address the preliminary injunction order by the US District Court, which preliminarily found that the EISs likely needed to be supplemented to address the range of alternatives, a hard look at environmental impacts, cumulative effects analysis, and the BLM's approach to compensatory mitigation.

Summary: The No Action Alternative is inexplicit regarding removing "triggered" allocation decisions and the preferred alternative does not contain a strong threshold to gauge success of Greater Sage-Grouse in the area.

Response: Appendix F (Adaptive Management Strategy) as presented in the Management Alignment Alternative in the Draft EIS and as presented in the Proposed Plan Amendment includes a section titled "*Longevity of Trigger Responses (Removing the Trigger Response)*," which outlines a collaborative process (which would include federal, state, and local agencies) to evaluate when it is appropriate to remove a trigger response. Within the Management Alignment Alternative and Proposed Plan Amendment, the use of immediate "land use plan allocation" responses to a hard trigger would be removed.

M.2.5 Mitigation

Summary: Commenters felt that the BLM should use Nevada's Conservation Credit System (CCS) as a methodology for developing mitigation options and if it does not, then the BLM should clarify how this RMPA aligns with the State Plan.

Response: The BLM entered into agreements with the States of Colorado, Idaho, Nevada, Oregon, Utah and Wyoming to clarify how BLM, project proponents, and state management agencies will collaborate to implement a State's compensatory mitigation plan. The BLM will defer to a state methodology for habitat quantification if such a tool exists and incorporate the state's assessment into the appropriate NEPA documentation. The 2018 Proposed Plan Amendment clarified that BLM will consider compensatory mitigation only as a component of compliance with a state mitigation plan, program, or authority, or when offered voluntarily by a project proponent. The 2018 Proposed Plan further clarified the application of the mitigation standard as a planning-level goal and objective for Greater Sage-Grouse habitat conservation. The BLM commits to cooperating with the State to analyze applicant-proffered or state-imposed compensatory mitigation to offset residual impacts. BLM may then authorize such actions consistent with NEPA analysis and the governing Resource Management Plan.

The BLM Nevada follows the Approved Regulation of the Sagebrush Ecosystem Council (LCB File No. R024-19, October 30, 2019; Authority: §§1-19, NRS 232.162):

> *A REGULATION relating to the greater sage-grouse; setting forth certain requirements related to the maintenance of sagebrush ecosystems and the conservation of the greater sage-grouse; and providing other matters properly relating thereto.*
>
> *Legislative Counsel's Digest:*
>
> *Existing law creates the Sagebrush Ecosystem Council within the State Department of Conservation and Natural Resources and requires the Council to establish a program to mitigate damage to sagebrush ecosystems in this State by authorizing a system that awards credits to persons, federal and state agencies, local governments and nonprofit organizations to protect, enhance or restore sagebrush ecosystems. (NRS 232.162) On December 7, 2018, Governor Sandoval issued Executive Order 2018-32 which requires the Council to adopt regulations requiring compliance with the credit system.*

For anthropogenic disturbances (as identified in the Greater Sage-Grouse LUPA) in Greater Sage-Grouse habitat, proponents are required to enter into an agreement with the State of Nevada for compensatory mitigation.

Summary: Commenters recommended that the BLM should more clearly define mitigation in the FSEIS, including the differences between compensatory and voluntary mitigation. In addition, commenters asserted that the FSEIS should analyze the effects of voluntary mitigation on Greater Sage-Grouse.

Response: The BLM entered into agreements with the States of Colorado, Idaho, Nevada, Oregon, Utah and Wyoming to clarify how BLM, project proponents, and state management agencies will collaborate to implement a State's compensatory mitigation plan. The BLM will defer to a state methodology for habitat quantification if such a tool exists and incorporate the state's assessment into the appropriate NEPA documentation. The 2018 Proposed Plan Amendment clarified that BLM will consider compensatory mitigation only as a component of compliance with a state mitigation plan, program, or authority, or when offered voluntarily by a project proponent. The 2018 Proposed Plan further clarified the application of the mitigation standard as a planning-level goal and objective for Greater Sage-Grouse habitat conservation. The BLM commits to cooperating with the State to analyze applicant-proffered or state-imposed compensatory mitigation to offset residual impacts. The BLM may then authorize such actions consistent with NEPA analysis and the governing Resource Management Plan. In the 2018 FEIS and the DSEIS, the BLM analyzed the effects of the mitigation standard, which is equal to net conservation gain in Nevada. Compensation is one tier of the mitigation hierarchy that could be used to reduce a proposals' residual effects. Other mitigation tiers are reduce, avoid, and minimize.

M.2.6 Lek Buffers

Summary: Commenters recommended that the BLM should revised the language in the Lek Buffers section to state that the BLM will utilize general lek buffer distances and guidance identified in the USGS Open File Report 20141239 to establish the evaluation area around leks used to identify impacts.

Response: The BLM clarified in Appendix B of the 2018 Final EISs that the BLM, "through project specific NEPA analysis, will assess and address impacts from the following activities using the lower end of the interpreted range of lek buffer-distances and guidance identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239)."

Summary: Commenters asserted that the BLM did not fully analyze lek buffers in the DSEIS or provide them for public review. Commenters recommended that the BLM should discuss the effects of using the lower end of lek buffer distances identified in the USTS Open File Report 20141239.

Response: The analysis contained in the 2015 Final EIS (Section 4.4 through Section 4.21), which was incorporated by reference in the 2018 Draft and Final EISs and DSEIS, included analysis that was appropriate at a land use planning level, considering the impacts to Greater Sage-Grouse and various programs and resources from the implementation of entire alternatives, not solely on individual management prescriptions contained within them. The lek buffer appendix (Appendix B) through clarification (plan maintenance) has been slightly modified to clarify that lek buffer distances are not to be "applied" as a land use plan allocation, but rather used as a tool to assess and address impacts at the project specific NEPA level.

M.2.7 New Alternative

Summary: Commenters requested a new alternative that fully adopts the State of Nevada Greater Sage-Grouse Conservation Plan (newly amended).

Response: The 2019 planning effort sought ultimate alignment with the Nevada Greater Sage-Grouse Conservation Plan where the BLM has the authority to implement measures in that plan. As such, this alternative was considered in the 2019 planning effort to the extent that the BLM has management authority.

Summary: Commenters requested that the BLM include a new alternative that closes all PHMA and GHMA to grazing, mining, and new roads.

Response: In the 2018 Final EISs, the BLM analyzed the Management Alignment Alternative and the Proposed Plan Amendment to respond to the 2018 purpose and need, thus expanding the full range of alternatives considered for Greater Sage-Grouse management to include those analyzed in the 2015 plans and the additional alternatives considered in 2018. This is described in detail in Section 2.1 of the DSEIS.

M.2.8 Range of Alternatives

Summary: Commenters pointed out that the BLM has not added new analysis to the DSEIS to demonstrate how the No Action alternative is now a reasonable alternative and how it comports with the purpose and need of the 2019 RMPA.

Response: The No Action alternative in the 2019 planning process was analyzed because it was the Approved Plan Amendment from the 2015 planning process. The BLM is required to analyze this alternative analyzed per CEQ NEPA regulations. The DSEIS includes all of the alternatives analyzed between the 2015 and 2019 planning processes. The No Action alternative does not need to meet the purpose and need as it forms a baseline for reference.

Summary: Commenters pointed out that seasonal timing restrictions and the allocation exception process under the No Action alternative do not provide exceptions for emergency actions and human health and safety.

Response: Standard exceptions, waivers, and modifications in Onshore Order 1 would include provisions for emergency and human health and safety. In addition, the 2019 planning process did analyze and incorporate an exception to allocations and seasonal timing restrictions that addresses human health and safety under MD SSS 5 (iii): "The proposed activity will be authorized to address public health and safety concerns, specifically as they relate to federal, state, local government and national priorities." In regard to seasonal timing restrictions, the 2019 ARMPA under MD SSS 3D included the following exception: "The seasonal dates could be modified or waived (in coordination with NDOW and/or CDFW) based on site-specific information that indicates . . . (ii) modifications are needed to address an immediate public health and safety concern in a timely manner (e.g., maintaining a road impacted by flooding)."

M.2.9 Greater Sage-Grouse

Summary: Commenters asserted that the BLM should clearly differentiate range-wide and Nevada and Northeastern California statistics related to Greater Sage-Grouse habitat investments and treatment acreages throughout the document, including the title page.

Response: Range-wide and specific information for NV and CA are discussed in the Executive summary of the DSEIS and Appendix H.

M.2.10 Livestock Grazing

Summary: Commenters recommended that the BLM should further describe how the 2015 analysis for livestock grazing remains accurate for the FSEIS.

Response: The analysis of impacts on livestock grazing is not substantially different from the impacts described for the alternatives in the 2015 Final EIS. Actions considered in the 2019 planning process would not have a measurably different outcome from those described. Therefore, no new analysis is needed in the FSEIS.

Summary: Commenters asserted that in the FSEIS, the BLM should consider planning direction in the 2009 Elko County Lands Policy Plan and the 2020 Idaho and Utah SEISs for livestock grazing, and should ensure that planning is in conformance with 43 CFR Part 4100, Subpart 4180.

Response: The Idaho and Utah SEISs are part of the cumulative analysis for overlapping WAFWA zones. This plan does not change any regulatory requirements pertaining to 43 CFR Part 4100, Subpart 4180. The BLM considered the 2009 Elko County Lands Policy Plan during the 2015 and 2019 planning processes as described in those Final EISs.

M.2.11 Travel and Transportation Management

Summary: Commenters noted that travel management restrictions cannot interfere with ingress and egress rights for the purpose of exploring for or developing minerals.

Response: The alternatives analyzed within the DSEIS do not include proposed management that would interfere with ingress and egress rights for the purpose of exploring for or developing minerals subject to the Mining Law, as all management actions proposed in the alternatives would be subject to valid existing rights, including those associated with the 1872 Mining Law.

M.3 Rangewide Comment Excerpts

M.3.1 Range-wide

State-level approaches to managing sage-grouse differ substantially across the range of the species. While some of these programs have been evaluated for effectiveness at statewide or smaller scales, other state plans are untested. Further, the potential collective effectiveness of these programs has not been examined, and the BLM provides no assessment of broad-scale applicability of these programs to meet the management goals the agency has established for itself. It is critical that the BLM evaluates the local programs it relies on and aligns only with programs that rigorously demonstrate that the conservation efforts collectively have a high probability of maintaining the long-term viability of sage-grouse populations across the range of the species.

M.3.2 Purpose and Need

There is no need to undertake the massive effort and expense of a totally new planning process. We urge the BLM to complete the 2020 DSEISs and issue a new record of decision based on the 2015 and 2019 NEPA analyses, as supplemented, rather than initiate a new land use planning process to consider new alternatives or information.

M.3.3 Issues

The 2019 plan amendments fail to provide adequate protections for sage grouse habitats from mineral development, livestock grazing, renewable energy development, range improvement structures, recreational facilities (including motorized trails), transmission lines, and other permitted activities, and also fail to consider reasonable alternatives to add science-based protections to avoid or minimize these impacts

BLM has failed to take a hard look at noise impacts to sage-grouse, and the resulting noise restrictions are scientifically invalid. We raised this issue in earlier comments and protests on all the plans (see Appendices B-K) and provided the relevant science supporting our claims. The DSEISs persist in allowing noise levels that will be harmful to sage-grouse.

BLM made no effort at all to analyze the impacts of noise on sage-grouse in PHMA in the FEISs; it makes the same mistake in the DSEISs. See Idaho DSEIS at 4-30; Wyoming DSEIS at 4-98. There is no analysis of the impacts of allowing limitless noise during the breeding and nesting seasons. There is no analysis of the impact of disturbing and stressing sage-grouse using habitats that surround leks, or of the magnitude of impact of displacement, reduction of nest success or brood success, and potentially lek abandonment that would result from daytime noise authorized within PHMA, IHMA, and GHMA. There is also no analysis on the effects of allowing noise greater than 25 dBA by failing to set baseline levels at natural ambient noise levels that have been empirically established. Indeed, if there is already human-caused noise at a lek site, and this noise level becomes the new ambient baseline (which is permitted under the wording of the DSEIS), then noise levels could be authorized to steadily creep upward until surrounding habitats and leks are abandoned by grouse. But the DSEISs do not disclose this, because the DSEISs do not make a good-faith effort to take a hard look at the impacts of noise, and instead perpetuates the problems of the FEISs..

M.3.4 Range of Alternatives

The document only analyizes 2 alternatives -- a no-action alternative and the Management Allignment Alternative. This is an inadequate range of alternatives, particularly as one of them is "Do-nothing".

There is an inadequate range of alternatives – only 2 were actually analyzed: No Action Alternative and the Management Alignment Alternative

In the 2019 Plan Amendments, there were two alternatives, but one - the "No Action" alternative - was not actually an alternative, since the BLM concluded that it would not meet the stated purpose and need. Similarly, while BLM purported to incorporate its evaluation of alternatives from the 2015 Sage-grouse Plans, those alternatives also did not meet its purpose and need for the 2019 Amendments. The court found: "Common sense and this record demonstrate that mid- range alternatives were available that would contain more protections for sage grouse than this single proposal." WWP v. Schneider, 417 F.Supp.3d at 1332. The court found that BLM must consider reasonable alternatives, including mid-range alternatives that would contain more protections for sage grouse than the "Management Alignment Alternative." Id. Nonetheless, in the Draft Supplemental EISs, BLM declines to consider any new alternatives and continues its commitment to the only action alternative in the 2019 Amendments. With respect to other alternatives, BLM states that "all of the previously analyzed alternatives, including one proposing constraints stricter than the current management plan, were predicted to result in a loss of development opportunities on public lands," which is in conflict with the goals and purpose of SO 3353 to "promote habitat conservation, while contributing to economic growth and energy independence." Oregon Draft SEIS, p. 2-3. Clearly, BLM is not evaluating the alternatives from the 2015 Sage-grouse Plans or any other alternatives. Rather, the agency is just re-explaining an approach that the court has already rejected. The range of alternatives is "the heart of the environmental impact statement." 40 C.F.R. § 1502.14. NEPA requires BLM to "rigorously explore and objectively evaluate" a range of alternatives to proposed federal actions, including considering more environmentally protective alternatives and mitigation measures. See 40 C.F.R. §§ 1502.14(a) and 1508.25(c); see also, Kootenai Tribe of Idaho v. Veneman, 313 F.3d 1094,1122-1123 (9th Cir. 2002) (and cases cited therein)

In this new DSEIS, the BLM has added nearly 300 pages of analyses of alternatives. However, these alternatives were considered in the 2015 LUPA process and decision, and not considered as alternatives in the 2019 RMPA process or in this DSEIS process. It is unclear how including these alternatives will cure the likely NEPA violation described in the Preliminary Injunction. "The stated goals of a project necessarily dictate the range of 'reasonable' alternatives. Id. An agency need not consider alternatives that are 'unlikely to be implemented or those inconsistent with its basic policy objectives.' Id" 13 Presumably this set of alternatives, like the No Action Alternative would not comport with the purpose and need of the 2019 RMPA because the 2019 RMPA purpose and need comports with new science and new policy implemented after the 2015 effort.

The DSEISs defend the failure to consider a range of alternatives in the 2018 FEIS by citing back to the 2015 plans' range of alternatives. See, e.g., Idaho DSEIS at ES-4; NV/CA DSEIS at 2-1 to 2-3. But the DSEISse fail to explore the differing contexts of the 2015 and 2018 plans, including the decrease in sage-grouse populations since the 2015 plans and the 2.4 million acres of new oil and gas leases the 3,570 new drilling permits in designated sage-grouse habitat allowed between January 2017 and March 2019. The "No Action" alternative has thus changed significantly since 2015.

BLM's regulations require BLM to "develop several complete alternatives for detailed study" in land-use planning. 43 C.F.R. § 1610.4-5. BLM cannot legitimately claim that it "considered" all of the alternatives evaluated during the 2015 Plan Amendment NEPA process. BLM eliminated these from reconsideration in 2019 because they "were predicted to result in a loss of development opportunities." See e.g., ID 831-33.11. Alternatives not considered in detail cannot be used to meet the agency's obligations to "rigorously explore" alternatives. Moreover, the Ninth Circuit has flatly rejected the approach of "incorporating" previously considered but rejected alternatives. See Sierra Forest Legacy v. Rey, 577 F.3d 1015 (9th Cir. 2009); Sierra Forest Legacy v. Sherman, 646 F.3d 1161 (9th Cir. 2011).

ICA believes that when the BLM conducted their analysis for the 2019 RMP, they considered a reasonable range of alternatives. During that process, they also referenced the alternatives that were extensively analyzed in the 2015 planning process. The DSEIS accurately justifies this process and underscores that a reasonable range of alternatives were presented and adequately analyzed.

M.3.5 New Alternative

We have repeatedly proposed a number of reasonable alternatives and BLM should evaluate them and others. As part of addressing the court's ruling, BLM should consider the alternatives we have proposed, including: * An alternative that is explicitly focused on enhancing cooperation with the states while conserving, enhancing and restoring sage-grouse habitat. We submitted a proposed alternative that would accomplish these goals, set out in detail in Attachment 1 to Exhibit 2 (our overarching comments), incorporated herein by reference. * Alternatives to complete additional analysis of net conservation gain and Sagebrush Focal Areas (SFA), which the 2019 Amendments eliminated in some states. * An alternative to maintain SFAs without the previously-proposed mineral withdrawal, while considering how application can be better coordinated with the states. * An alternative to strengthen criteria and restrictions for waivers, exceptions and modifications to lease stipulations. * An alternative to strengthen the approach to prioritizing oil and gas leasing and development outside habitat.

M.3.6 Alternatives - Other

BLM claims to have incorporated by reference alternatives from the 2015 ARMPA EIS process, and to have "Fully Analyzed" these alternatives, along with others, in the DSEIS. Table 2-2, Idaho DSEIS at 2-19; Table 2-2, Wyoming DSEIS at 2-13;NV/CA DSEIS at 2-9 to 2-12 (Table 2-2a); Northwest Colorado DSEIS at 2-5 (Table 2-1). This table is immediately followed by Table 2-3, "Detailed Comparison of 2019 Alternatives," in which only a No Action Alternative, the Management Alignment Alternative, and the Proposed Plan (essentially identical to the Management Alignment alternative) are described. Idaho DSEIS at 2-23; Wyoming DSEIS at 2-28; NV/CA DSEIS at 2-16; Northwest Colorado DEIS at 2-9 (Table 2-2). The Management Alignment Alternative and Proposed Plan are so similar that BLM provides a single, common impacts analysis for both, with no differentiation between the effects of the two alternatives. See Wyoming DSEIS at 4-91. Thus, the 2019 plan amendment EIS considers basically two alternatives: a No Action alternative (which would leave the 2015 Plan Amendment, with all its weaknesses and inadequacies, unchanged), and the Management Alignment/Proposed Plan alternative, which the agency ultimately adopted and which significantly weakened sage-grouse habitat protections provided under the 2015 plan amendment. This Management Alignment alternative is designed to make federal sage-grouse protections mirror state policies

M.3.7 Data and Science

The Winmill Decision reinstates the 2015 Plans, and BLM has stated that it is accordingly implementing the 2015 Plans in the affected states.3 Consequentially, the need to address and correct the scientific flaws that originated in the 2015 Plans and carried forward to the 2019 Plans has become even more urgent.

The 2015 Plans ignored the full spectrum of on-point, more recent science currently available, and instead relied upon biased and outdated science. Namely, BLM relied on several outdated and faulty reports: the National Technical Team ("NTT") Report, the Conservation Objectives Team ("COT") Report, the Comprehensive Review of Ecology and Conservation of the Greater Sage Grouse: A Landscape Species and its Habitats ("the Monograph"), and the "Conservation Buffer Distance Estimates for Greater Sage-Grouse-A Review" (the "Buffer Report")4(collectively "the Reports."). 4 Daniel J. Manier, et al., Conservation Buffer Distance Estimates for Greater Sage-Grouse-A Review, U.S. GEOLOGICAL SURVEY OPEN-FILE REPORT 2014-1239 (2014), http://dx.doi.org/10.3133/ofr20141239.

The Reports erroneously ignore accurate population data and adopt methodologically- flawed modeling approaches that have consistently failed to accurately predict populations. This selective use of science is wholly misleading, and assumes GRSG populations are in decline despite evidence to the contrary. More specifically, the Reports ignore natural population fluctuations; single out human-driven activities for alleged declines; and, again, overlook actual threats to GRSG such as weather, predation, and hunter harvest-primary drivers of GRSG population changes (in contrast to anthropogenic disturbance) (see Blomberg et al. 20149 Guttery et al. 201310, and Ramey et al. 201811). Other factors not seriously considered were raven predation (see, e.g., Coates et al. 201612) and hunter harvest at times of the year and during life stages when GRSG are most vulnerable (see, e.g., Blomberg et al. 201513; Caudill et al. 201714). It is worthwhile to note that GRSG hunter harvest reports from the states of Colorado, Utah, Wyoming, Montana, Oregon, Nevada, and California show a take of approximately 129,095 birds between 2000 and 2018. 9 Erik J. Blomberg, et al., Carryover Effects and Climatic Conditions Influence the Postfledging Survival of Greater Sage-Grouse, 4(23) ECOLOGY & EVOLUTION, 4488-4499 (2014), https://doi.org/10.1002/ece3.1139. 10 Michael R. Guttery, et al., Effects of Landscape-Scale Environmental Variation on Greater Sage-Grouse Chick Survival, 8(6) PLoS ONE e65582 (2013), https://doi.org/10.1371/journal.pone.0065582. 11 Rob Roy Ramey II, et al., Local and population-level responses of Greater sage-grouse to oil and gas development and climatic variation in Wyoming. PeerJ 6: e5417 (2018), http://doi.org/10.7717/peerj.5417. 12 Peter S. Coates, et al., Landscape characteristics and livestock presence influence common ravens-Relevance to greater sage-grouse conservation: ECOSPHERE, v. 7, no. 2, article e01203, 20 p., https://doi.org/10.1002/ecs2.1203. 13 Erik J. Blomberg, et al., The influence of harvest timing on greater sage-grouse survival-A cautionary perspective: J. OF WILDLIFE MANAGEMENT, v. 79, no. 5, p. 695-703 (2015). 14 Danny Caudill, et al., Individual heterogeneity and effects of harvest on greater sage-grouse populations: J. OF WILDLIFE MANAGEMENT, v. 81, no. 5, p. 754-765 (2017).

the Reports themselves were premised on a faulty bias-the presumption that GRSG populations are in decline due to disturbance from various land use activities, of which oil and gas development was allegedly a primary factor. The NTT Report also failed to acknowledge lower impact technologies and mitigation that emerged and became the standard in the oil and gas industry around 2005, such as hydraulic fracturing and directional drilling. These modern technologies, along with 3-D and 4-D remote-sensing of underground hydrocarbon reservoirs and other developments, have radically minimized disturbance compared to the practices in use just a decade or more previously which were reviewed by the studies cited by the Reports.15 15 See Rob Roy Ramey II, et al., Oil and Gas Development and Greater Sage Grouse ("Centrocercus urophasianus"): A Review of Threats and Mitigation Measures, 35 (1/2) J. OF ENERGY AND DEV., 49-78 (2011)

GRSG research published since 2015 is "extensive and collectively supersedes the NTT and COT reports." See Exhibit A at 1; see also Exhibit A-1. Much of the new research has occurred thanks to improvements in: estimating seasonal habitat, modeling population trends in light of climate variables, and determining causality behind predation and disturbances. Further, new science has shown that GRGS dispersal is much more expansive than was thought prior to 2015, both in distances flown and dispersal frequency. In addition, improved means of mitigation and habitat recovery have decreased overall GRSG disturbances. In sum, the scientific understanding of GRSG populations and how various factors affect said populations has advanced far beyond the biased and limited work upon which the 2015 Plans (and, to a certain extent, the 2019 Plans) rely.

Since 2005, studies have analyzed large-scale climatic fluctuations and the resulting effects on inland species, including GRSG. Notably, research has emphasized the impacts sea surface temperature variations in the North Pacific Ocean have on GRSG populations due to the resulting climatic patterns. The PDO is one of several climate indices useful in estimating population responses. Ramey et al. 2018. In sum, GRSG populations experience cyclic fluctuations "linked to patterns of temperature and precipitation. . .which affect reproduction and survival…." Exhibit B at 1. To maintain accuracy, any land use plans must take into account large-scale climatic fluctuations and GRSG population responses.

GRSG populations fluctuate naturally due to "population density feedbacks affect[ing] population growth rate" and "inter-annual and multi-decadal variation in large-scale regional weather patterns." See Exhibit D at 1. Therefore, any research which calculates population estimates in terms of the effect of anthropogenic activities must also account for population changes resulting from these natural factors. Furthermore, changes to one GRSG lek population may affect nearby leks. Id. at 2. Ideally, population modeling should incorporate data from unrelated leks (to function as a control group) and data regarding effects from climate changes and density feedbacks. We urge BLM to consider usage of a stage-based population dynamic model. "The advantages of stage-based population dynamic models are that multiple sources of information for different life-stages and sexes including prior information from previous analysis can be readily incorporated while lags are readily accounted for thus providing tighter linkages between population drivers and lek counts." Id. This will bring sage grouse management into the contemporary realm of real-time population modeling.

Mathematical Error in Edmunds et al. 201716 Managers must be cognizant of errors scientific papers that can compromise results and interpretations, even if identified and "corrected" later. We highlight here, a paper by Edmunds et al. (2017) that found that "populations in 5 of the 8 working group[s in Wyoming] significantly declined (? < 1 with $p < 0.05$) between 1993 and 2015; and 2) that [sub]populations within working groups can follow different trends." See Exhibit E at 1. However, Edmunds et al. later published an erratum (Edmunds et al. 2018)17 finding that the mathematical calculations were incorrect, thereby invalidating their first conclusion: that the populations in 5 of the 8 working group significantly declined (? < 1 with $p < 0.05$) between 1993 and 2015. However, they authors did not state that needed change to the text of their erratum. Thus, managers could easily misinterpret the conclusions as valid, when they are not. Beyond this issue, a central failure of many past papers (including those cited by the Reports), is that they do not account for population-wide temporal oscillations (i.e., those driven by climatic variation/weather). Moreover, analyzing subpopulation-level differences in trends merely adds noise to analyses. 16 David R. Edmunds, et al., Greater sage-grouse population trends across Wyoming: WY Sage-Grouse Population Viability Analysis. J. WILDLIFE MANAGEMENT, 82(2): 397-412 (2017), http://doi.org/10.1002/jwmg.21386. 17 David R. Edmunds, et al., Erratum-Greater sage-grouse population trends across Wyoming. J. WILDLIFE MANAGEMENT, 82(8):1808 (2018).

The agency should emphasize the use of locally-collected monitoring and transparent assessment data and the continued development and integration of local data and information, peer-reviewed science (with publicly-available data), and other high quality information.

The Counties urge BLM to consider innovative new tools, such as the use of unmanned aerial vehicles with infrared sensing, and new statistical approaches to undertake more accurate population counts.

Federal population targets and triggers are inappropriate and unwarranted. First, local governments may have better information. Second, wildlife management is a state issue. To the extent population numbers are utilized, the BLM should rely upon state and local population data

It is vital that the BLM develop processes to use data from a variety of sources, including peer-reviewed journals with associated data, agency data, and local collected partner information. BLM should also rely upon locally-relevant science and data to inform implementation of management actions, data sharing, and the development of methods to gather and use local and traditional ecological knowledge. BLM must review and consider the DQA Challenges with respect to the Reports underpinning the land use plan amendments and the GRSG listing decision and revise its planning documents and decisions appropriately. The Counties strongly support peer review, transparency and reproducibility in regards to science as well as the relevance to local conditions. Had BLM recognized the flaws brought to bear in the Challenges and new science available, the Winmill Decision may have turned out differently.

Sage-Grouse populations have declined precipitously over the past three years; The Draft SEIS's do not take into account the significant declines (30-60 percent) in Sage-Grouse populations in all 7 states over the past 3 years (2016-19) California – reduced 3.86 percent/year since 1999 (60 percent total) Montana – 40 percent reduction since 2016 Oregon – the lowest population levels ever recorded; 28% loss in one year Idaho – 52 percent reduction since 2015 Nevada – one third reduction since 2016 Wyoming – 44 percent reduction since 2016 Utah – 61 percent reduction since 2015 Colorado – 5 out of 6 leks showed a 69 percent reduction since 2016

The draft EIS does not mention or take into account that all 7 states where populations were monitored from 2016 to 2019 showed significant population declines ranging from 30% to over 60% decline.

The Draft SEIS's do not take into account the significant declines (30-60 percent) in sage-grouse populations in all 7 states over the past 3 years (2016-19)

On a related note, DNR encourages the BLM to consider the most recent available data in its analyses in future versions of this supplemental review process. We note, for instance, that Section 3.3 in the 2020 DSEIS, Changes to Affected Environment Since 2015, replicates the same section from the 2018

PRMPA/FEIS, which considered 2014-2017 data in calculating the 3-year average High-Male Count (HMC) used to estimate GrSG populations. Subsequent revisions to this EIS should examine data from the previous two years (2018-2019) when calculating the most recent 3-year average HMC. In addition, the BLM mentions Reasonably Foreseeable Actions as an item to be clarified in the 2020 DSEIS, but the document does not take any new information into account in its analysis. 20 Future EIS revisions or planning decisions should incorporate updated data, recent events, BLM actions, new plans and decisions, revised regulations, etc., when presenting reasonably foreseeable scenarios both in the evaluation of cumulative or other environmental effects and in consideration of changed conditions that could warrant new review (see Appendix 2, Section 2.1, Table 1, Rangewide Impacts from Past, Present, and Reasonably Foreseeable Actions). For example, a recent report suggests a significant increase in the rate of fluid mineral leases issued within GHMA and PHMA under the 2015 CO GrSG RMPA, as compared to in recent years.21 20 DSEIS, 1-13. 21 National Audubon Society, Oil and Gas Leasing on Federal Lands and in Sage Grouse Habitats: October 2015 through March 2019 (July, 2019), Tables 2-4.

Improved Prioritization of GRSG Management Author: Doherty et al. Year: 2016 Title: Importance of regional variation in conservation planning-A rangewide example of greater sage-grouse: Ecosphere, v. 7, no.10, article e01462, 27 p. Implications: Improved spatial population models show overlap of habitats, populations, conservation actions, and threats. Threats to, or conservation actions in, these hotspots could affect a large proportion of GRSG populations. Thresholds in vegetation cover types, disturbance, and other factors varied spatially, so results from one location may not extrapolate to other locations. GRSG in MZ VI (Columbia Basin) and MZ I (Northern Great Plains) appeared to diverge in functional habitat selection from other MZs. The authors emphasize the large spatial scale of this analysis and that on-the-ground management actions may need to be informed by analyses at smaller spatial scales. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; Conservation planning Significance: Management prioritization, improved methodology Comments: Underscores the fact that a one-size fits all approach is inappropriate.

Improved Prioritization of GRSG Management Author: Chambers et al. Year: 2016 Title: Using resilience and resistance concepts to manage threats to sagebrush ecosystems, Gunnison sage-grouse, and greater sage-grouse in their eastern range-A strategic multi-scale approach: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, General Technical Report RMRS-GTR-356, 143 p., Implications: "This [USDA] report provides a strategic approach developed by a Western Association of Fish and Wildlife Agencies interagency working group for conservation of sagebrush ecosystems, Greater sage-grouse, and Gunnison sage-grouse. It uses information on (1) factors that influence sagebrush ecosystem resilience to disturbance and resistance to nonnative invasive annual grasses and (2) distribution and relative abundance of sage-grouse populations to address persistent ecosystem threats, such as invasive annual grasses and wildfire, and land use and development threats, such as oil and gas development and cropland conversion, to develop effective management strategies.""Areas for targeted management are assessed by overlaying matrix components with Greater sage-grouse Priority Areas for Conservation and Gunnison sage-grouse critical habitat and linkages, breeding bird concentration areas, and specific habitat threats. Decision tools are discussed for determining the suitability of target areas for management and the most appropriate management actions." Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; Conservation management Significance: Prioritization of management; Provides a holistic approach to managing threats, conservation, and restortation. Comments: Caveat: long-term projections based on untestable Global Circulation Models

Improved Prioritization of GRSG Management Author: Chambers et al. Year: 2017 Title: Science framework for conservation and restoration of the sagebrush biome: Linking the Department of the Interior's Integrated Rangeland Fire Management Strategy to long-term strategic conservation actions. Part 1. Science basis and applications: Geno. Tech. Rep. RMRS-GTR-360. Fort Collins, CO: U.S Department of Agriculture, Forest Service, Rocky Mountain Research Station. p. 213. Implications: This comprehensive report provides the scientific basis and applications for the DOI's Conservation and Restoration Strategy for sagebrush ecosystems. As such, it is a highly influential document. The Science Framework is intended to "help prioritize areas for management and determine the most appropriate management strategies. The Science Framework is based on: (1) the likely response of an area to disturbance or stress due to threats and/or management actions (i.e., resilience to disturbance and resistance to invasion by nonnative plants), (2) the capacity of an area to support target species and/or resources, and (3) the predominant threats." Supersedes NTT: Yes Supersedes COT: Yes Issue: Comprehensive conservation strategy. Significance: Likely highly influential document. Comments: Additional review suggested.

Improved Prioritization of GRSG Management Author: Chambers et al. Year: 2017 Title: Using resilience and resistance concepts to manage persistent threats to sagebrush ecosystems and greater sage-grouse: Rangeland Ecology and Management, v. 70, no. 2, p. 149-164. Implications: From the paper's conclusions: "We successfully operationalized resilience and resistance concepts in a risk-based framework to help managers reduce persistent threats to a species of high concern in one of the largest terrestrial ecosystems in North America. By linking our understanding of sagebrush ecosystem resilience to disturbance and resistance to invasive annual grasses to sage-grouse distribution and habitat requirements, we provided a means for decision makers to strategically allocate resources and triage complex problems. This approach offers an innovative decision support system to address the needs of at-risk species in the context of dynamic and adaptive ecosystems. We believe this approach is applicable to species conservation in other largely intact ecosystems with persistent, ecosystem-based threats such as invasive species and altered disturbance regimes." Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; identification of threats; conservation triage Significance: Improved methodology and prioritization of management Comments: Utilize an operational definition of resistance and resilience.

Improved Prioritization of GRSG Management Author: Crist et al. Year: 2019 Title: Science framework for conservation and restoration of the sagebrush biome: Linking the Department of the Interior's Integrated Rangeland Fire Management Strategy to long-term strategic conservation actions. Part 2. Management applications. Gen. Tech. Rep. RMRS-GTR-389. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 237 p. Implications: The strategic, long-term, multiscale approaches described in this report, as well as associated tools, will aid resource managers in implementing on-the-ground management actions in the sagebrush biome. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement Significance: Prioritization of management. Likely highly influential. Comments: Additional review suggested.

PAW maintains the NTT Report does not represent the best available science as it relates to oil and gas impacts to sage-grouse habitat. The technological improvements associated with oil and gas development also reduced the threats of oil and gas as outlined in the COT Report. BLM should not solely rely on these documents when forming oil and gas stipulations and conservation measures. We are encouraged that BLM included a review of these Reports and analyzed their relevance to the planning process in Appendix F to the Draft SEIS.

PAW supports the analysis provided in the Draft SEIS, particularly as the 2015 ARMPAs analyzed impacts that were as a result of previous technological techniques and the science does not reflect the significant changes that have taken place over the past decade. Specifically, the timeframe of the research included in the NTT and COT Reports predates significant technological advancements that have taken place in the oil and gas industry during that timeframe. These advancements have played a dramatic role in reducing well pad and road density and disturbance associated with oil and gas development.

the NTT report failed to recognize that the level of disturbance and activity associated with a well is not constant throughout its life. The highest level of surface disturbance associated with oil and gas development occurs during the construction, drilling and completion phases, which can last up to a few months, depending upon the time it takes to complete the well. Once production ensues, these activities subside dramatically, especially with the increased use of remote monitoring of oil and gas operations. Shortly after well completion, the operator normally begins interim reclamation to restore any impacted habitat that is not being used. This interim reclamation remains in effect until the well has been depleted. Upon conclusion of production activities, the operator will then move forward with plugging and abandonment procedures, which also includes final reclamation that will ultimately result in full restoration of the site and its return to productive habitat.

they believe that a wide variety of peer-reviewed publications which collectively provide the best available science for sage-grouse should form BLM's basis for conserving the species. They went on to recommend that management and regulatory mechanisms be centered upon the best available science which would provide the best strategy for near- and long-term management of sage-grouse and provide the best opportunity for precluding a listing under the Endangered Species Act (ESA).

Based upon these new documented findings, the assumptions contained in the NTT are incomplete. They are predicated upon widespread development of oil and gas using tightly spaced vertical wells and, therefore, result inaccurate hypothesis that oil and gas development "impacts are universally negative and typically severe."

More importantly, new science and new technology in the deployment of oil and gas development indicates impacts to sage-grouse will be significantly lower than those described in the NTT Report.

The 2015 plans resulted from years of negotiations between ranchers, scientists, state and Federal agencies, and the conservation community. It is a science based plan that was agreeable to all the stakeholders. It led to the USFWS withdrawing it's plan to list the species under the Endangered Species Act. If the 2015 plan is NOT adopted, I feel that the Greater Sage-Grouse SHOULD be listed under the Endangered Species Act

Similarly, while BLM refers to its reliance on "best available science," that is not defined or explained in the Draft Supplemental EISs. In fact, as discussed in detail in a June 2018 letter submitted by numerous sage-grouse scientists recognized as experts in this field, the 2019 Amendments were contrary to the best science. See, June 2018 Sage-grouse scientists letter, attached as Exhibit 3.

BLM is also obligated to evaluate "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts" through supplemental NEPA. 40 C.F.R. § 1502.9(c)(ii). There are significant new circumstances and information that BLM must take into account, some of which we have repeatedly highlighted in previous comments and protests but have continued to intensify. These are discussed in detail in a letter from expert sage-grouse scientists, attached as Exhibit 4. Sage-grouse populations have been declining and this trend has become even more concerning. As noted in the attached sage-grouse scientists' letter, state-level data indicates sage-grouse populations have declined 44% on average over the last four years, with estimated statewide declines in strongholds of between 33% and 52% in Oregon, Idaho, Nevada, Montana, and Wyoming. BLM must take these losses and the continued projected declines into account in evaluating the impacts of the proposed changes to the 2015 Sage-grouse Plans.

Specifically, the DSEIS does not update the No Action Alternative using the best available science. It remains based on analysis that was not comprised of the best available science and includes outdated and improper habitat mapping, 15 an issue that this County and others repeatedly explained throughout the RMPA process.16 As the Court pointed out in its October 2019 decision, "In order to be adequate, an environmental impact statement must consider "not every possible alternative, but every reasonable alternative."17 The No Action Alternative, as it is currently presented and analyzed, is not a reasonable alternative as it fails to include the best available science or comport with current BLM policy. A possible solution therefore is for BLM to update the science behind the No Action Alternative so that it is current with the science used in the Management Alignment Alternative. The County hopes that the BLM will update the science of the No Action Alternative in order to demonstrate how the preferred alternative better aligns with the BLM's stated policy goals and the conservation of Sage-grouse.

Chapter 5, Consultation and Coordination, does not indicate any coordination or consultation with other Federal (USFWS, USGS) or state agencies, who maintain scientific expertise on both sage-grouse and sagebrush habitat. Without consultation with these scientific experts, the conclusions of this document on potential impacts to the Greater sage-grouse lack scientific credibility.

The Idaho District court granting the motion to preliminarily enjoin the 2019 plans relies in large part on the assumption that the 2015 plans were based on the sound science, specifically the findings and suggestions contained in the 2011 National Technical Team (NTT) and 2013 Conservation Technical Team (COT) Reports.11 The Idaho District Court incorrectly assumed in its decision that the NTT and COT reports represent the best available science, and therefore, any deviation from these reports amounts to an unjustified reduction in protection for the Sage Grouse.12 This reliance on the NTT and COT Reports is misplaced. 11 See Western Watersheds Project et al v. Schneider et al. Case No. CV-00083-BLM, 2019, at 11, 17. (D. Idaho Oct. 16, 2019). 12 Id. The 2011 NTT Report and the 2013 COT Report did not receive adequate peer review and suffered from a number of substantive flaws including: ignoring substantial threats such to the Greater Sage Grouse such as predation in favor of unsupported conjectures regarding human impact; failure to account for natural population fluctuations due to weather patterns; not using the best available science, and were policy rather than science driven. These flawed reports suggested the adoption of equally flawed measures that became central to the 2015 planning effort including the designation of Sage Brush Focal Areas (SFAs) and the establishment of lek buffers.

the application of lek buffer distances was integrated into another document previously not available or included in the DEIS for public review: a U.S. Geological Survey (USGS) report entitled Conservation Buffer Distance Estimates for Greater Sage-grouse - a Review, USGS Open File Report 2014 1239. Both SFAs and lek buffer distances were allowed to evolve from the NTT and COT reports into the 2015 plans without receiving adequate review and comment and in place of utilizing existing conservation tools already available.

Although the SFAs and the lek buffers constituted substantial changes to the proposed action, no supplemental EIS was prepared to analyze them and the public was not provided an opportunity to offer input on their use as guiding elements of the 2015 land use plans. As a result, the 2015 plans did not reflect the best scientific information available to and used by the states that are home to the Greater Sage Grouse.

Sage-grouse population declines and habitat loss represent significant new environmental information that bears on the management actions established in the 2015 and 2019 sage-grouse RMP amendments. BLM must address these circumstances through supplements to the EISs used to inform those RMPs as prescribed in 40 CFR 1502.9(c)(1)(ii) of the National Environmental Policy Act (NEPA). Specifically, the regulations require agencies to: "prepare supplements to either draft or final environmental impact statements if there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." The Draft SEISs released February 11, 2020 do not reflect the reality of these new circumstances and provide no scientific justification for the majority of BLM management decisions given the current situation. Accordingly, BLM must expand the scope of these SEISs to address this new information and set of circumstances facing sage-grouse and sagebrush habitat.

The BLM needs to expand the scope of the Draft SEISs to address new circumstances described and substantiated with recent population and sagebrush habitat trends. Expansion of the scope provides an opportunity for the BLM to more rigorously analyze and assess the direct, indirect and cumulative impacts of management decisions on sage-grouse populations and habitats. Accomplishing such assessments is entirely feasible given the expertise, data, and analytical tools currently available to the BLM. The U.S. Geological Survey (USGS) in their synthesis of relevant literature published from 2015 to 2017 describe several decision-support tools that would apply directly to such analyses. The BLM itself has developed the Assessment, Inventory, and Monitoring (AIM) strategy and the Fire and Invasives Assessment Tool (FIAT) which are expressly meant to provide the agency with analyticallyderived information for making impact and habitat management decisions. Further, in each of the 2015 Final EISs the BLM included a Greater Sage-grouse Monitoring Framework which established metrics and approaches for monitoring response of sage-grouse to management actions. The data and analytical tools established in this framework are also directly applicable to analyses we suggest.

2015 Greater Sage Grouse Plans Were Not Supported by the Best Available Science The Idaho District court granting the motion to preliminarily enjoin the 2019 plans relies in large part on the assumption that the 2015 plans were based on the sound science, specifically the findings and suggestions contained in the 2011 National Technical Team (NTT) and 2013 Conservation Technical Team (COT) Reports.11 The Idaho District Court incorrectly assumed in its decision that the NTT and COT reports represent the best available science, and therefore, any deviation from these reports amounts to an unjustified reduction in protection for the Sage Grouse.12 This reliance on the NTT and COT Reports is misplaced.

we believe it is imperative that BLM clarify how the 2019 plans relied on the best available science, a critical component of the decision in the district court. As such, we request that BLM update and supplement its review of the scientific information on which it relies for conservation of sage grouse habitat and management of those federal lands. Specifically, BLM must take into account scientific information that has been developed since the reports prepared by the National Technical Team (NTT)1 in 2011 and the Conservation Objectives Team (COT)2 in 2013, including over 150 scientific papers and reports prepared since 2014 that are described and referenced in the materials we submit as attachments to this letter (Attachment B and F below). These reports make clear that the NTT and COT reports are no longer the best available science, contra the district court's assertion. 1 Report on National Greater Sage-Grouse Conservation Measures Produced by the BLM Sage-Grouse National Technical Team, Bureau of Land Management (Dec. 2011). 2 Greater Sage-Grouse (Centrocercus urophasianus) Conservation Objections: Final Report, U.S. Fish and Wildlife Service (Feb. 2013).

The Trades previously argued that BLM's reliance in the 2015 Land Use Plan Amendments (LUPAs) on the U.S. Fish and Wildlife Service's COT Report and BLM's NTT Report in determining stipulations, restrictions, and conservation measures for operations in sage-grouse country was arbitrary and capricious under the Administrative Procedures Act. The NTT Report and the COT Report failed to utilize the best available science; failed to adhere to the standards of integrity, objectivity, and transparency required by the agency guidelines implementing the Data Quality Act, and suffered from inadequate peer review (Attachment A below). The NTT Report fails to adequately support its propositions and conclusions. For example, the NTT Report provided no scientific justification for the three percent disturbance cap, which was described in the 2015 LUPAs. Rather, the disturbance cap was based upon the "professional judgment" of the NTT authors and the authors of the studies they cited, which represents opinion, not fact. The noise restrictions and required design features in the 2015 LUPAs, also recommended by the NTT report, are likewise based upon studies that relied on unpublished data and speculation, and employed suspect testing equipment under unrealistic conditions. Conservation measures based upon "professional judgment" and flawed studies do not constitute the best available science, and BLM should not have relied upon these studies or the NTT Report in the 2015 LUPAs

the NTT Report failed to cite or include numerous scientific papers and reports on oil and natural gas operations and mitigation measures that were available at the time the report was created. For example, the NTT Report failed to cite a 2011 paper (which was made available to the NTT authors) that discusses the inadequacy of the research relied upon by the NTT Report in light of new technologies and mitigation measures designed to enhance efficiency and reduce environmental impacts

The COT Report likewise fails to utilize the best available science, and the BLM and other agencies inappropriately relied upon it in the 2015 LUPAs. The COT Report provides no original data or quantitative analyses, and therefore its validity as a scientific document hinges on the quality of the data it employs and the literature it cites. The COT Report contains serious methodological biases and mathematical errors, and the report's data and modeling programs are not public and thus neither verifiable nor reproducible. Finally, the COT Report provides a table assigning various rankings to GrSG threats, but gives no indication that any quantitative, verifiable methodology was used in assigning these ranks. Absent a quantifiable methodology, these rankings are subjective and rather than relying upon any conservation measures derived from these rankings.

more recent genetic studies with large sample sizes and data from GPS tagged birds reveal that sage grouse disperse over much greater distances than previously thought, refuting previous assumptions central to the NTT and COT reports that sage grouse dispersal was limited. These same data also refute the assumptions behind the extinction predictions by Garton et al. (2011) that were central to the COT report and the 2010 "Warranted but Precluded" ESA-listing decision. Finally, this new body of science provides extensive documentation of refined mitigation measures and habitat restoration that reduce impacts to GrSG. This dramatically improved body of research is more precise and reliable than the studies previously relied upon in the NTT and COT Reports, and other reports relied upon in the development of the 2015 LUPAs.

as the information we're submitting with this letter will describe in more detail, various advancements in operational efficiency, with secondary benefits to sage grouse, have also been implemented in exploration and production operations carried out within the GrSG range, both as voluntary efforts and as measures undertaken in compliance with regulatory requirements. These improvements in operational efficiency translate into reduced drilling and completion times, reductions in operational footprints, reduced noise and truck traffic, and therefore, reduced disturbance to sage grouse and other species. Virtually all of these innovations came after the primary and most influential studies on which the NTT and COT Reports rely were conducted (i.e. after 2006)

The Pinedale Planning area is an area in which a significant population of the GrSG occurs as well as a region within which periods of noteworthy oil and natural gas resource development have taken place during the past 100 years. Therefore, we think it is particularly important to note that another difference between past and current oil and natural gas development, particularly in the Pinedale Planning Area, has been the implementation of extensive mitigation measures designed to reduce overall impacts to sage grouse and enhance their habitat. Pinedale was the subject of many of the reports upon which the findings and conclusions of the NTT and COT Reports were based. These factors demonstrate the importance of BLM's management of these lands and lands elsewhere in the range of the GrSG being informed by the best available science (Attachment E).

What would be the most effective strategy to ensure that an effort to revise and update LUPs are not again influenced by misguided information and recommendations of the Monograph and NTT, COT, and Buffer reports? With over 150 scientific papers and reports produced on greater sage-grouse biology and conservation since 2014, a straightforward solution would be to either file new DQA challenges, describing why the Monograph and reports are outdated and superseded by new research, or work with the BLM to help them reach the same conclusion and revise its contested RMPs accordingly

we produced our annotated bibliography as a spreadsheet (Attachment F). This spreadsheet lists: the lead author, citation, implications, whether it supersedes the NTT or COT reports, the primary issue addressed, the significance of the findings, and additional comments. We have also flagged papers for additional review because of their potential to be highly influential during the upcoming USFWS status review and land use plan revisions. After reviewing these papers, several key observations emerge: 1) The science that has been published since 2015 is extensive and collectively supersedes the NTT and COT reports. Importantly, improved methodologies such as: refined technology to estimating GRSG seasonal habitat, models that incorporate climate variables to predict population trends, and cause and effect mechanisms that drive predation or disturbance. Additionally, several recent papers document how new oil and gas technologies (i.e. directional drilling) and environmental regulations (i.e. Wyoming's Core Areas) have measurably reduced impacts to GRSG. Similarly, genetic studies with large sample sizes and data from GPS tagged birds reveal that GRSG disperse over much greater distances than previously thought, refuting previous assumptions central to the NTT and COT reports that GRSG dispersal was limited. These same data also refute the assumptions behind the extinction predictions by Garton et al. (2011) that were central to the COT report and the 2010 "Warranted but Precluded" ESA-listing decision. And finally, this new body of science provides extensive documentation of refined mitigation measures and habitat restoration that reduce impacts to GRSG. This dramatically improved body of research is more precise and reliable than the studies previously relied upon in the NTT, COT, Buffer Report, and land use plans.

We expect that anthropogenic climate change will be cited in the upcoming USFWS status review as a serious threat to sage grouse. That assessment is based on multiple papers that make long-range projections regarding the future of GRSG habitat, forward in time to 2050, 2070, and 2100. The weakness of these papers however, is three-fold. First, these papers base their long-range predictions on downscaled general circulation models (IPCC or similar) and rely on linking outputs of several models, thus multiplying uncertainty. Second, we found that at least two of these papers utilize the "unlikely high-risk future" scenarios of the IPCC Representative Concentration Pathway RCP8.5. A recent January 29, 2020 paper in the journal Nature pointed out the fallacy of basing predictions on such worst-case scenarios as they are highly unlikely to come true (https://www.nature.com/articles/d41586-020-00177-3). And third, such long-range predictions are inherently untestable as hypotheses because: a) their predictions extend far enough into the future that they exceed a typical human career span (i.e. 30 years), thus it is highly unlikely that they will ever be tested, and b) because of the fast pace of climate science, no one bothers to testing the validity of such predictions at shorter intervals in the first place. This general lack of potential falsifiability puts many climate science predictions outside the realm of empirical, testable science.

numerous papers point to a stable or not-so troubling GRSG declines to a stable equilibrium, there are a handful of authors who consistent seem to find severe, ongoing declines in the same data sets. It would be worthwhile reviewing these papers in detail to understand why this is the case. These reviews should be completed before the USFWS status review gets underway

It is well documented in the scientific literature that annual fluctuations in sea surface temperatures in the North Pacific Ocean drive multi-year variation in temperature and precipitation patterns in western North America. The Pacific Decadal Oscillation (PDO) is an index of the sea surface temperature variation in the North Pacific Ocean that has a significant influence on temperature and precipitation patterns (http://research.jisao.washington.edu/pdo/PDO.latest). This regional climatic variation (i.e. periodic fluctuations in large-scale weather patterns) in turn affect marine and terrestrial plant and animal population cycles, and contributes to phenomena such as summer heat and fire frequency in the western USA. Large-scale climate indices, such as the PDO, often outperform local temperature and precipitation data in predicting population dynamics and ecological processes (Stenseth et al. 2002; Hallett et al. 2004). Multiple authors have reported that greater sage-grouse populations experience cyclic fluctuations, and that these population dynamics are linked to patterns of temperature and precipitation, or the PDO, which affect reproduction and survival (Blomberg et al., 2012, 2014, 2017; Green, Aldridge & O'Donnell, 2016; Coates et al., 2016; Gibson et al., 2017; Ramey et al. 2018). This relationship between climatic variation on population dynamics of greater sage-grouse is not surprising as there is a long and ecologically important history of studies examining the influence of climatic variation on the population dynamics of other tetraonids, including black grouse, ptarmigans, and prairie chickens. Those papers include: Moran (1952, 1954); Ranta, Lindstrom & Linden (1995); Lindström et al. (1996); Cattadori, Haydon & Hudson (2005); Ludwig et al. (2006); Kvasnes et al. (2010); Selås et al. (2011); Viterbi et al. (2015); Ross et al. (2016); Hagen et al. (2017). Significance The significance of these findings to the conservation of sage grouse, and to future land use plans in particular, are threefold: 1) State and federal agencies need to account for the predictable responses to periodic regional climatic fluctuations when managing sage grouse in Wyoming and elsewhere in the western USA in an adaptive management framework. This is especially important as the current USFS and BLM Land Use Plans for greater-sage grouse make no mention of this obviously important demographic phenomenon. 2) Policies based on population "triggers" (i.e. additional restrictions and conservation measures that are implemented when a population dips to a certain level) are flawed unless the effects of the PDO are taken into account so that natural fluctuations are not misinterpreted. Such triggers should be defined as the percent divergence from the expected carrying capacity, with the carrying capacity tracking the regional climate. Several of the current triggers will be tripped during the course of natural population fluctuations. 3) The current pattern of the PDO indicates that sage grouse populations will be at a temporary low ebb in 2020 when the US Fish and Wildlife Service conducts a status review and reconsiders an Endangered Species Act "threatened" listing

Neilson et al. (2005) were the first to hypothesize that inter-annual and inter-decadal climate variability of El Niño-La Niña (ENSO) and the Pacific Decadal Oscillation (PDO) affect sagebrush ecosystem dynamics in the Great Basin, with the PDO being the primary driver of wet-dry cycles

Fedy and Doherty (2011) Reported on the synchrony between population cycles of Wyoming cottontail rabbits (Sylvilagus spp.) and greater sage-grouse, and hypothesized "a broad-scale causal influence" of weather cycles affecting these species.

Blomberg et al. (2012) reported that as much as 75% of the annual variance in greater sage-grouse population size in their study area over 12 years could be accounted for with annual variation in precipitation variables. The authors concluded that, "These results are consistent with bottom-up regulation of sage-grouse populations, where abundance is determined in large part by climate-driven variation in resource availability."

Guttery et al. (2013) reported that large-scale climatic variability in Utah and Idaho plays a primary role in determining greater sage-grouse reproductive success and that temperature and precipitation variables were found to have significant effects on chick survival. They concluded that, "An understanding of large-scale population drivers is essential for effective wildlife conservation planning and provides a baseline for developing meaningful hypotheses about specific local factors affecting populations at smaller spatial and temporal scales."

Coates et al. (2016 and 2017) demonstrated the importance of modeling climatically driven population cycles of sage grouse in Nevada and eastern California to understand "the difference between when populations are responding naturally to weather related patterns, compared to experiencing more localized- and habitat-based declines."

3D seismic surveys The rapid evolution of 3D seismic survey technology and its widespread adoption in the mid-1990s was arguably the most significant change to how oil and gas exploration and development occurred in sage grouse habitat (Gray et al. 2002; Chopra and Marfurt 2005). While this technology resulted in the discovery and development of new oil and gas fields, it also led to far more efficient and concentrated development of those resources than was previously possible. Consequently, the previous practice of grading access roads and drilling numerous exploratory "wildcat wells" across the landscape became obsolete by the late 1990s. With concentrated development possible directly over the most concentrated resources, planned oil and gas development was possible along with large, planned conservation set-asides for sage grouse and other species. In the Pinedale Planning Area, this led to large no surface occupancy areas being set aside by the BLM for sage grouse and other species. To visualize one-hundred years of change in surface development in the Pinedale Planning Area, from the era of wildcat well exploration and development to 3D seismic exploration and development (post 1995)

The most environmentally-significant of these new technologies has been improvements to and widespread adoption of directional drilling (Arthur and Cornue 2010; BLM 2006a; Ramey, Brown, and Blackgoat 2011; Seto 2011; Applegate and Owens 2014). Directional drilling involves drilling multiple wells (up to 50 presently) that angle away from a centralized well pad and single rig to tap oil and gas deposits a mile or more away and thousands of feet below the surface (https://www.rigzone.com/training/insight.asp?insight_id=295). This is a far more efficient, economical, and less environmentally impactful method than drilling many vertical wells to tap the same resource, because operators can access subsurface resources over a broad area from a single pad. (Directional wells that start vertically and make a 90-degree turn to traverse laterally to access in horizontal strata are known as horizontal wells.) Formerly, many closely-spaced vertical wells on separate pads were required to tap the same resource, which resulted in extensive surface disturbance, such as that seen in aerial photographs of the Jonah Field in Wyoming in the early 2000s. The Jonah Field underwent extensive vertical drilling in the 1990s before the widespread adoption of directional drilling and more stringent regulations on well pad spacing. While many directional wells currently traverse laterally a distance of less than two miles, the most recent records for lateral distance is 6.1 miles in the USA and 6.8 miles in Qatar (https://www.drillingcontractor.org/corva-helps-break-north-american-drilling-record-for-longest-lateral-with-32468-ft-well-53647; https://www.guinnessworldrecords.com/world-records/longest-drilled-oil-well/). These records illustrate that under ideal conditions a single well pad has the potential to access oil and gas resources in a subsurface area of over 19 square miles (12,265 acres) with minimal surface disturbance. Data from the Pinedale Planning Area shows that the transition from predominantly vertical wells to directional wells occurred around 2004 (Figure 1). This represented a major shift in drilling efficiency and subsequently less surface disturbance. Directional wells now account for virtually all of the wells drilled in the Pinedale Planning Area and those planned for the Normally Pressurized Lance Field. More recently, advances in computational geoscience coupled with down-hole, near-the- drill-bit gamma ray, resistivity, and navigational sensors, allow real-time, high resolution 3D visualization of subsurface features in rocks surrounding the bore as drilling proceeds. This technology, coupled with the advent of rotary steerable system drill bits (first introduced on the Pinedale Anticline in 2008) dramatically decreases drilling time (Okafor et al. 2009). This combination of technologies, along with more recent advances in dynamic point-the-bit rotary steerable systems and analytical software has ushered in a new era of "geosteering" which has further increased the efficiency of tapping subsurface resources (Zhang et al. 2019). In simple terms, higher drilling efficiency translates into less surface disturbance and activity above ground, both of which can affect sage grouse. Directional drilling of multiple wells from the same well pad has also led to a new type of operational efficiency, one that was not possible during the single-well-per-pad-era: the co-location of supporting infrastructure for completion and production activities being simultaneously carried out on different wells drilled from the same well pad. This translates into reduced surface disturbance, equipment moving on and off site, and manpower required. For example, drilling rig moves that used to take 150 or more truck trips to move between pads, are now accomplished by skidding the rig a few feet to a nearby location on the same pad (Kreckel, 2011). See attachment for Figure 1. Figure 1. Annual number of vertical and directional wells drilled by the oil and gas industry in the Pinedale Planning Area from 1973 to 2012. The annual number of traditional vertical bore wells is indicated in red, and directional wells (including horizontal wells) are indicated in blue. The transition from predominantly vertical wells to directional wells took place in 2004. As of 2010, virtually all new wells drilled in the Pinedale Planning Area are directional wells.

Advances in technology allow shorter drilling and completion times, reducing potential disturbance to sage grouse More efficient technology has also resulted in shorter drilling and well completion times. While the averages we report show marked improvement (from spudding to completion), it should be noted that these completion times also include periods of inactivity at a well site due to interruptions from logistical and seasonal constraints. Therefore, actual drill and completion times (not including inactive periods), may provide a more accurate portrayal of the duration of potentially disturbing activities to sage grouse. For example, companies reported that drilling a well on the Pinedale Anticline (with an average depth of 13,000 feet) took an average of 65 days in 2002 and this decreased to 35 days by 2006 (OGJ 2007). By 2011 this had improved further, to an average of 14 days of drilling to depth, and in 2013, QEP Resources reported that they had achieved a well to depth time of 9.3 days, a new record (QEP 2013). Similar improvements in drilling and completion efficiency have been reported elsewhere (DTC Energy Group 2013). Overall, uninterrupted completion times have dropped from six months to as few as 2 to 3 days in 2013 (AECOM 2013). Currently (as of January 2020), the average well depth on the Pinedale Anticline is 13,700 feet and drilling from spud to total depth takes an average of 8 days (range 6 to 10 days). Completions take approximatly 3 days for two wells which are done in pairs for greater efficiency (data from Ultra Resources, Inc.). Collectively, these data illustrate that much has changed in drilling and completion technology over the 18 years from 2002 to 2020, resulting in reduced industrial activity and subsequent potential disturbance to sage grouse.

Beginning in the early 2000s closed-loop drilling fluid systems began to replace open reserve pits adjacent to wells being drilled. Closed-loop drilling fluid systems are a best management practice that has emerged as a more environmentally responsible and economically viable alternative to open reserve pits and evaporation ponds that require frequent truck trips, can trap sage grouse and other birds, and represent a potential source of groundwater pollution (US Environmental Protection Agency 2019). Closed-loop systems separate drilling fluid from drill cuttings and other solids, which are dewatered for solid waste disposal in landfills. Water is then recycled back into the drilling process, minimizing fresh water use and making solid waste easier to dispose of (Colorado School of Mines. 2009; Pei et al. 2011). While an increasing number of companies have adopted closed loop drilling systems and on-site water purification systems to recycle produced water (Colorado Department of Natural Resources 2019, as cited in U.S. Environmental Protection Agency 2019), some have gone further and implemented a comprehensive, field-level liquid gathering systems (LGS) and water purification facilities. The most notable of these liquid gathering and water purification facilities went online on the Pinedale Anticline in 2012 and was designed to eliminate 165,000 truck trips per year (BLM 2005). A study conducted over two winters reported that the LGS system reduced overall human activity at LGS-equipped well pads, as compared to conventional well pads, by at least a factor of two and thereby reduced avoidance by sage grouse (Holloran et al. 2015). That study concluded that "implementing efforts to decrease anthropogenic activity levels associated with infrastructure of natural gas fields during both drilling and production phases of development (i.e. using LGS) may also help reduce effects of the infrastructure on wintering sage-grouse." A similar LGS and water purification system is also planned for the Normally Pressurized Lance Field for the same reasons

Other advancements in operational efficiency, with secondary benefits to sage grouse, have also been implemented in the Pinedale Planning Area, both as voluntary and regulatory efforts. The most significant of these to sage grouse have included: - Installation of remote telemetry systems to monitor wells and condensate tanks (initiated in 2008 and completed in 2012; BLM 2008a,b). - Electrification of the Pinedale Anticline (BLM 2012), allowing equipment to be powered with electricity rather than internal combustion generators and motors. While this change was originally intended to reduce high levels of ozone accumulation in the Pinedale Planning Area, it has the secondary benefit of reducing engine noise and truck traffic (needed to refuel and maintain internal combustion engines). - Required use of EPA compliant Tier II diesel engines on drill rigs, with phase out into more efficient Tier III and IV designs, all of which reduce noise (and pollutants) compared to non-compliant engines in use prior to 2006. Collectively, these improvements in efficiency translate into reduced drilling and completion times, reduced noise and truck traffic, and therefore, reduced disturbance to sage grouse and other species. Virtually all of the innovations listed above came after the primary and most influential studies were conducted at Pinedale (i.e. after 2006). Admittedly, the development of more efficient oil and gas development and production technology is often driven by economic considerations, however the benefits to the environment are obvious: reduced drilling and completion time which translates into less noise, less traffic, and less overall disturbance to wildlife

The biggest limitation of a statistical approach is the uncertainty in the effect of an individual project. At more local scales, this uncertainty can be substantially reduced by including data from other similar projects in the analyses while allowing for inter-project variation in the response (LaMontagne et al. 2002) through a random effect (Kéry 2010). Large-scale projects such as land-management plans may have to be broken into a series of smaller activities in order to estimate the effect with sufficient certainty for it to be useful in decision-making. The models should strive to analyse all available lek count data including historical counts using stage-based population dynamic models (Kery and Schaub 2011; McCaffery and Lukacs 2016). The advantages of stage-based population dynamic models are that multiple sources of information for different life-stages and sexes including prior information from previous analysis can be readily incorporated while lags are readily accounted for thus providing tighter linkages between population drivers and lek counts. However, computational memory and/or run-time requirements may necessitate the fitting of simpler models to reduced datasets if they cannot be overcome through the use of supercomputers

Mining Author: Petersen et al. Year: 2016 Title: Response of greater sage-grouse to surface coal mining and habitat conservation in association with the mine: Human-Wildlife Interactions, v. 10, no. 2, p. 205-216. Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: The authors conclude that surface coal mining and associated mitigation did not cause a decline in the existing GRSG population at the Alton/Sink Valley area of southwest Utah. Habitat fidelity and acclimation to a long history of anthropogenic activities may have affected GRSG behavior in this region. GRSG at this location did not avoid mining activities as other GRSG populations have been observed to do elsewhere in the range. Supersedes NTT: Yes Supersedes COT: Yes Issue: Coal mining; mitigation Significance: Lack of avoidance is notable, the question is why?

Predation Author: Harju et al. Year: 2018 Title: Common raven movement and space use: influence of anthropogenic subsidies within greater sage-grouse nesting habitat: Ecosphere, v. 9, no. 7, article e02348, 16 p, https://doi.org/10.1002/ecs2.2348. Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: Lethal control of ravens at primary subsidies likely does not impact breeding ravens, who tend to utilize these sources less and pose a greater threat to GRSG through nest depredation. Inducing nest failure may cause ravens to change their space use and movement patterns to a wider-ranging nonbreeding pattern, which would likely, and leave them more vulnerable to lethal control at primary subsidies. Supersedes NTT: Yes Supersedes COT: Yes Issue: Predation; mitigation (Technique refinement) Significance: Ravens Comments: Potential method to disrupt raven behavior making them more succeptible to lethal control.

Author: Creutzburg et al. Year: 2015 Title: Climate change and land management impact rangeland condition and sage-grouse habitat in southeastern Oregon: AIMS Environmental Science, v. 2, no. 2, p. 203-236. Implications: This paper, "evaluated varying scenarios of future climate and management and their implications for rangeland condition and habitat quality, ... simulations indicate that climate change may have both positive and negative implications for maintaining sage-grouse habitat." Supersedes NTT: Yes Supersedes COT: Yes Issue: Climate (long range predictions) Significance: Potential changes to habitat are posiive and negative for GRSG Comments: "Linking multiple models creates greater complexity and creates new opportunities for error." In this case, four models with unknown error.

Climate (long range preditions) Author: Homer et al. Year: 2015 Title: Forecasting sagebrush ecosystem components and greater sage-grouse habitat for 2050-Learning from past climate patterns and Landsat imagery to predict the future. Ecological Indicators, v. 55, p. 131-145. Implications: Predicted losses of GRSG habitat to 2050 based on two extreme scenario, downscaled IPCC general circulation models. Issue: Climate (long range predictions) Significance: Questionable long-range predictions Comments: Caveats: Old error-prone data mixed with new data (1984-2011); Predictions rely on two highest anthrogenic radiative forcing models

Climate (long range preditions) Author: Balzotti et al. Year: 2016 Title: Beyond the single species climate envelope-A multifaceted approach to mapping climate change vulnerability: Ecosphere, v. 7, no. 9, article e01444, 23 p., https://doi.org/10.1002/ecs2.1444. Implications: Long-range predictions of habitat changes in Nevada and Utah (to 2070) were based on machine-learning software utilizing regional predictions derived from previously published, downscaled global general circulation models and data from 1961-90 "normal period." Issue: Climate (long range predictions) Significance: Long-term predictions on habitat or population trends Comments: Caveat: Long range predictions to 2070. Predictions untestable.

Climate (long range preditions) Author: Boyte et al. Year: 2016 Title: Boyte, S.P., Wylie, B.K., and Major, D.J., 2016, Cheatgrass percent cover change-Comparing recent estimates to climate change-driven predictions in the northern Great Basin: Rangeland Ecology and Management, v. 69, no. 4, p. 265-279. Implications: Identified areas where cheatgrass was likely to change and projected the potential future magnitude of change for years 2050 and 2070. Climate projections were based on scenarios from the Intergovernmental Panel on Climate Change (IPCC) for 2050 and 2070. Issue: Climate (long range predictions) Significance: Evaluated potential cheatgrass spread inl future Comments: Caveat: Climate projections based on scenarios derived from IPCC general circulation models

Climate (long range preditions) Author: Palmquist et al. Year: 2016 Title: Mid-latitude shrub steppe plant communities-Climate change consequences for soil water resources: Ecology, v. 97, no. 9, p. 2342-2354 Implications: Long-range predictions (to 2100) based on global circulation models (GCM), representative concentration pathways (RCPs), and process-based soil water model. Longer, drier summers will likely have a negative effect on sagebrush regeneration and seedling survival and may result in changes to plant functional group composition within current GRSG habitats. Oucome depends on GCM chosen. Issue: Climate(long range predictions) Significance: Questionable very long-range predictions Comments: Caveats: Predictions based on down-scaled general circulation models and outputs of multiple linked models.

Climate (long range preditions) Author: Palmquist et al. Year: 2016 Title: Spatial and ecological variation in dryland ecohydrological responses to climate change- Implications for management: Ecosphere, v. 7, no. 11, article e01590, 20 p., Implications: Long-range predictions (2050) based on GCM and RCPs. Predict drier summer conditions in higher elevation areas could lead to increased suitability for big sagebrush, whereas mid to lower elevation sites could become less suitable for big sagebrush and consequently GRSG. This information could help prioritize areas for conservation of shrub steppe ecosystems into the future (but they do not say how). Issue: Climate (long range predictions) Significance: Questionable long-range predictions based on most extreme warming scenario (i.e. 5°C by 2100). Comments: Caveat: Predictions based on most extreme scenario RCP8.5 (i.e. unlikely high-risk future) and outputs of multiple linked models.

Regional climatic variation and weather Author: Caudill et al. Year: 2016 Title: Factors affecting seasonal movements of juvenile greater sage-grouse-A reconceptualized nest survival model: The Condor, v. 118, no. 1, p. 139-147. Implications: Results suggested that precipitation, rather than snow accumulation or depth, was the primary driver of juvenile migration. Movement from late fall habitats to winter habitats was variable, indicating that the effects of harvest may vary with harvest timing and its relation to seasonal movements. Changes in climate may negatively affect GRSG if the onset of winter conditions is delayed, affecting the movement of juveniles to winter habitat. The model application presented here may be used to develop a better understanding of relations between environmental factors and GRSG behavior. Supersedes NTT: Yes Supersedes COT: Yes Issue: Seasonal climate and juvenile GRSG migration; Technique refinement: hunting season Significance: Measurable effects of weather on seasonal movements and habitat use; prioritization of management

Regional climatic variation and weather Author: Gibson et al. Year: 2017 Title: Weather, habitat composition, and female behavior interact to modify offspring survival in greater sagegrouse: Ecological Applications, v. 27, no. 1, p. 168-181. Implications: The authors evaluated relations between (1) weather and brood survival, (2) drought and breeding site selection, and (3) shifts in breeding site selection and brood survival of GRSG. Chick survival was negatively related to drought severity. Nest sites at low elevations may contribute little to reproduction in drought years,and extended droughts may be detrimental to GRSG populations that cannot access highelevation sites. Supersedes NTT: Yes Issue: Climate (local/seasonal and regional drought) Significance: Local/seasonal effects of weather and drought on vital rates, nesting behavior, and population Comments: GRSG exihibit behavioral response to drought although prolonged drought can be deleterious.

Regional climatic variation and weather Author: Coates et al Year: 2018 Title: The relative importance of intrinsic and extrinsic drivers to population growth vary among local populations of greater sage-grouse: an integrated population modeling approach: AUK, v. 135, no. 2, p. 240-261. Implications: Using integrated population modeling allowed the authors to disentangle the effects of precipitation variability on GRSG populations at the DPS level from those at the sub-population level. This information will help resource managers understand how growth rates in the Bi-State DPS can appear stable, while at the same time, certain sub-populations may decline due to extrinsic factors such as drought, unless management actions are taken. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; population trends Significance: Measurable local, seasonal effects of precipitation variabilityon population dynamics.

Regional climatic variation and weather Author: Mathews et al. Year: 2018 Title: An integrated population model for greater sage-grouse (Centrocercus urophasianus) in the bi-state distinct population segment, california and nevada, 2003-17: US Geological Survey Open-File Report 2018-1177, 89 p., https://doi.org/10.3133/ofr20181177. Implications: Results suggested that GRSG use increased following pinyon-juniper conifer removal treatments. Modeling showed annual variations in subpopulations, with an overall 2 percent decline in the Bi-State population from 2003 to 2017. The overall decline in the Bi-State population was likely a result of drought events; subpopulations that are stable or increasing are insulated from drought due to water availability. Issue: Climate (regional variation and drought); Habitat restoration; Translocation Significance: Population trends in response to drought, Positive resposnse to habitat restoration) Comments: Increased GRSG use after tree removal, drought causes population declines. Mixed results for translocated broods.

Regional climatic variation and weather Author: Ramey et al Year: 2018 Title: Local and population-level responses of greater sage-grouse to oil and gas development and climatic variation in Wyoming: PEERJ, v. 2018, no. 6, p. e5417, https://doi.org/10.7717/peerj.5417. Implications: Hierarchical models were used to estimate the effects of the areal disturbance due to well pads as well as climatic variation on individual lek counts and Greater sage-grouse populations (management units) over 32 years. Modeling revealed that oil and gas had a strong negative effect on local-scale lek attendance within a 3.2 km radius around a well. Oil and gas was a weak predictor of population-scale changes, but appeared consistent with local-scale responses. The PDO was found to be a strong predictor of long-term population density fluctuations at local and population scales. Supersedes NTT: Yes Supersedes COT: Yes Issue: Climate (regional climatic variation); population fluctuations; oil & gas Significance: PDO was the major driver of population trends rather than oil and gas development Comments: Wildlife agencies need toaccount for the effects of regional climatic variation when managing sage-grousepopulations.

Translocation and Captive Breeding for GRSG Restoration Author: Thompson et al. Year: 2015 Title: Captive rearing sagegrouse for augmentation of surrogate wild broods-Evidence for success: Journal of Wildlife Management, v. 79, no. 6, p. 998-1013. Implications: Egg collection and hatching, rearing, and adoption of captive-raised chicks into wild broods is feasible. Supersedes NTT: Yes Supersedes COT: Yes Issue: Captive rearing GRSG; itigation Significance: Another paper showing population augmentation is feasible

Translocation and Captive Breeding for GRSG Restoration Author: Gruber-Hadden et al. Year: 2016 Title: Population vital rates of resident and translocated female greater sage-grouse: Journal of Wildlife Management, v. 80, no. 4, p. 753-760. Implications: Retention of translocated GRSG within the targeted release site was 82 percent. There was not statistical support for a difference between resident and translocated birds for female, nest, and chick survival. Nest initiation rates and clutch sizes were generally higher for residents compared to translocated GRSG. Nest success was positively related to grass height. Successful translocations will depend on resolving issues that have imperiled the resident population. Supersedes NTT: Yes Supersedes COT: Yes Issue: Mitigation Significance: Translocation Comments: Small sample size, more data needed

Translocation and Captive Breeding for GRSG Restoration Author: Apa, et al. Year: 2017 Title: Apa, A.D., Thompson, T.R., and Reese, K.P., 2017, Juvenile greater sage-grouse survival, movements, and recruitment in Colorado: Journal of Wildlife Management, v. 81, no. 4, p. 652-668. Implications: Experimentally introduced domestically-hatched chicks into existing wild broods. Was deemed successful because survival rates of these birds were comparable to wild-hatched birds. Supersedes NTT: Yes Supersedes COT: Yes Issue: mitigation; translocation Significance: Translocation successful; reintroduction and augmentation are viable techniques Comments: Successful experimental reintroduction technique.

Translocation and Captive Breeding for GRSG Restoration Author: Duvuvuei et al. Year: 2017 Title: Contribution of translocated greater sage-grouse to population vital rates: Journal of Wildlife Management, v. 81, no. 6, p. 1033-1041. Implications: Translocating adult females may maximize translocation success overall, as adults are more likely than juveniles to raise a brood in the first year. Authors recommend continuing monitoring for multiple years following translocations. They suggest that factors causing declines in the focal GRSG population be mitigated prior to receiving translocated females. Supersedes NTT: Yes Supersedes COT: Yes Issue: Mitigation Significance: Translocation/population augmentation Comments: One of several recent studies that have shown translocation is a useful tool for GRSG conservation.

Translocation and Captive Breeding for GRSG Restoration Author: Ebenhoch et al. Year: 2019 Title: Effects of post-release movements on survival of translocated sage-grouse: The Journal of Wildlife Management, v. 83, no. 6, p. 1314-1326. Implications: Supersedes NTT: Newly translocated GRSG had smaller home ranges and traveled longer daily distances than either resident or previously translocated birds, but distances moved between seasonal centers did not differ among the three groups. Annual survival was not significantly lower in newly translocated birds; males and birds that moved greater daily distances had greater mortality risk. Newly translocated birds initiated nests less often than other groups, but nest initiation date and nest survival did not vary with residency status. Nest success was higher when nests were initiated later in the nesting season. Resident GRSG nested farther from active leks than translocated birds. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique improvement; Mitigation Significance: Translocation of GRSG is a potential tool for augmenting declining populations or reestablishing ones that have been extripated. Comments: It has long been argued that translocation is unsuccessful despite data to the contrary (Strawberry Hill). This information also suggests that survival of translocated birds does not differ from resident birds

Translocation and Captive Breeding for GRSG Restoration Author: Heinrichs et al. Year: 2019 Title: Optimizing the use of endangered species in multi-population collection, captive breeding and release programs: Global Ecology and Conservation, v. 17, article e00558, 12 p, https://doi.org/10.1016/j.gecco.2019.e00558. Implications: Modeled tradeoffs of releasing captive bred birds to augment populations. Reported,"Releases into small and rapidly declining populations provided the greatest near-term reductions in extinction risk, but improvements were short-term. Yet releases into larger and more stable populations resulted in longer lasting conservation benefits than in more vulnerable populations but required greater initial release effort. Systematic modeling approaches that evaluate a spectrum of trade-offs and quantify conservation risks and benefits can help direct the expectations and effort invested in captive breeding and release programs." Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; captive breeding and release Significance: Captive breeding and release is a potentially effective tool to bolster wild populations.

Improved Habitat Mapping and Assessment Author: Gibson et al. Year: 2015 Title: Observer effects strongly influence estimates of daily nest survival probability but do not substantially increase rates of nest failure in greater sage-grouse: The Auk, v. 132, no. 2, p. 397-407 Implications: Observer-induced nest abandonment can decrease estimates of daily nest survival. The authors recommend assessing the potential costs and benefits of nest surveys on sensitive populations and incorporating bias corrections into estimates of nest survival. Supersedes NTT: Yes Issue: Technique refinement; nest survival studies Significance: Researchers can have deleterious effect on parameter they are studying. Comments: Raises concern that some previous studies may have biased results.

Improved Habitat Mapping and Assessment Author: McCaffery et al. Year: 2016 Title: Improved analysis of lek count data using N-mixture models: Journal of Wildlife Management, v. 80, no. 6, p. 1011-1021 Implications: The authors found that N-mixture models produced more accurate population trend estimates than naive lek count data, largely because they corrected for substantial year-to-year variability in detection probability. Using naive lek count data may result in inaccurate and misleading estimates of GRSG population size and trend when compared to results obtained by using an N-mixture modeling approach that can better account for variable detection probability and missing data. The authors provide suggestions for lek monitoring designs that can be analyzed using N-mixture models Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; population trend estimates Significance: Highly significant paper on estimating population trend estimates than traditional methods from lek count data. Comments: Additional review suggested

Improved Habitat Mapping and Assessment Author: McCaffery and Lukacs Year: 2016 Title: A generalized integrated population model to estimate greater sage-grouse population dynamics: Ecosphere, v. 7, no. 11, article e01585, 14 p., Implications: Integrated population models improved estimates of annual GRSG population dynamics by smoothing variability attributable to sampling noise. The authors conclude that their integrated population model framework could provide robust assessments of population size and trend, information on mechanisms underlying observed trends, and a unified tool for use by GRSG biologists studying various populations throughout the range of the species. The authors suggest that future field sampling efforts should seek improved information on sex and age ratios, female population sizes, sex-specific survival rates by life stage, and the proportion of leks surveyed annually in a given area. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement: Improved analysis of lek count data using N-mixture models Significance: Highly significant paper for future estimating of population trends and abundance Comments: Additional review suggested

Improved Habitat Mapping and Assessment Author: Caudill et al. Year: 2017 Title: Individual heterogeneity and effects of harvest on greater sage-grouse populations: Journal of Wildlife Management, v. 81, no. 5, p. 754-765. Implications: "Using the revised formulae, the authors demonstrated that effects of selective harvest on grouse tend to be depensatory [adult mortality contributes to reduced productivity and/or survivorship in the population] when robust individuals are more susceptible to harvest, and some level of compensation is likely when frail individuals are more susceptible to harvest." Issue: Technique refinement; Hunting Significance: Mitigating potential population-level effect of hunting Comments: Example of effective application of determing cause and effect mechanisms for effective mitigation.

Improved Habitat Mapping and Assessment Author: Forby et al. Year: 2017 Title: Emerging technology to measure habitat quality and behavior of grouse-Examples from studies of greater sage-grouse: Wildlife Biology, article wlb.00238, 10 p., https://doi.org/10.2981/wlb.00238 Implications: Significant changes in our understanding of GRSG ecology may arise from new technologies, but they will require scientific testing, calibration, and communication between managers and scientists to overcome challenges and target data collection and use Supersedes NTT: Yes Issue: Potential technique refinements Significance: Showcasing of various potential Improvements in methodology via UAVs, spectral imaging, robotic animals and biotelemetry systems. Comments: Caveat: Except for spectral imaging of vegetation, seems like high tech methods in search of a question.

Improved Habitat Mapping and Assessment Author: Fregman et al. Year: 2017 Title: Necklace-style radio-transmitters are associated with changes in display vocalizations of male greater sage-grouse: Wildlife Biology, article wlb.00236, 8 p., https://doi.org/10.2981/wlb.00236. Implications: Vocalizations made by males with necklace-style radio transmitters fell outside the normal range of vocalizations produced by males throughout the range of GRSG, suggesting that radio collars may impair their ability to produce normal vocalizations. The use of necklace-style collars that sit on the necks of GRSG are not recommended for use in behavioral studies of GRSG. Alternative attachment methods should be developed and tested. Supersedes NTT: Yes Issue: Technique refinement Significance: Necklace-style transmitters alter behavior. Comments: Raises concern that previous studies that used this and other outdated technology may have biased results.

Improved Habitat Mapping and Assessment Author: Hagen et al. Year: 2018 Title: Estimating sex-ratio, survival, and harvest susceptibility in greater sage-grouse: making the most of hunter harvests: Wildlife Biology, article wlb.00362, 7 p., https://doi.org/10.2981/wlb.00362. Implications: The authors suggest that demographics of harvested populations can be modeled for GRSG or other game birds using a mark-recovery approach of harvested individuals. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; population estimation Significance: Hunter harvested sage grouse are an important source of data on suvivorship. Comments: Caveat: requires hunting

Improved Habitat Mapping and Assessment Author: Monroe et al. Year: 2019 Title: The importance of simulation assumptions when evaluating detectability in population models: Ecosphere, v. 10, no. 7, p. 1-17., https://doi.org/10.1002/ecs2.2791. Implications: Using simulation scenarios with systematic trends in detectability may be more informative for evaluating population models than scenarios that assume detectability is constant or random. With finite monitoring resources available, using auxiliary data on lek attendance to model GRSG populations with N-mixture models may allow more leks to be studied less intensively. However, additional investigation is needed to evaluate the extent to which auxiliary data are appropriate for different GRSG populations across their range. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; estimating abundance and population trend Significance: Simulations used to evaluate proposed analytical approach which performed favorably

Improved Habitat Mapping and Assessment Author: Severson et al. Year: 2019 Title: Global positioning system tracking devices can decrease Greater Sage-grouse survival: The Condor, v. 121, p. 1-15. Implications: The authors reported, "We found lower survival for GPS marked compared to VHF-marked sage-grouse across most sex, age, and seasonal comparisons. Estimates of annual survival for GPS-marked sage-grouse were 0.55-0.86 times that of VHF-marked birds with considerable variation among sex and age classes. Differences in survival could be attributed to features associated with GPS devices, including greater weight, position of attachment (e.g., rump-mount harness), and a semi-reflective solar panel." Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; GPS tagging Significance: GPS tagged individual had decreased survival compared to older VHF rtechnology. Studies using GPS tags assume no cost to survival or fitness, an assumption obviously violated. Comments: Consistent with other studies. Previos studies using GPS may have biased results.

Improved Prioritization of GRSG Management Author: Dahlgren et al. Year: 2015 Title: Greater sage-grouse and range management-Insights from a 25-year case study in Utah and Wyoming: Rangeland Ecology and Management, v. 68, no. 5, p. 375-382. Implications: This retrospective analysis used 25 years of data across three large landscapes in northern Utah and southwestern Wyoming to assess sage-grouse population change and corresponding land management differences and sagebrush treatments (prescribed fire, chemical treatment, and grazing) in a case study design to test hypotheses and make recommendations based on research. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; habitat and population management Significance: Long-term research used to inform effective habitat and population management.

Improved Prioritization of GRSG Management Author: Carlisle et al. Year: 2018 Title: Identifying holes in the greater sage-grouse conservation umbrella: Journal of Wildlife Management, v. 82, no. 5, p. 948-957. Implications: The authors conclude that species with small distributions or those with habitat requirements that are only partly similar to those of GRSG will receive relatively fewer conservation benefits from GRSG as an umbrella species. These species may need seperate protections established for their conservation. The authors further suggest that applying the umbrella species concept to GRSG and sagebrush habitats requires attention to details regarding the umbrella species, habitat reserves created to benefit the species, and the degree of habitat similarity shared with co-occurring species. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; GRSG as a conservation "umbrella species" Significance: Prioritization of management actions; unintended consequences Comments: The NTT, COT, and LUPs completely fail to take into account other species and can have negative impacts on other species at a local level. The one-size fits all, single species managemnt approach has proven adverse effects to other species.

Improved Prioritization of GRSG Management Author: Hanser et al. Year: 2018 Title: Greater sage-grouse science (2015-17)-synthesis and potential management implications: U.S. Geological Survey, Open-File Report 2018-1017, 46 p., https://doi.org/10.3133/ofr20181017. Implications: This is a USGS synthesis of papers from the USGS annotated bibliography on GRSG literature by Carter et al. (2018) covering topics: The six primary topics were: Multiscale habitat suitability and mapping tools; Discrete anthropogenic activities; Diffuse activities; Fire and invasive species; Restoration effectiveness; Population estimation and genetics. Supersedes NTT: Yes Supersedes COT: Yes Issue: Literature review 2015-2018 Significance: Likely influential in USFWS 2020 status review. Comments: USGS literature review. Potentially influential, additional review recommended.

Habitat Improvement Author: Gustafson et al. Year: 2018 Title: Using object-based image analysis to conduct high-resolution conifer extraction at regional spatial scales: International Journal of Applied Earth Observation and Geoinformation, v. 73, p. 148 - 155. Implications: The maps produced can help to inform land managers on where to target pinyon-juniper treatment in order to aid sagebrush restoration and GRSG conservation. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement Significance: Prioritization of management actions; Unintended consequences Comments: The NTT, COT, and LUPs completely fail to take into account other species and can have negative impacts on other species at a local level. The one-size fits all, single species managemnt approach has proven adverse effects to other species.

Habitat Improvement Author: Gustafson et al. Year: 2018 Title: Using object-based image analysis to conduct high-resolution conifer extraction at regional spatial scales: International Journal of Applied Earth Observation and Geoinformation, v. 73, p. 148 - 155. Implications: The maps produced can help to inform land managers on where to target pinyon-juniper treatment in order to aid sagebrush restoration and GRSG conservation. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; habitat mapping; Pinion-juniper treatment Significance: Habitat mapping; habitat restoration Comments: Potential technique for offset mitigation.

Habitat Improvement Author: Ricca et al. Year: 2018 Title: A conservation planning tool for greater sage-grouse using indices of species distribution, resilience, and resistance: Ecological Applications, v. 28, no. 4, p. 878-896. Implications: The CPT could help resource managers evaluate potential costs and benefits of treatments in particular locations in order to facilitate restoration prioritization decisions across landscapes used by GRSG. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; habitat restoration Significance: Prioritization of management; new planning tool Comments: An improved planning tool. Also undermines the argument that habitats cannot be restored by recognizing the BLM prioritization process for restoring lands needs improvement. This tool can help with that.

Habitat Improvement Author: Davee et al. Year: 2019 Title: Using beaver dam analogues for fish and wildlife recovery on public and private rangelands in Eastern Oregon: Research Paper PNW-RP-617. Northwest Climate Hub, U.S Department of Agriculture, Forest Service, Pacific Northwest Research Station, p. 32. Implications: Beaver dam analogues can improve habitat for fish and wildlife, including GRSG, but implementing this tool may require navigating new or yet-to-be established regulatory pathways and obtaining by-in from private landowners and ranchers is an important consideration for increasing implementation of this tool. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; Mitigation; Habitat restoration Significance: Innovative method for habitat resotation; habitat expansion Comments: Expands mesic areas making them more resilient (potentially usefull for drought/climate mitigation and/or conservation offset).

Mitigation-Restoration of Habitat - Pinyon-Juniper removal Author: Farzan et al. Year: 2015 Title: Western juniper management-Assessing strategies for improving greater sage-grouse habitat and rangeland productivity: Environmental Management, v. 56, no. 3, p. 675-683. Implications: The study showed that juniper removal can benefit both GRSG and cattle forage production, but the benefits depend on site characteristics and how sites were selected. Sites chosen to maximize forage did not substantially benefit GRSG. Sites chosen for GRSG habitat did benefit forage production, but larger habitat treatments had decreasing returns on investment. The benefits achieved for either goal were altered by agency coordination, budgetary constraints, and wildfire. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; pinyon-juniper removal Significance: Management can be prioritized to benefit GRSG habitat and cattle forage Comments: Management actions can have a dual purpose.

Mitigation-Restoration of Habitat - Pinyon-Juniper removal Author: Coates et al. Year: 2017 Title: Pinyon and juniper encroachment into sagebrush ecosystems impacts distribution and survival of greater sage-grouse: Rangeland Ecology and Management, v. 70, no. 1, p. 25-38. Implications: From the authors: "Collectively, these results provide clear evidence that local sage-grouse distributions and demographic rates are influenced by pinyon-juniper, especially in habitats with higher primary productivity but relatively low and seemingly benign tree cover. Such areas may function as ecological traps that convey attractive resources but adversely affect populationvital rates. To increase sage-grouse survival, our model predictions support reducing actual pinyon-junipercover as low as 1.5%, which is lower than the published target of 4.0%." Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; Improved standards for pinyon-juniper removal Significance: New threshold for pinion-juniper removalprovided greater benefits to GRSG

Mitigation-Restoration of Habitat - Pinyon-Juniper removal Author: Prochazka et al. Year: 2017 Title: Encounters with pinyon-juniper influence riskier movements in greater sage-grouse across the Great Basin: Rangeland Ecology and Management, v. 70, p. 39-49. Implications: The authors conclude that GRSG are negatively affected by pinyon-juniper encroachment because this habitat type stimulates faster, high-risk movements, such as flight, which likely attract visual predators. Further, the study quantifies age-specific GRSG mortality risk when individuals move through landscapes containing pinyon-juniper stands. Supersedes NTT: Yes Supersedes COT: Yes Issue: Pinion-juniper; predation risk Significance: Pinion-juniper; predation risk Comments: Cause and effect mechanism explaining predation risk

Mitigation-Restoration of Habitat - Pinyon-Juniper removal Author: Reinhardt et al. Year: 2017 Title: The authors conclude that the optimization framework and models used in this study illustrate an approach, increasingly available to land managers, which can augment or complement standard expert-based approaches to planning and prioritization. Such approaches could reduce planning and implementation time for landscape-scale conifer removal treatments. Topics: broad-scale habitat characteristics, conifer expansion, new geospatial data, habitat restoration or reclamation Implications: Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; conifer removal Significance: Prioritization of management Comments: Improved methodology

Mitigation-Restoration of Habitat - Pinyon-Juniper removal Author: Davies and Bates Year: 2019 Title: Longer-term evaluation of sagebrush restoration after juniper control and herbaceous vegetation trade-offs: Rangeland Ecology & Management, v. 72, no. 2, p. 260-265. Implications: Following juniper control in dense stands that lack sagebrush, mountain big sagebrush re-establishment is likely to be accelerated by seeding, whereas herbaceous vegetation cover may be reduced. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; pinion-juniper removal and sagebrush restoration

Mitigation-Wildfire Author: Davis and Crawford Year: 2015 Title: Case study-Short-term response of greater sage- grouse habitats to wildfire in mountain big sagebrush communities: Wildlife Society Bulletin, v. 39, no. 1, p. 129-137. Implications: The authors sought to identify the short-term (<11 year) response of GRSG nesting and brood-rearing habitats to wildfire. In mountain big sagebrush communities where sagebrush is abundant, the understory is composed of adequate native perennial grasses and forbs, and invasive annual grasses are limited, prescribed burning may be a useful tool for improving GRSG nesting and brood-rearing habitat. The application of fire treatments in less mesic sagebrush communities with fewer forbs may not produce the desired results, which emphasizes that management decisions need to be made in light of existing conditions and documented GRSG seasonal habitat needs. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; prescribed fire Significance: Selective use of prescribed fire to improve GRSG habitat. Comments: Supresedes NTT because fire treatments may benefit higher elevation mountain big sagebrush communities i.e. not a one-size-fits-all strategy.

Mitigation-Wildfire Author: Coates et al. Year: 2016 Title: Wildfire, climate, and invasive grass interactions negatively impact an indicator species by reshaping sagebrush ecosystems: Proceedings of the National Academy of Sciences of the United States of America, v. 113, no. 45, p. 12745-12750. Implications: The authors describe, "Using three decades of sage-grouse population count, wildfire, and climate data within a modeling framework that allowed for variable postfire recovery of sagebrush, we provide quantitative evidence that links long-term declines of sage-grouse to chronic effects of wildfire. Projected declines may be slowed or halted by targeting fire suppression in remaining areas of intact sagebrush with high densities of breeding sage-grouse." Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; targeted wildfire supression Significance: Prioritization of fire suppression to minimize deleterious effects to GRSG Comments: Important preplanning strategy to reduce threat of wildfire.

Mitigation-Wildfire Author: Ellsworth et al. Year: 2016 Title: Ecosystem resilience is evident 17 years after fire in Wyoming big sagebrush ecosystems: Ecosphere, v. 7, no. 12, article e01618, 12 p., https://doi.org/10.1002/ecs2.1618. Implications: Results demonstrate post-fire resiliance of the xeric Wyoming big sagebrush system, possibly because of its high quality and presence of unburned patches within the fire perimeter. The conditions are representative of xeric Wyoming big sagebrush communties prior to the invasion of cheatgrass, where there were islands of sagebrush left after fire which helps the system recover from fire and provide habitat for GRSG. Controlled burning of some xeric sagebrush systems that are in goodcondition and dominated by natives may have benefits for ecosystem heterogeneity and herbaceous cover. Authors conclude, "Our results illustrate that management of all habitat components, including natural disturbance and a mosaic of successional stages, is important for persistent resilience and that suppression of all fires in the sagebrush steppe may create long-term losses of heterogeneity in good condition Wyoming big sagebrush ecosystems." Supersedes NTT: Yes Supersedes COT: Yes Issue: Wildfire; mitigation strategy Significance: Selective use of prescribed fire

Mitigation-Wildfire Author: Foster et al. Year: 2018 Title: Potential effects of GPS transmitters on greater sage-grouse survival in a post-fire landscape: Wildlife Biology, v. 2018, no. 1, p. 1-5. Implications: Survival rates measured in this post-fire study were much lower than observed in other studies in the Great Basin, though they did eventually increase to comparable levels (after the conclusion of this study). If the slightly lower survival rates of birds with GPS versus VHF devices observed in this study are confirmed (5% lower survival), they are of concern because of the increasing use of GPS units and the potential for effects of this magnitude to affect population growth rates. Findings from this study were limited by small sample sizes. Supersedes NTT: Yes Supersedes COT: Yes Issue: Post-fire study; GPS transmitters affect survival Significance: GPS transmitters reduce survival compared to VHF transmitters Comments: Authors appropriately recognize that the GPS may have biased the conclusions. As such, this study better informs future study designs.

Mitigation-Wildfire Author: Shinneman et al. Year: 2018 Title: A conservation paradox in the great basin-altering sagebrush landscapes with fuel breaks to reduce habitat loss from wildfire: US Geological Survey, v. XXX, no. XXX, p. XXX*Open File Report. Implications: The authors conclude that more research is needed to document fuel break effectiveness, effects on plant communities, and effect on wildlife. However, they suggest that installing fuel breaks in an effort to protect intact sagebrush habitat may provide long-term benefits to sagebrush-associated species, even if these benefits come at a cost to some individual species at local scales. Supersedes NTT: Yes Supersedes COT: Yes Issue: Wildfire; fuel breaks Significance: Supports the reality that historical habitat was not a vast sagebrush sea, but rather an ecosystem made up of sagbrush islands. Comments:Suggest additional review due to significance as a mitigation measure.

Mitigation-Wildfire Author: Foster et al. Year: 2019 Title: Greater sage-grouse vital rates after wildfire: Journal of Wildlife Management, v. 83, no. 1, p. 121-134. Implications: GRSG continued to use areas within the wildlife perimeter, but had lower nest and adult survival rates compared to other reported values for GRSG in the Great Basin. Apparent decreased nest site fidelity within the fire perimeter may relate to increased habitat fragmentation. Increased nest survival in the second year may relate to increased vegetation in the burned area. Findings suggest that fire suppression activities to maintain intact habitat patches may be a critical tool for managers of GRSG populations and habitat in landscapes prone to fire. Supersedes NTT: Yes Supersedes COT: Yes Issue: Wildfire; mitigation strategy Significance: Improved Wildfire firefighting strategy to benefit GRSG.

Mitigation-Wildfire Author: Shinneman et al. Year: 2019 Title: The ecological uncertainty of wildfire fuel breaks: examples from the sagebrush steppe: Frontiers in Ecology and Environment, v. 17, no. 5, p. 279-289. Implications: To produce a robust cost-benefit analysis regarding fuel break effectiveness and ecological impacts, more research is needed. The authors suggest several specific research questions that could provide useful information to policy and decision-makers "to disentangle their ecological costs and benefits." Supersedes NTT: Yes Supersedes COT: Yes Issue: wildfire; fuel breaks Significance: Ecological cost benefit analysis of fuel breaks Comments: Ecological cost benefit analysis of fuel breaks

Mitigation-Wildfire Author: Stenvoorden et al. Year: 2019 Title: The potential importance of unburned islands as refugia for the persistence of wildlife species in fire-prone ecosystems: Ecology and Evolution, DOI: 10.1002/ece3.5432. Implications: Population dynamics of leks located within fire perimeters are negatively impacted. Unburned islands play an important role as refugia, and maintaining unburned vegetation may be vital for the success of GRSG populations after a wildfire event. The recovery of natural vegetation postfire may also benefit GRSG populations. Supersedes NTT: Yes Supersedes COT: Yes Issue: Wildfire; fire suppression Significance: Prioritization of fiire suppression to maintain unburned refugia and enhance pos- wild fire restoration.

Other Mitigation Author: Blomberg et al. Year: 2015 Title: Blomberg, E.J., 2015, The influence of harvest timing on greater sage-grouse survival-A cautionary perspective: Journal of Wildlife Management, v. 79, no. 5, p. 695-703. Implications: The author concluded that timing of mortality, coupled with potential effects indicated by compensatory and additive mortality models, suggests that moving harvest to later in the year will not benefit GRSG populations and may have unintended negative consequences. Issue: Technique refinement: hunting season Significance: Reducing population effects but shifting hunting season Comments: Applies only to where GRSG are hunted

Other Mitigation Author: Wing and Messmer Year: 2016 Title: Impact of sagebrush nutrients and monoterpenes on greater sage-grouse vital rates: Human-Wildlife Interactions, v. 10, no. 2, p. 157-168. Implications: Study results confirmed the importance of black sagebrush as pre-nesting season forage and suggested that any forage selection related to monoterpenes may reflect some aspect of an individual monoterpene rather than the total concentration of all monoterpenes. Study results should be interpreted cautiously because of the small sample size, single year, and single study site. Supersedes NTT: Yes Supersedes COT: Yes Issue: black sagebrush; GRSG forage

Other Mitigation Author: Blomberg et al. Year: 2015 Title: Blomberg, E.J., 2015, The influence of harvest timing on greater sage-grouse survival-A cautionary perspective: Journal of Wildlife Management, v. 79, no. 5, p. 695-703. Implications: The author concluded that timing of mortality, coupled with potential effects indicated by compensatory and additive mortality models, suggests that moving harvest to later in the year will not benefit GRSG populations and may have unintended negative consequences. Issue: Technique refinement: hunting season Significance: Reducing population effects but shifting hunting season Comments: Applies only to where GRSG are hunted

The BLM 2020 draft SEISs do not address or offer any substantive analysis or cumulative impact assessments of its management decisions.

Only after thoroughly analyzing these eminently reasonable, science-based sage-grouse habitat protections will BLM have given the requisite consideration to a range of reasonable alternatives under its plan amendment SEISs. (We also note that BLM did not provide a scoping period for the SEIS; this is WWP et al.'s first opportunity to provide comments on the scope of the 2020 draft SEIS.)

Also notable is BLM's claim that "it did not discover new information that would indicate the agency should increase the level of conservation, management, and protection to achieve its land use plan objective." New information on habitat and population declines clearly provides such "new information" suggesting that protections should be increased. Moreover, BLM's claim begs the question: did BLM discover new science suggesting the agency should decrease the level of conservation?

BLM has a NEPA duty to evaluate how baseline sage-grouse conditions have changed since its last analysis in the 2015 Plans and since BLM prepared its 2018 FEIS. The DSEIS, like the FEIS, is flawed because it fails to look at updated data on sage-grouse populations and analyze the proposed actions against this new baseline.

The BLM's failure to consider updated population data is just one failing of the agency to take a hard look and use the best available science in informing its decision-making. In fact, population declines have continued across the species' range.

In Montana, the population dropped more than 40 percent in the past three years. MFWP 2019.

In North Dakota, a spring 2019 survey found just 29 male grouse, despite having supplemented the population with birds from Wyoming since 2017.10 10 https://bismarcktribune.com/news/state-and-regional/yearslong-effort-to-save-sage-grouse-in-nd-takes- a/article_ff07b771-1ad0-5861-8ea1-e2c7d2695805.html ? In South Dakota and Washington, sage-grouse populations are vanishingly small.

WWP has gathered population data directly from state wildlife agencies and, upon review and analysis, verified the reported trajectories; presumably, the BLM should be able to obtain, analyze, and disclose the same downward trends in this SEIS process. BLM should provide a spatially explicit lek trend analysis, determining whether downward population counts are proximate to habitat impacts authorized by these plans, and/or whether management and land tenure makes a difference as to the population trajectory on leks. This analysis should include all of the states with Greater sage-grouse-including Washington, North and South Dakota, and Montana-not just the states included in the recent plan revisions.

Another new and relevant study pertaining to sage-grouse populations that should be considered is Edmunds et al. 2018, which discusses how the scale of a population analysis may obscure the site-specific population impacts of disturbance. BLM should collect the spatial population data for every state and take a fresh, hard look at the lek trends relative to the disturbances allowed by the plans.

The BLM must also consider the new scientific evidence that pinyon-juniper forests comprise an enormous amount of the Great Basin's potential for carbon storage. See Fusco, et al. 2019. The impacts of the vegetation treatment projects that BLM is promoting must be balanced against the loss of this potential. The BLM must also consider the new evidence that shows how coniferous forests are able to respond to climate change and analyze how the proposed vegetation projects undermine that potential.15 BLM must also analyze how its habitat improvement projects for sage-grouse affect the habitat of other sagebrush species, such as mule deer. Morano et al. 2019. Additionally, the predictions of climate-adaptations and species movement should be used for determining the connectedness of sage-grouse populations and the need for more protected habitats, not fewer, as the 2019 plans provide.16 15 D. Scott Mackay, Philip R. Savoy, Charlotte Grossiord, Xiaonan Tai, Jonathan R. Pleban, Diane R. Wang, Nathan G. McDowell, Henry D. Adams, John S. Sperry. Conifers depend on established roots during drought: results from a coupled model of carbon allocation and hydraulics. New Phytologist, 2019; 225 (2): 679 DOI: 10.1111/nph.16043 16 Lawler JJ, Rinnan DS, Michalak JL, Withey JC, Randels CR, Possingham HP. 2020 Planning for climate change through additions to a national protected area network: implications for cost and configuration. Phil. Trans. R. Soc. B 375: 20190117. http://dx.doi.org/10.1098/rstb.2019.0117

BLM seems to claim, in identical or virtually-identical appendices to the DSEISs, that the NTT Report and COT Report no longer represent the best available science on sage-grouse needs in light of new State sage-grouse plans, or else that BLM relied on the best available science because it included the U.S. Fish and Wildlife Service as a cooperating agency in developing the 2019 sage-grouse plans, or else that it did not need to apply the best available science in the NTT Report, only consider it, and the Plans comply with the COT Report. See, e.g., WY DSEIS at 1-3 to 1-4; ID DSEIS at 1-3. These statements are incoherent and inaccurate; sage-grouse habitat needs have not changed since 2011, nor has our scientific understanding of those needs, nor could the implementation of State plans alter sage-grouse biology. BLM's failure to apply the science-based recommendations set forth in the NTT Report was an error in its 2015 Plans that carried over in the 2019 Plans and persists in the rationalizations set forth in the DSEISs now.

The NTT Report set forth science-based protections recommended to protect sage-grouse from the effects of activities shown to be harmful to the species and its habitat. The reasons BLM gives for departing from NTT's recommendations reveal that BLM's motivation in this planning effort is not to implement protections the sage- grouse needs, but rather to loosen restrictions on activities known to harm the species.

BLM claims that it can depart from the NTT Report recommendations because IM-2012- 044 states "while [the NTT Report's] conservation measures are range-wide in scale, it is expected that at the regional and sub-regional planning scales there may be some adjustments of these conservation measures in order to address local ecological site variability." ID DSEIS at Appx. S-1-2 (emphasis added). But this highlights one of the problems with the Plans that we have repeatedly identified; adjustments to sage-grouse habitat needs identified in the NTT are not being made "to address local ecological site variability," they are being made based upon what is politically acceptable to powerful State and industry interests. BLM has not identified any science on "local ecological site variability" that would support its departures from the NTT report. Indeed, BLM's initiation of this new NEPA process to advance "management alignment" and backfill its decision to depart still farther from NTT's science-based recommendations only underlines that the process is being dictated by politics and not by what science says the species needs to survive and recover.

BLM makes much of the assertion that the NTT prescribes conservation measures that are applicable rangewide, and are not tailored to local conditions or political preferences. See, e.g., Northwest Colorado DSEIS at App-3-3, App-3-4. This is because NTT recommendations are based on the best available science, whereas politics are bound to influence local decision- making more so than science. . The habitat requirements of sage-grouse do not differ substantially from state to state, or from county to county. Sage-grouse require large tracts of undeveloped sage-grouse habitat, everywhere throughout their range. Sage-grouse are sensitive to industrial activity, and are disturbed and displaced by it, everywhere throughout their range. The large majority of sage-grouse nest within 4 miles of the lek site, everywhere throughout their range (and this has been shown in habitats as disparate as the cold deserts of western Wyoming (Holloran et al. 2005), the mixed-grass prairies of the High Plains in the Dakotas (Kaczor et al. 2011), and the hot deserts of Nevada (Coates et al. 2013)). Sage-grouse require at least 7 inches of grass height (10.2 inches in the far eastern end of their range) for hiding cover to maximize their nest success and ability to escape predation, and this has been demonstrated definitively from the shortgrass prairies on northeastern Wyoming (Doherty et al. 2014) to the arid deserts of the Great Basin in Oregon (Gregg et al. 1994). This objective, as listed in the objective table, needs to be an enforceable standard that is applied annually as a term of use for every livestock grazing lease.

The burden of proof is upon the BLM if they wish to show a scientific basis for altering protection measures from region to region, but there is no such scientific basis. Instead, BLM seeks only to defer to the desires of certain state and local governments, and industry lobbyists, to minimize sage grouse protections to levels that would be more profitable for local, politically influential industries, but detrimental to sage-grouse based on the best available science. The habitat requirements of sage-grouse do not differ significantly, rangewide, and it is therefore inappropriate for sage-grouse habitat protection thresholds to differ rangewide.

BLM seems to be trying to address its failure to adhere to the recommendations of the NTT Report by now claiming the NTT Report somehow does not represent the best available science. WY DSEIS at 1-3. "Of course, agencies may change their policies over time. But an agency must at least display awareness that it is changing position and show that there are good reasons for the new policy." Oregon Nat. Desert Ass'n v. Rose, 921 F.3d 1185, 1190 (9th Cir. 2019), reh'g denied (July 3, 2019) (internal quotations omitted). BLM seems intent on ignoring that the NTT Report is still the only available resource recommending science-based measures to protect sage-grouse. Until BLM and other agencies produce equally robust and scientifically- supported recommendations on measures to protect sage-grouse, the NTT measures remain what science says is required to protect sage-grouse. The burden of proof is upon the BLM if they wish to show a scientific basis for altering protection measures from region to region, but there is no such scientific basis.38 38 BLM posits that Carter et al. (2018) and Hanser et al. (2018) constitute significant advancements in the best available science on sage-grouse that should inform plan amendments. See, e.g., ID DSEIS at S-1-14. However, neither the annotated bibliography provided by Carter et al. (2018) - essentially a collection of abstracts - nor the Hanser et al. (2018) which adds two paragraphs of generalizations about the need for more sagebrush science and science-based management decisions to accompany its collection of abstracts (without making a single recommendation regarding a sage-grouse habitat protection threshold) attempt a current review of the science leading to science-based sage-grouse habitat management prescriptions. Which is not to say these publications are devoid of scientific value. Hanser et al. (2018) includes abstracts for papers by Shinneman et al. (2018)(reviewing the science and concluding that fuel break construction has no proven value for reducing the intensity or extent of fires in sagebrush habitats, while the impacts of fuel break construction to sage grouse are known and certain), Shinneman et al. (2019)(showing that fuel breaks could be vectors for cheatgrass invasion, fragment sagebrush habitats, and increase predation on sage-grouse by ravens and other predators), Pilliod et al. (2017) (showing that cheatgrass expands during wet years), Coates et al. (2016a)(fire and subsequent cheatgrass invasion have contributed significantly to sage-grouse declines in the Great Basin), and Coates et al. (2016b) (showing that the presence of livestock significantly increased raven occurrence, to the detriment of sage-grouse). However, for most of the key issues surrounding the appropriate levels of habitat protections under the Wyoming DSEIS (appropriate size of lek buffers, appropriate disturbance density, legitimacy of DDCT/BSU-level analysis of disturbance density thresholds, appropriateness of Wyoming lek buffers in PHMA or GHMA, appropriate allowable noise levels, or appropriateness of sage- grouse PHMA boundaries), the studies in these two compendia of abstracts are silent, and the best available science either was reviewed in the NTT report, or has been brought forward to the BLM's attention by conservation NGOs like WWP et al. in comments on the sage-grouse RMPA process.

In addition to arbitrarily downplaying the importance of the NTT Report, the DSEISs contains a misleading analysis of why the 2019 amendments are supposedly consistent with the COT Report. See, e.g., UT Appx 4 at 4-21; CO Appx 3 at App-3-16; ID Appx S-1 at App-S-1- 15; WY Appx F at App-F-15. But the COT report was primarily focused on identifying threats to the sage-grouse, not on undertaking a comprehensive review of the scientific literature (as NTT did) nor recommending measurable sage-grouse protections based on that science to be applied in land-use plans (as NTT did). Simply complying with the COT Report (to the extent the Plans do) is not enough - they must also implement the protections required by NTT.

As someone who cares about birds and the places they need, I strongly oppose any changes to the BLM sage-grouse management plans from what was originally agreed to in 2015. The health of our nation's public lands is important to me. It is a legacy that we are passing on to future generations. BLM should focus on engaging communities in implementing the 2015 plans. In 2010, the U.S. Fish and Wildlife Service determined that Greater Sage-Grouse populations were in serious trouble and warranted protection under the Endangered Species Act. An unprecedented numbers of stakeholders across the West worked for many years on ensuring that sage-grouse management is based on science and good for local economies. The plans that were agreed to in 2015 led the USFWS to reverse its 2010 decision and find the future for sage-grouse was secure. Weakening the plans would not be good for western states, put years of good work to waste, and revive the risk of a threatened or endangered species listing that was averted in 2015. BLM must use this supplemental process to thoroughly evaluate how its proposed change in management direction is likely to harm Greater Sage-Grouse habitat and is inconsistent with accepted science that tells us to meaningfully protect it. An honest analysis should lead to a different conclusion. Management of our nation's public lands should be based on science and take the long-term needs of communities into consideration, not the short-term political gains of a few.

The DSEIS addresses the agency's past and present use of the 2011 National Technical Team report (NTT) and the 2013 Conservation Objectives Team report (COT). In general, ICA both approves of and encourages the agency's use of the best available science throughout the NEPA analysis process and when decisions are made. We have long maintained significant concerns with the 2011 National Technical Team report (NTT). Among other things, the NTT was a one-size-fits-all management prescription that treated livestock grazing as a primary threat, contrary to the COT Report and the best available science. Further, the use of the NTT report was problematic as it contained overly burdensome recommendations that were not based on local conditions in Idaho. The NTT report failed to make use of the latest scientific and biological information available. According to an independent review of the report, it contained many methodological and technical errors, selectively presented scientific information to justify recommended conservation measures, and was disproportionately influenced by a small group of specialist advocates. By contrast, the COT allows land managers to be more responsive to localized threats and concerns and emphasizes the importance for state-based plans.

Predation Author: Howe and Coates Year: 2015 Title: Observations of territorial breeding common ravens caching eggs of greater sage-grouse: Journal of Fish and Wildlife Management, v. 6, no. 1, p. 187-190. Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: Ravens can significantly influence reproductive success of GRSG at local scales, but population-level effects remain unclear. Breeding ravens may target GRSG nests more than nonbreeders. Declines of GRSG may be compounded by anthropogenic activities that have improved nesting habitat for ravens in sagebrush ecosystems. Supersedes NTT: Yes Supersedes COT: Yes Issue: predation; mitigation (Technique refinement) Significance: Predator management and mitigation Comment: Examined cause and effect mechanisms behind predation

Predation Author: Coates et al. Year: 2016 Title: Landscape characteristics and livestock presence influence common ravens-Relevance to greater sage-grouse conservation: Ecosphere, v. 7, no. 2, article e01203, 20p., https://doi.org/10.1002/ecs2.1203.Background: Over the last four decades, Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: Supersedes NTT: Yes Supersedes COT: Yes Issue: Predation mitigation; reducing GRSG nest and brood predation by ravens Significance: Anthropogenic subsidies; Ravens Comment: Important as it examined cause and effect mechanisms.

Predation Author: Dinkins et al. Year: 2016 Title: Effects of common raven and coyote removal and temporal variation on climate on greater sage-grouse nesting success: Biological Conservation, v. 202, p. 50-58 Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: The authors asked whether (1) changes in raven density and coyote abundance following removal efforts affected GRSG nest success and (2) weather conditions influenced these results for coyotes.

Management of breeding and transient ravens may be a viable mitigation action in areas with high raven densities because it can reduce raven abundance and may increase GRSG nest success. However, long-term solutions, such as reducing supplemental food sources and perch structures, are necessary. Coyote removal likely results in lowered GRSG nest success because of the potential expansion of mesopredators (for example, badgers, skunks, and raccoons), which do better at smelling and thus locating and predating GRSG in wetter years. Supersedes NTT: Yes Supersedes COT: Yes Issue: Predation; Potetial mitigation (Technique refinement) Significance: Recommendations for more effective predator management; Mesopredator release after coyote removal Comment: Also, noted increased coyote predation on GRSG in wet years (like due to smell) - good investigation of cause and effect mechanisms.

Predation Author: Peebles et al. Year: 2016 Title: Effectiveness of the toxicant DRC-1339 in reducing populations of common ravens in Wyoming: Wildlife Society Bulletin, v. 40, no. 2, p. 281- 287. Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: Results indicated that raven populations near GRSG nests can be reduced through DRC-1339 poisoning. However, populations quickly recovered to pretreatment levels, suggesting that annual treatment may be needed. The authors also suggested limiting anthropogenic sources of food for ravens and frequently removing roadkill. Supersedes NTT: Yes Supersedes COT: Yes Issue: Predation (Technique refinement) Significance: Prioritization of management actions; raven management using DRC-1339 avicide

Predation Author: Walker et al. Year: 2016 Title: Mapping and prioritizing seasonal habitats for greater sage-grouse in Northwestern Colorado: Journal of Wildlife Management, v. 80, no. 1, p. 63-77. Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: Study in Northwestern Colorado. GRSG generally selected for vegetation characteristics at small spatial scales (100-400 m); terrain roughness was also a strong negative predictor at 100 m in all seasons. A mosaic of habitats with sagebrush are important in multiple seasons, and actions that increase sagebrush within 400 m and reduce forest within 100-400 m may be most beneficial. Topics: broad-scale habitat characteristics, new geospatial data, effect distances or spatial scale, behavior or demographics, habitat selection, site-scale habitat characteristics Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; habitat mapping Significance: Imporved habitat mapping for enhancement (i.e. pinion-juniper removal) and mitigation.

Predation Author: Conover and Roberts Year: 2017 Title: Predators, predator removal, and sage-grouse-A review: Journal of Wildlife Management, v. 81, no. 1, p. 7-15. Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: This was a literature review of past studies of varying quality, methods, and conclusions. The authors concluded that predation is not a likely factor in rangewide GRSG trends, with the exception of ravens in recent years. Issue: Predation Significance: Literature review Comments: Caveat: literature review of papers looking at different predator species and using different methods.

Predation Author: Peebles et al. Year: 2017 Title: Adult sage-grouse numbers rise following raven removal or an increase in precipitation: Wildlife Society Bulletin, v. 41, no. 3, p. 471-478. Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: Supersedes NTT: Yes Supersedes COT: Yes Issue: Predation; mitigation (Technique refinement) Significance: Prioritization of management; Predator control Comments: Makes a connection between weather conditions and predator control, suggesting thatwhen used in conjunction managers can increase GRSG survival.

Predation Author: Gibson et al. Year: 2018 Title: Effects of power lines on habitat use and demography of greater sage-grouse (Centrocercus urophasianus): Wildlife Monographs, v. 200, no. 1, p. 1-41. Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: There was support for GRSG avoidance of power lines to 10 km, for decreased demographic rates to 12.5 km, and for decreased population growth to 5 km. Multiple effects of transmission lines varied with raven abundance, which increased near the transmission line in this study. Some effects were small, highlighting the importance of long-term (10-20 year) studies of impact assessment. Transmission line effects on GRSG may be mitigated by decreasing raven numbers near the line, but the effectiveness of previous predator control and perch deterrent efforts have been inconclusive. Co-locating, burying, or routing lines outside of GRSG habitat may be options. Supersedes NTT: Yes Supersedes COT: Yes Issue: Transmission lines; associated predation; mitigation Significance: Potential mitigation of raven predation near transmission lines. Comments: Negative effects can be potentially mitigated

Predation Author: Kirol et al. Year: 2018 Title: Using DNA from hairs left at depredated greater sage-grouse nests to detect mammalian nest predators: Wildlife Society Bulletin, v. 42, no. 1, p. 160-165. Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: This study presents a novel, noninvasive, and cost-effective survey method that minimizes collection bias and can be used at larger spatial scales to gain insight on mammalian predators that influence GRSG nest productivity. It can also help to identify exotic predators that benefit from human subsidies and habitat modification. This methods could be expanded to include other forms of DNA (e.g. feathers or saliva) for greater inference. Supersedes NTT: Yes Supersedes COT: Yes Issue: Predation (Technique refinement) Significance: Potential method for identifying mammalian predators of GRSG nests. Comment: Trail cameras at nests would provide data with shorter turn-around time.

Predation Author: O'Neil et al. Year: 2018 Title: Broad-scale occurrence of a subsidized avian predator-reducing impacts of ravens on sage-grouse and other sensitive prey: Journal of Applied Ecology, v. 55, no. 6, p. 2641-2652., https://doi.org/10.1111/1365-2664.13249 Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: The authors proposed that their anthropogenic influence index can be used to identify priority areas where ravens are more likely to affect GRSG. It can also be used to target where management of anthropogenic features can help reduce raven expansion. Finally, they argued that their methods can be applied to the management of other generalist predators. Supersedes NTT: Yes Supersedes COT: Yes Issue: predation (Technique refinement) Significance: Prioritization of management; improved methodolgy for more effective predator management

Predation Author: O'Neil et al. Year: 2018 Title: Broad-scale occurrence of a subsidized avian predator-reducing impacts of ravens on sage-grouse and other sensitive prey: Journal of Applied Ecology, v. 55, no. 6, p. 2641-2652., https://doi.org/10.1111/1365-2664.13249 Implications: The authors proposed that their anthropogenic influence index can be used to identify priority areas where ravens are more likely to affect GRSG. It can also be used to target where management of anthropogenic features can help reduce raven expansion. Finally, they argued that their methods can be applied to the management of other generalist predators. Supersedes NTT: Yes Supersedes COT: Yes Issue: predation (Technique refinement) Significance: Prioritization of management; improved methodolgy for more effective predator management

Predation Author: Smith et al. Year: 2018 Title: Phenology largely explains taller grass at successful nests in greater sage-grouse: Ecology and Evolution, v. 8, p. 356-364 Implications: The available evidence for a causal relation between grass height and nest success was weak, although grass height remained positively correlated with nest survival in the Powder River Basin of Wyoming after correction. Variations in results suggested that taller grass may be beneficial to nest survival in some circumstances (such as where shrub cover is low), but this explanation was not supported by the data analyzed here. Nest site selection or other life stages (for example, brood survival) may be affected by the structure of grasses. The authors suggested that findings from previous studies may have led to an overemphasis of the role of grass height in GRSG nesting habitat quality. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement: habitat quality mapping Significance: Grass height is over emphasized in evaluating habitat quality.

Predation Author: Dudko et al. Year: 2019 Title: Movements of female sage grouse centrocercus urophasianus during incubation recess: IBIS, v. 161, no. 1, p. 222-229. Implications: Data suggest that a larger area around nests than previously thought may be important for nesting success, which is an important consideration in determining minimum patch sizes needed for nesting and appropriate spatial scales for evaluating nesting habitat. The flights associated with recesses may expose GRSG to predation by ravens. Striking vertical structures during these flights, which typically occur during low light conditions, may be a mortality risk. Issue: Predation risk; Potential mitigation Significance: Ravens Comments: Provides a behavioral mechanism for susceptibility to raven predation, and therefore informs better predator control methods.

Predation Author: Kammerle and Storch Year: 2019 Title: Predation, predator control and grouse populations: a review: Wildlife Biology, article wlb.00464, 12 p., https://doi.org/10.2981/wlb.00464. Implications: Well-designed predator control programs are likely to cause short-term benefits to various grouse species. However more research is needed, particularly on how the competitive interactions of predator species influence grouse predation risk and whether removing certain predator species may have unintended cascading effects. Supersedes NTT: Yes Supersedes COT: Yes Issue: Predation; mitigation (Technique refinement) Significance: Predator management Comments: Looked at cause and effect mechanisms behind unintended consequences.

Predation Author: Smith et al. Year: 2019 Title: Approaches to delineate Greater Sage-grouse winter concentration areas: The Journal of Wildlife Management, v. 83, no. 7, p. 1495-1507. Implications: The authors suggest that individual-based resource selection function models(RSF) can be useful when data on flock sizes are not available in winter concentration areas. They also suggest that their survey and modeling approach was constructive for identifying habitat selection and determining whether currently protected areas are adequate for all seasons of use by GRSG (. They conclude that an important amount of GRSG winter habitat might not be adequately protected by Core Areas in Wyoming (although this conclusion is not well justified). Issue: Potential technique refinement Significance: This is duplicative of other methods to delineate winter habitat.

Analysis and mitigation to address impacts of predation of sage-grouse should also be taken into consideration. NACD encourages BLM to work with state and local governments and other appropriate federal agencies (such as U.S. Fish and Wildlife Service and USDA-Wildlife Services) to determine the most sensible approach to reduce the impacts of predation. Species such as the Common Raven have a disproportionate impact on sage-grouse but also have paradoxical protections under the Migratory Bird Treaty Act

The DSEISs and the BLM still haven't taken a hard look at the effects of anthropogenic infrastructure and the subsidization of sage-grouse predators. We have provided extensive discussions of this in the past, but BLM continues to ignore the fact that its actions are creating improved conditions for predatory species such as ravens. Three new papers illuminate raven interactions with sage-grouse.Harju et al. (2018) discusses breeding ravens' use of structures (including oil and gas facilities) and the differences in the use of space between breeding and non-breeding ravens, which has implications for raven management that induces nest failure (such as oiling eggs) as a means for affecting predation on sage-grouse. O'Neil et al. (2018) provide spatial information about the effects of anthropogenic infrastructure and discuss how removing these subsidies could assist in preventing raven predation on sage-grouse. Dudko et al. (2019) posit that movements by sage hens assist in raven detection of nests, and that habitat important for nesting "may be more extensive than previously appreciated."

Habitat Improvement Author: Davee et al. Year: 2019 Title: Using beaver dam analogues for fish and wildlife recovery on public and private rangelands in Eastern Oregon: Research Paper PNW-RP-617. Northwest Climate Hub, U.S Department of Agriculture, Forest Service, Pacific Northwest Research Station, p. 32. Implications: Beaver dam analogues can improve habitat for fish and wildlife, including GRSG, but implementing this tool may require navigating new or yet-to-be established regulatory pathways and obtaining by-in from private landowners and ranchers is an important consideration for increasing implementation of this tool. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; Mitigation; Habitat restoration Significance: Innovative method for habitat resotation; habitat expansion Comments: Expands mesic areas making them more resilient (potentially usefull for drought/climate mitigation and/or conservation offset).

Mining Author: Pratt and Beck Year: 2019 Title: Greater sage-grouse response to bentonite mining: The Journal of Wildlife Management, v. 84, no. 4, p. 866-879 Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: In general, the adverse effects of bentonite mining on GRSG appear to be consistent with those of energy development. A greater proportion of the Bighorn Basin GRSG population is affected by mining during the winter season than at other times of the year. Therefore, prioritization of winter habitat may be a key management strategy there. Further, reclaimed mines remain unsuitable for GRSG due to slow regeneration of sagebrush cover, so intense propmotion of sagebrush regeneration is important for restoring GRSG habitat. Issue: bentonite mining impacts Significance: Reclaimed mines not utilized by GRSG due to slow regeneration

Re-setting noise limits to a maximum of 25 dBA, in accordance with the best available science;

Sage-grouse lek population declines occur once noise levels exceed the 25 dBA level. With this in mind, ambient noise levels should be defined in all plans as 15 dBA and cumulative noise should be limited to 25 dBA in occupied breeding, nesting, brood-rearing, and wintering habitats, which equates to 10 dBA above the scientifically-derived ambient threshold.

M.3.8 Direct/Indirect Impacts

Lastly, the terms "minor", "negligible", "similar", and "no measurable effects" run rampant throughout Chapter 4, however, none carry any objective definitions relative to the currently proposed alternatives.

For example, consider Section 4.11 Impacts on Livestock Grazing Subsection 4.11.2 Management Alignment Alternative: "Despite minor differences between the actions described in the Management Alignment Alternative and those analyzed in the 2015 Final EIS, the difference between the nature and type of impacts described would be negligible.

These impacts are discussed in Section 4.10 of the 2015 Final EIS." Modification of management procedures and stipulations regarding millions of acres of public land is hardly "minor," therefore, the impacts of such modifications cannot be "negligible." Furthermore, referencing an impact analysis corresponding to the current policy as analyzed in the past bears no merit to a "hard look" at impacts pertaining to the proposed modification of the current policy relative to its potential impacts in the future.

There is an inadequate analysis of the impacts to sage-grouse and sagebrush habitat from the proposed management changes, including increased oil and gas leasing, reduced mitigation, elimination of buffers, and the increased opportunity to use waivers, exemptions or modifications to oil and gas permit stipulations including within priority sage-grouse habitat. The conclusion that these changes will have no additional impact to sage-grouse populations is not supported. Allows county governments to determine whether waivers should be allowed rather than the scientists from the state wildlife agencies and U.S. Geological Survey.

The proposed management changes in the EIS which include increased oil and gas leasing, reduced mitigation, and oil and gas permit stipulations either being reduced or eliminated in sage grouse priority habitat are profoundly significant changes yet the document states that these changes will have no significant impact-- a conclusion that simply makes no sense. These changes will instead have significant impact.

It is imperative the scope of the current SEIS process be expanded to include robust examinations of multiscaled assessments of sage-grouse population-level response to direct, indirect, and cumulative impacts associated with management alternatives. Informed decision-making requires scientifically-valid approaches to assessing these impacts that expressly take into account the uncertainty and risk inherent in sagebrush habitat management.

M.3.9 Assumptions and Methodology

The attempts by the BLM to weaken the 2015 plan are putting our sagebrush ecosystem, and the hundreds of species that rely on it, at risk. The proposed changes to the 2015 plan contradict scientific recommendations for conserving greater sage-grouse, and the supplemental environmental impact statement fails to analyze and acknowledge the negative impacts that will result from the agency's proposed change in management direction.

M.3.10 Cumulative Impacts

In the 2019 Plan Amendments, BLM failed to conduct sufficient analysis of the proposed changes. As an example, the court found that BLM did not justify limiting its cumulative effects analysis to state boundaries, finding "sage grouse range covers multiple states and that a key factor - connectivity of habitat - requires a large-scale analysis that transcends the boundaries of any single State." WWP v. Schneider, 417 F.Supp.3d at 1333. Although the court noted BLM's unique position in being able to analyze cumulative impacts over the entire range of sage-grouse, the Draft Supplemental EISs ignore the opportunity to conduct a sufficient analysis. Instead, BLM states: Conditions on public land also have changed little since the 2015 Final EISs, and to the extent that there have been new actions or developments, the impacts associated with those actions or developments are in line with the projections in the 2015 Final EISs regarding reasonably foreseeable actions and effects. . . . Since the nature and context of the cumulative effects scenario has not appreciably changed since 2015, and the 2015 analysis covered the entire range of the Greater Sage-Grouse, the BLM's consideration of cumulative effects in the 2015 Final EISs adequately addresses most, if not all, of the planning decisions to be made through this planning effort. Nevada Draft SEIS, pp. 4-53. This statement outright rejects the purpose of supplemental analysis, which is to supplement previous analysis to address impacts that have not yet been sufficiently considered, and ignores the substantial changes in condition on public lands. The 2019 Plan Amendments present sweeping changes across sage grouse range, yet fail to analyze large-scale impacts, as found by the court. Similar to the Richardson case, "BLM neglects the fundamental nature of the environmental problem at issue" that location of development widely influences the impacts on wildlife. 565 F.3d at 705. Reliance on previous analysis utterly fails to address the need for additional environmental review.

The court also found that BLM must conduct a "robust cumulative impacts analysis" but did not take into account impacts outside of state boundaries, even though "the sage grouse range covers multiple states and that a key factor - connectivity of habitat - requires a large-scale analysis that transcends the boundaries of any single State." WWP v. Schneider, 417 F.Supp.3d at 1332.

Instead of expanding its cumulative impacts analysis to the requisite scope, BLM made no changes and states: Since the nature and context of the cumulative effects scenario has not appreciably changed since 2015, and the 2015 analysis covered the entire range of the Greater Sage-Grouse, the BLM's consideration of cumulative effects in the 2015 Final EISs adequately addresses most, if not all, of the planning decisions to be made through this planning effort. Nevada Draft SEIS, p. 4-55. This is the same statement that BLM included in the 2019 Amendments. Further, the cumulative impacts analysis does not appear to address leasing and development that has occurred since 2018, which makes a significant contribution to overall impacts across the species' range. See, Appendix H (Cumulative Effects Supporting Information); Nevada Draft SEIS, p. 4-55. The BLM is required to consider the cumulative environmental impacts to sage-grouse and sage- grouse habitat in these FEISS. Cumulative environmental impacts are defined as: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. 40 C.F.R. § 1508.7. "Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." Id. Cumulative impacts must be considered in the scope of an EIS. Id. § 1508.25(c). BLM has not complied with this requirement, which would require evaluation of the impacts of the changes in the 2019 Amendments across the range of the sage-grouse, including population declines, loss of habitat to fire, the likely effects of fuel breaks projects, and the impact of increased oil and gas leasing and drilling.

Cumulative Impacts ? We agree with using the cumulative effects analysis (CEA) of the 2015 FEIS as a fundamental data to identify the additional cumulative impact. However, there is no clear information about the past cumulative effects analysis in the 2019 DEIS. It will impede public review and confuse decision makers. We request that it is made clear that the CEA in 2015 FEIS must appear in the 2019 EIS. According to the past cumulative effects analysis, the 2019 EIS also needs to clearly provide additional cumulative impacts between 2015 FEIS and 2019 EIS. ? The CEA does not include all relevant activities, with oil and gas projects in Wyoming and other scheduled lease sales not contributing to the assessment. We ask that the BLM consider all relevant activities while conducting the CEA. When writing the FEIS, we ask that the BLM provide all past, present, and expected actions that will impact connected projects. ? Although Management Action 4 would allow Greater-Sage Grouse to be considered through site-specific analysis, it seems safer to keep the specific language regarding Greater-Sage Grouse in the Proposed Plan in Wyoming. This would guarantee that the Greater-Sage Grouse is considered when taking action. ? The preservation of Greater-Sage grouse habitat is vital, and millions of dollars have been spent protecting the species. Regarding the use and development of sage grouse critical habitat mentioned in the Unavoidable Adverse Impacts, a no net loss policy should be implemented to at least maintain the current amount of habitat available.

The counties have consistently opposed range-wide cumulative effects analysis and opposed the use management zones that go beyond a local BLM field office planning area or a particular National Forest. The counties' position on this has not changed. However, as to the question whether the DSEIS has clarified that the cumulative effects analysis was done at the range wide level organized by WAFWA management zones

Science-based Decision Making Data-driven, statistically-sound assessments of potential responses of sage-grouse populations and habitats to proposed management are necessary to ensure informed decision-making. Yet, the BLM in the 2020 Draft SEISs does not offer any substantive analysis of the indirect and cumulative impacts to sage-grouse of its management decisions. Given current circumstances, rigorous cumulative impact assessments are especially important because of BLM's reliance on the largely disjunct set of management approaches being implemented across the species' range (i.e., state-to-state coordination is limited). The BLM has failed to inform its decision making by not conducting rigorous impact analyses. This oversight will likely jeopardize the agency's ability to meet sage-grouse management goals.

NEPA requires adequate disclosure of the cumulative impacts of the proposed action "when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions." 40 C.F.R. § 1508.7. If separate proposed actions themselves are connected or cumulative, they must be analyzed in a single EIS. Id. § 1508.25(a). Here, BLM improperly fragmented its analysis into six EISs, in violation of 40 C.F.R. § 1508.25(a), and then also failed to conduct any meaningful cumulative impacts analysis within each EIS, in violation of 40 C.F.R. § 1508.25(c).

For example, the oil and gas leasing cumulative effects supporting data for the NW Colorado, Nevada/California, Utah, and Wyoming SDEIS analyses is out of date or non-existent. The Utah DSEIS does not include acreages for oil and gas lease sales held after December 2018 or that are currently pending, even though these lease sales include designated sage-grouse habitat management areas, which means that BLM is using outdated information for its decision- making.25 25 See Nevada/California DSEIS at H-4 and Utah DSEIS at D-8.

It is arbitrary and capricious for BLM to consider oil and gas leasing acreages in its sage- grouse plan NEPA analyses for some states but not all. Moreover, all of these acreage omissions must be remedied in the FSEIS for each state with oil and gas leasing. In order that BLM can make an informed decision about these greater sage-grouse plans, cumulative effects oil and gas leasing acreages should include both an acreage total and acreage breakouts by sage-grouse habitat management area type.

M.3.11 Adaptive Management

However, we oppose the universal retention as to "Land Tenure"; we oppose the universal avoidance of "Rights-of-way" in PHMA and IHMA, and we oppose the universal limited access as to "Travel management" - for the reasons we previously addressed in our comments. Specifically, flexibility should be added to adjustments in "Land Tenure", to "Rights-of-Way, and to "Travel Management" relative to site conditions in any FSEIS and plan amendments.

The SEISs also must disclose the known flaws in the methodology of Coates and others, which has resulted in some questions about the triggering changes from various states. The BLM should revisit all the states' data to see where triggers have been met with new and improved methods, and explain in the forthcoming EISs what causal factor analyses have resulted in which adaptive management changes

M.3.12 Burial of Transmission Lines

Wind Turbines and Transmission Lines Author: LeBeau et al. Year: 2017 Title: Greater sage-grouse habitat selection, survival, and wind energy infrastructure: Journal of Wildlife Management, v. 81, no. 4, p. 690-711. Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: GRSG appeared to select nest sites without regard to wind energy infrastructure but avoided such infrastructure during brood rearing and summer. Stronger effects of disturbance associated with wind energy on brood-rearing habitat selection in the later time period suggest a lagged population-level response. GRSG survival did not appear to be negatively affected by the facility. Supersedes NTT: Yes Supersedes COT: Yes Issue: Wind energy; GRSG habitat use and survivorship Significance: Apparent lag effect of wind energy infrastructure.

Wind Turbines and Transmission Lines Author: Kohl et al. Year: 2019 Title: The effects of electric power lines on the breeding ecology of greater sage-grouse: Plos One, v. 14, no. 1, p. E0209968., https://doi.org/10.1371/journal.pone.0209968 Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: The authors proposed 2.3 km buffer zones around active leks as a best management practice for new transmission line construction. They also proposed site-specific management for distribution lines, and colocation with existing disturbances for all new power lines. Maintenance of sagebrush cover around power lines may improve GRSG habitat suitability, despite the presence of human disturbance. Issue: Mitigation Significance: Transmission lines

Wind Turbines and Transmission Lines Author: LeBeau et al. Year: 2019 Title: Greater Sage-grouse habitat function relative to 230-kV transmission lines: The Journal of Wildlife Management, p. 1-14. Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: The authors suggest that future transmission line placement decisions should consider potential negative effects on GRSG habitat and demographics and that transmission lines should be located in areas of lower GRSG habitat suitability and greater than 3.1 km from occupied leks if possible. Issue: Mitigation Significance: Transmission lines

M.3.13 Disturbance and Density Caps

Uniquely among the ARMPAs, the Wyoming 2019 RMPA applied a disturbance density cap of 5% in PHMA rather than the 3% applied under other plans. The DSEIS fails to explain why sage-grouse in Wyoming are more tolerant of disturbance than other states, or indeed, more tolerant than the best available science demonstrates. Knick et al. (2013) concluded that 99% of the active leks in the study area (encompassing the entire western range of the greater sage grouse) were surrounded by habitat with 3% or less surface disturbance (defined using GIS as residential or industrial development). Kirol (2012), found for his Wyoming study area that surface disturbance greater than or equal to 4% of the land area had a significant negative impact on greater sage grouse brood rearing habitat.

M.3.14 Habitat Management Area

Definitions and management actions associated with BLM habitat designations need to be removed from private land as they apply specifically to BLM administered lands; therefore there is no basis for including private land in density and disturbance calculations.

As Simplot noted in previous comments to the Draft ARMPA, the Final EIS and DSEIS continue to fail to disclose the basis by which private lands can be considered in a federal land management planning document. This seems to suggest a de-facto critical habitat designation without a listed endangered or threatened species. While section 4 of the ESA can take into consideration conservation efforts on state and private lands to avoid a listing, BLM has no authority under FLPMA to apply land use plan restrictions on private land. The Draft RMPA, the Final EIS and the DSEIS continue to apply Sage-Grouse habitat management area definitions, designated through the BLM planning process specifically for BLM administered land, to private land (including Planning Area, PHMA, IMHA and BSUs).

The DSEIS offers absolutely no science-based justification for the "modification" of HMAs. The only justification that can be ascertained from the document amounts to nothing more than an argumentum ad verecundiam opinion: "BLM recognizes that landscape level mapping may not accurately reflect on-the-ground conditions. Therefore, the HMAs (Figure 2-1 b) do not constitute a land use plan decision but rather a landscape level reference of relative habitat suitability. " (DSEIS Table 2-2b). Clearly as based on fundamental logic, HMAs constitute a land use plan decision because each HMA requires an explicit set of stipulations regarding how the land is utilized within each HMA. For example, as defined in the 2015 ARMPA for the Great Basin, SFAs are not simple "landscape level mapping" that "may not accurately reflect on-the-ground conditions". Rather, SF As are areas identified by interagency GRSG experts based on on-the-ground research that has occurred for decades. SF As are thus identified by the U.S. Fish and Wildlife Service (FWS) as GRSG "strongholds" and represent "a subset of priority habitat most vital to the species persistence within which we recommend the strongest levels of protection" (2015 ARMP A, Page 1-16). "The strongest levels of protection" can be further defined as No Surface Occupancy (NSO) to be applied without waiver, modification, or exception.

For example, consider W AFW A MZ III. How many acres of each HMA designation will be removed? How many acres are currently leased and planned to be leased for Minerals and Energy? How will modification of each HMA designation in W AFW A MZ III change the current HMA designation stipulations relative to Minerals and Energy development requirements? How many acres of currently leased and planned to be leased publio lands for Minerals and Energy development occur in SF As? How would removal of SF As and their associated "NSO without waiver, exception, or modification, for fluid mineral leasing" stipulation both directly and indirectly impact GRSG?

In order to take a hard look, the DSEIS needs to consider the effects of existing management and predict the impacts of future decisions. Without considering the current context of population and habitat triggers in each state, the agency is failing to take a hard look at its proposed amendments.

Aside from a brief, but incomplete (and already now outdated) narrative summary, the DSEIS fails to provide a full and clear listing of the PACs and tripped triggers, and how they relate to the key RNAs. BLM fails to include its Causal Factor Analyses ("CFA"), including the worksheets, annual review documents, and full reports, as an appendix to the EIS or otherwise. In fact, we understand that BLM has failed to complete many of the required CFAs. Again, the DSEIS fails to discuss this information essential to meaningful public review and informed agency decision making.

These results show that the ARMPA sage-grouse protections are not having the desired effect of recovering sage-grouse populations and habitats, but instead that populations and habitats across the West continue to deteriorate and "trip triggers" toward more intensive management actions. Thus, the BLM is using more protective management as a backstop when populations and habitats are in trouble instead of preventing the trouble in the first place through adequate regulatory mechanisms. The DSEIS is being issued in this context, and the BLM must take a hard look at this information in assessing the impacts of the proposed plans, including the effects on the ground of existing management.

Nor can BLM write off the tripping of these triggers as unrelated to management and excuse its failure to rein in industrial uses of sage-grouse habitats that way. Regardless of whether BLM management or some other factor is the direct cause of population declines and habitat degradation, BLM should address those problems by limiting known disturbances in sage-grouse habitats. To the extent the existing Plans or revised Plans allow the agency to do otherwise, they are inadequate to protect sage-grouse.

The 2019 amendments in certain states purport to allow BLM to adjust habitat management area boundaries through plan maintenance. These provisions must be cabined to ensure compliance with BLM land-use planning regulations, which provide that land use plan maintenance is only proper to reflect "minor changes in data." 43 CFR § 1610.5-4 (emphasis added) Thus, plan maintenance cannot properly be used to make anything exceeding a minor adjustment to habitat boundaries. See also Klamath Siskiyou Wildlands Ctr. v. Boody, 468 F.3d 549 (9th Cir. 2006) ("whenever resource management plans are changed in any meaningful way, the changes must be made via amendment (i.e., supported by scientific environmental analysis and public disclosure"); see also Conservation Nw. v. Sherman, 715 F.3d 1181, 1186 (9th Cir. 2013) (observing that there is a "low threshold to trigger formal amendment procedures").

M.3.15 Habitat Objectives

Section: 2.5 Page: 2-23 Paragraph/Line/Figure/Table: Table 2-2b Issue: Modifying Habitat Objectives Comment: No-Action Alternative: We do not support this approach as it does not allow for incorporation of the best available science that has emerged since, was not considered or was omitted previously, or will emerge. Additionally, the Habitat Objectives themselves are not achievable, applicable, or warranted in many areas of GRSG range, particularly in those areas that have crossed an ecological threshold to some other state. Setting objectives that are not SMART - specific, measurable, achievable, relevant, and time-certain - violates the BLMs own planning handbook. Proposed Plan Amendment: We generally support this alternative and the ability to incorporate best available science moving forward as well as the clarification as to how objectives are to be viewed and implemented. The following suggested revisions are intended to strengthen this alternative. Please revise the second paragraph to read "The Habitat Objectives (Table 2-2) in the 2015 Final EIS would be implemented following this guidance: The Habitat Objectives (Table 2-2) in the 2015 Final EIS are desired habitat conditions that are broad goals based on Greater Sage-Grouse habitat selection that may not be achievable or applicable in all areas. The ability of a site to achieve the objectives should be based on site potential informed by ecological site descriptions, state-and-transition models, Disturbance Response Groups, etc. We also request adding a citation to the MOU that BLM and other federal agencies signed with NRCS regarding update and use of ESDs. The following references also support the use and application of these tools: * BOLTZ, S., AND G. PEACOCK. 2002. Ecological sites: understanding the landscape. Rangelands 24:18-21. * BRISKE, D.D., B.T. BESTELMEYER, T.K. STRINGHAM, AND P.L. SHAVER. 2008. Recommendations for development of resilience based state-and-transition models. Rangeland Ecology & Management 61:359-367. * SOIL SURVEY DIVISION STAFF. 1993. Soil survey manual. Soil Conservation Service US Department of Agriculture Handbook 18. * STRINGHAM, T.K., P. NOVAK-ECHENIQUE, P. BLACKBURN, C. COOMBS, D. SNYDER, AND A. WARTGOW. 2015. Final report for USDA ecological site description state-and-transition models, Major Land Resource Area 28A and 28B Nevada. University of Nevada Reno, Nevada Agricultural Experiment Station Research Report 2015-01. p. 1524. Available at: http://www.cabnr.unr. edu/resources/MLRA.aspx. * STRINGHAM, T.K., P. NOVAK-ECHENIQUE, P. BLACKBURN, D. SNYDER, AND A. WARTGOW. 2015. Final report for USDA ecological site description state-and-transition models by disturbance response groups, Major Land Resource Area 25 Nevada. University of Nevada Reno, Nevada Agricultural Experiment Station Research Report 2015-02:572. Available at: http://www.cabnr.unr.edu/resources/MLRA.aspx. * STRINGHAM, T.K., P. NOVAK-ECHENIQUE, D. SNYDER, S. PETERSON AND K. SNYDER. 2016. Disturbance Response Grouping of Ecological Sites Increases Utility of Ecological Sites and State-and-Transition Models for Landscape Planning in the Great Basin. Rangelands 38(6):371-378. Previous Unaddressed Comment on 2019 RMPA?: Yes

The DSEIS adequately addresses fragmentation within management areas on an individual scale. This is problematic because the management plans don't properly address fragmentation between management areas. This inadequacy is alarming from an ecological standpoint due to the likelihood of speciation.

Habitat Improvement Author: Pyke et al. Year: 2015 Title: Restoration handbook for sagebrush steppe ecosystems with emphasis on greater sage-grouse habitat-Part 1. Concepts for understanding and applying restoration: U.S. Geological Survey Circular 1416, 44 p. Implications: This report will help resource managers make decisions about where and how to conduct restoration treatments in former sagebrush ecosystems for the benefit of sagebrushobligate species like GRSG. Topics: broad-scale habitat characteristics, fire or fuel breaks, habitat restoration or reclamation, nonnative invasive plants. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement Significance: Prioritization of management Comments:

Habitat Improvement Author: Pyke et al. Year: 2015 Title: Restoration handbook for sagebrush steppe ecosystems with emphasis on greater sage-grouse habitat-Part 2. Landscape level restoration decisions: U.S. Geological Survey Circular 1418, 21 p Implications: This report and the decision tool that it describes will help resource managers make decisions for prioritizing landscapes for restoration work. Once priority landscapes are determined, managers can move to selecting sites for restoration and use Part 3 in the handbook series. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement Significance: Prioritization of management

Habitat Improvement Author: Pyke et al. Year: 2017 Title: Restoration handbook for sagebrush steppe ecosystems with emphasis on greater sage-grouse habitat-Part 3 . Site level restoration decisions: U.S.

Geological Survey Circular 1426, 62 p Implications: This report and the tool it describes will help resource managers make decisions that should enhance their success in restoring sagebrush ecosystems and thus GRSG habitat at an individual site. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement Significance: Prioritization of management

The BLM made no meaningful effort to look at the habitat conditions and trends across sage grouse range in the DSEISs, despite this being identified as a major failing of the 2019 plans. Instead, the BLM touts the acres of vegetation "treatments" on the plans' cover pages, without acknowledging that some of these "treatments" are untested, unsuccessful, and may not result in actual sagebrush restoration for many decades, if ever. The mere fact that treatment has occurred does not indicate that the habitat has successfully been restored. In fact, habitat conditions and trends across the range show widespread degradation.

It is not sufficient to protect only sage-grouse breeding, nesting, and brood-rearing habitats; if sage-grouse cannot survive the winter due to degradation or industrialization of their winter habitats, populations will decline toward extirpation. PHMAs were designated on the basis of buffers around active lek sites, which encompass the breeding and nesting habitats used by grouse during spring and summer. But protecting wintering habitats is equally important to assuring the continued existence and ultimate recovery of the species, and these wintering habitats are frequently located outside the protective boundaries of designated Priority Habitats. BLM's analysis highlights the importance of protecting these habitats. Haak (2020, Attachment O) demonstrates that the 2019 plans are insufficiently protective of all sage-grouse habitats, and states, in her professional opinion: I was also concerned by BLM's failure to assess the conservation value of peripheral sage-grouse populations and habitat. For example, in discussing the impacts of the elimination of GHMA in Utah, BLM asserts that "there would be no significant effect of accelerating the impacts on the small populations in former GHMA[.]" See Utah FEIS at 4-21. This statement fails to consider that peripheral sage-grouse populations and habitats help ensure the species continues to exist by contributing to redundancy, representation, and resilience. See U.S. Fish and Wildlife Service, Greater Sage-grouse (Centrocercus urophasianus) Conservation Objectives: Final Report (Feb. 2013) ("COT" Report), at 12- 13. As explained above, recent studies have also emphasized the importance of the landscape outside of PHMA as stopover habitat for long-distance migrants and corridors to seasonal habitats (Newton et al. 2017; Crist et al. 2015) as well as pathways for genetic connectivity and dispersal from population centers to low population areas around the range margins (Cross et al. 2018; Heinrichs et al 2018; Row et al. 2018). These surrounding habitats are also important for the preservation of conservation options as environmental conditions change (Burkhalter et al. 2018). BLM's FEISs failed to consider these values provided by GHMA and other non-priority habitats. Haak's observation here applies equally to wintering habitats outside of the protected HMAs. The DSEISs do nothing to reconcile this inadequacy, but forthcoming iterations of the plans should identify wintering habitats, connectivity corridors, and marginal habitats (including habitats and populations in Washington and the Dakotas, which have basically been written off by BLM in these revisions). Cross et al. (2018) provide the genetic analysis of sage-grouse networks that demonstrate the relative importance of each sage-grouse population to the maintenance of resilient and viable populations over time. Row et al. (2018) provides spatial insights into maintaining functional connectivity and causal resistance. Ricca et al. (2018) also provides insights into the significance of management on species distribution, resilience, and resistance.

Retaining 7-inch residual grass height requirements in lands currently designated as PHMA and IHMA and increase grass-height requirement effectiveness by adding a requirement that this provision be applied each spring to all BLM grazing allotments;

M.3.16 Lek Buffers

Kirol et al. (2020)17 studied greater sage-grouse at six locations across Wyoming from 2008-2014, measuring the impacts to grouse of both fossil fuel energy and renewable energy. Kirol et al. found that ongoing surface disturbance from energy development within 8 km (4.97 miles) of a greater sage-grouse nest decreased the likelihood of nest success. Sage-grouse broods within 1 km (0.62 miles) of ongoing surface disturbance from energy development were less likely to survive than those further away. As ongoing disturbance increased, sage-grouse nests had an increasing rate of failure. Furthermore, female sage-grouse avoided habitat with higher levels of disturbance in favor of habitat with lower levels of disturbance. This means that current BLM greater sage-grouse nest buffers are too small to conserve grouse and implementing disturbance caps of 3-5% does not eliminate the negative impacts of ongoing disturbance on nest survival. While this paper is specific to leks in Wyoming, it should be used in each of the forthcoming SEISs as evidence of the inadequacies of current and proposed regulations.

The 2011 NTT Report and the 2013 COT Report did not receive adequate peer review and suffered from a number of substantive flaws including: ignoring substantial threats such to the Greater Sage Grouse such as predation in favor of unsupported conjectures regarding human impact; failure to account for natural population fluctuations due to weather patterns; not using the best available science, and were policy rather than science driven. These flawed reports suggested the adoption of equally flawed measures that became central to the 2015 planning effort including the designation of Sage Brush Focal Areas (SFAs) and the establishment of lek buffers. Rather than using the established land management tools, the SFA framework was formalized in the pronouncement of an October 27, 2014 memorandum from former FWS Director Dan Ashe entitled "Greater Sage-grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes". Similarly, the application of lek buffer distances was integrated into another document previously not available or included in the DEIS for public review: a U.S. Geological Survey (USGS) report entitled Conservation Buffer Distance Estimates for Greater Sage-grouse - a Review, USGS Open File Report 2014 1239. Both SFAs and lek buffer distances were allowed to evolve from the NTT and COT reports into the 2015 plans without receiving adequate review and comment and in place of utilizing existing conservation tools already available.

Improved Habitat Mapping and Assessment Author: Dahlgren et al. Year: 2016 Title: Evaluating vital rate contributions to greater sage-grouse population dynamics to inform conservation: Ecosphere, v. 7, no. 3, article e01249, 15 p., Implications: Lek counts reliably estimate changes in GRSG populations, and telemetry studies are useful for demographic monitoring. In combination, these two methods can be used to measure life-cycle dynamics. Results suggest that GRSG females can exploit varying environmental conditions and may respond to management actions, whereas nest survival is highly variable and more affected by natural environmental variation. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; Lek count and telemetry studies Significance: Improved methodology for populaion management

Improved Habitat Mapping and Assessment Author: Fregman et al. Year: 2016 Title: Male greater sage-grouse detectability on leks: Journal of Wildlife Management, v. 80, no. 2, p. 266-274. Implications:

Conducting sightability surveys to establish correction factors is recommended to avoid underestimation of regional GRSG abundance, particularly if vegetation and snow cover vary among leks. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique improvement; lek counts Significance: Sightability estimates are key to estimating population density or abundance from count data. Comments: Improves lek counting, outdates previous methods and anything that relied on previous standards

Improved Habitat Mapping and Assessment Author: Fregman et al. Year: 2017 Title: Male greater sage-grouse movements among leks: Journal of Wildlife Management, v. 81, no. 3, p. 498-508. Implications: The reported frequency of crossing between leks is higher than in previous estimates. As such, movements between leks may explain a substantial amount of variability in annual lek counts, reducing the ability of lek count data to accurately depict GRSG population abundance or trends. Lek counts done earlier in the spring are less likely than those done later (at peak attendance) to reflect population abundance, particularly in areas where male GRSG move to higher elevations as snowpack melts. Conducting lek counts during peak attendance and avoiding counts during days with precipitation, particularly at higher elevations, is recommended. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique improvement; lek counts Significance: Timing of lek counts is important to maximizing sighting of males at leks.

Improved Habitat Mapping and Assessment Author: Shyvers et al. Year: 2018 Title: Dual-frame lek surveys for estimating greater sage-grouse populations: Journal of Wildlife Management, v. 82, no. 8, p. 1689-1700. Implications: Study in northwestern Colorado. Authors report that, "We estimated that annual lek surveys captured an average of 45-74% of active leks and 43-78% of lekking males each year. Our results suggest that many active leks remain unknown and annual counts fail to account for a substantial, but variable, proportion of the number of active leks and lekking males in the population in any given year. Managers need to recognize this potential source of bias in lek-count data and, if possible, account for it in trend analyses and management efforts." Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; lek counts Significance: Important for estimating population denity and trends in low density populations. Comments: Data used by CPW and BLM for RMP development for NW Colorado is obviously biased.

Improved Habitat Mapping and Assessment Author: Coates et al. Year: 2019 Title: Estimating sightability of Greater Sage-grouse at leks using an aerial infrared system and N-mixture models. Wildlife Biology, 2019: wlb.00552, p. 1-11. Implications: The authors suggest that ground-basd lek surveys are likely to result in population estimates about 14% lower than true values, especially in areas with high sagebrush cover. Using aerial integrated infrared imaging system surveys resulted in greater sightability rates, however using repeated morning ground-based surveys or generalized correction values provided by the authors could improve GRSG population estimates derived from ground-based lek counts. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; lek counts Significance: New method for estimating lek attendance and therefore, population trends.

Improved Habitat Mapping and Assessment Author: Fregmen et al. Year: 2019 Title: Weather conditions and date influence male sage grouse attendance rates at leks: IBIS, v. 161, no. 1, p. 35-49. Implications: Considering potential biases of attendance, detection can improve the performance of lek counts as indices of population abundance. Attendance here was strongly influenced by precipitation, consistent with other studies and supporting lek-count protocols that discourage counts during rain. Slight negative effects of wind observed here also support avoiding counts during high winds. Supersedes NTT: Yes

Supersedes COT: Yes Issue: Technique refinement; lek counts Significance: Don't count sage grouse in the rain.

Improved Habitat Mapping and Assessment Author: O'Donnell et al. Year: 2019 Title: Designing multi-scale hierarchical monitoring frameworks for wildlife to support management: a sage-grouse case study: Ecosphere, v. 10, no. 9, p. 1-34. Implications: The ability to cluster GRSG leks into nested, biologically meaningful lek clusters may aid researchers and managers in producing population trend estimates at different spatial scales and help them determine drives of trends across scales. This information will be important for developing effective management actions. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; population trends Significance: Additional research required for evaluation for implementation

Improved Habitat Mapping and Assessment Author: Wann et al. Year: 2019 Title: Assessing lek attendance of male greater sage-grouse using fine-resolution gps data-implications for population monitoring of lek mating grouse: Population Ecology, v. 61, no. 2, p. 183-197., https://doi.org/10.1002/1438-390X.1019. Implications: Lek-switching occurred at a higher rate than previously thought. Therefore, the authors recommended that surveys of leks within 4 km of each other should be conducted on the same morning to reduce the chance of double counting males. Date-corrected daily lek counts using attendance probability can reliably estimate population sizes, allowing more leks to be monitored less frequently. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; lek counts Significance: Potentially resolves issue with males moving beween multiple leks by counting simultaneously.

Ramey et al. (2018) reported that regional climatic variation, as indexed by the Pacific Decadal Oscillation (PDO), was an important positive predictor of density changes at both the local and population level, particularly in the most recent part of the time series when lek count data were of higher quality.

In essence, the local and population-level effects should be quantified by the relative change in abundance of sage grouse after controlling for intrinsic factors such as density-dependence and extrinsic factors such as climatic variation (Coates et al. 2018; Ramey et al. 2018). As described below, these methods include analysis of lek counts based on stage-based population dynamic models. The sage grouse abundance should be based on lek counts (Walsh et al. 2004) as this data is relatively inexpensive and non-intrusive to collect, has been collected historically via ground-based visual surveys for several decades in many areas and provides an index of population abundance (Monroe et al. 2016). In particular, the counts of male sage grouse should be corrected for sightability (Fremgen et al. 2016; Coates et al. 2019), seasonality (Wann et al. 2019) and where possible time of day to provide an estimate of the absolute male attendance at each lek in each year. Lek counts from ground based visual surveys can be supplemented by more extensive aerial infrared surveys (Gillette et al. 2013), provided they are also corrected for sightability (Coates et al. 2019).

The change in abundance due to human activity should be quantified in terms of the change in male lek attendance relative to what the attendance would have been in the absence of the activity. In order to estimate this term it is not enough to simply compare the lek attendance before the activity to the lek attendance after the activity. This is because lek attendance in sage grouse like other tetraonids (Kvasnes et al. 2010) undergoes large oscillations driven by density-dependence (i.e. population density feedbacks affect population growth rate) and regional climatic variation (i.e. inter-annual and multi-decadal variation in large-scale regional weather patterns) (Ramey et al. 2018). In other words, we must be able to account for these two naturally interacting processes in any analysis of human influences. Without accounting for these, the result could be an activity with a negative impact appearing neutral or even beneficial if it was undertaken while the population was recovering from lowered densities due to suboptimal climatic conditions. Likewise, a downturn may be entirely due to natural processes, rather than the activity in question (e.g. a low ebb in the Wyoming sage grouse can be expected as part of a population cycle, based almost entirely on the natural processes).

In addition to accounting for temporal dependencies due to population fluctuations, the statistical models also need to account for spatial dependencies in the response of individual leks. In particular the effect of an activity is expected to decay by distance while reductions at one lek could lead to decreases or increases at neighbouring leks depending on whether depensation (i.e. decrease in local population density or number due to the loss of breeding adults) or compensation (i.e. displacement of breeding sage grouse to nearby, undisturbed leks) is occurring. The extent to which these mechanisms are operating and how best to model them remains an open question. However, this is an important question to answer because it is central to quantifying, the extent to which a locally-observed decrease in sage grouse density in a project area may, or may not be, contributing to an overall decrease in the carrying capacity of the larger, surrounding population, or the cumulative effects of multiple projects and activities on a population. In other words, the question of "how much is too much" development, relative to a desirable population threshold.

Depending on the scale, the most promising method(s) include statistical analyses that can either use other leks that are outside the zone of influence as controls and/or explicitly model density-dependence, climatic variation and other extrinsic factors (Ramey et al. 2018). Ideally they would do both. The resultant effect size should be expressed as the estimated n-fold change due to the activity with 95% confidence/credible intervals (Bradford et al. 2005). As described below, explicit models should be stage-based population dynamics models.

Excluding new primary, secondary, or high-activity roads within 1.9 miles of leks, and excluding all new road construction or location within 0.6 miles of leks (with no exceptions, waivers, or modifications)

The downward lek trends and population declines are worrisome; while sage-grouse are a cyclical species, the current downward trajectory is an anomaly.

Despite our extensive analysis and comments on the proposed changes in the 2019 RMPAs in regard to lek buffers, the DSEISs persist in maintaining the inadequate protections of the previous plans. We refer BLM to our previous comments - and extensive scientific evidence provided in literature - on this issue.

There have been a number of scientific studies demonstrating that lek buffers greater than the 0.25-mile lek buffers (e.g. authorized in the 2018 Idaho EIS for IHMA and GHMA, and also greater than the 0.6-mile buffers authorized for PHMA and SFA in the Idaho plan), are necessary to maintain current sage-grouse populations in the face of industrial development. No scientific study has ever recommended a lek buffer of 0.25 mile as an adequate conservation measure. The DSEISs don't provide any new or justifiable rationale for having weakened these standards in the FEIS or for rejecting the recommendations of an interagency team of sage-grouse experts from state and federal agencies who performed a comprehensive review of the scientific literature and recommended a 4-mile lek buffer for siting industrial development in sage-grouse habitat (National Technical Team 2011), a prescription in greater accord with the science.

M.3.17 Livestock Grazing Management

BLM fails to consider new science showing harms to sage-grouse habitat from livestock grazing and fails to consider that even under the more-restrictive 2015 Plans, few changes to livestock grazing to address sage-grouse needs have occurred. BLM is treating addressing harms to sage-grouse from livestock grazing as a paper exercise instead of taking the substantive actions needed to protect the species' habitat. BLM's failure to address grazing by implementing the 2015 Plans only confirms that those Plans do not go far enough to protect sage-grouse and the 2019 Plans and SDEISs only repeat and exacerbate this error. New scientific studies more definitively link the presence of livestock grazing with cheatgrass. Time-series data and results in Williamson et al. (2019) indicate that grazing corresponds with increased cheatgrass occurrence and prevalence regardless of variation in climate, topography, or community composition, and provide no support for the notion that contemporary grazing regimes or grazing in conjunction with fire can suppress cheatgrass. None of the BLM's DSEISs incorporate or interpret this potential impact of livestock grazing on sage- grouse habitat.

The BLM has indicated in its scoping materials for the planned grazing regulations revision that it intends to make significant changes in how NEPA will be applied to grazing authorizations. According to the documents provided, the BLM will be seeking to eliminate the requirement for notice, comment, protest, and appeal on a substantial number of authorizations. These might include permits for trailing and crossing of livestock and temporary permits for "targeted grazing," supposedly to reduce fuel loads and wildfire risk. Targeted grazing authorizations are likely to include livestock infrastructure including fencing, water tanks and wells all of which can have significant negative impacts to sage-grouse in addition the impacts of the grazing itself which is likely to segment habitat and create barriers to sage-grouse migration, breeding, nesting and brood rearing. The BLM must address the impacts of targeted grazing on sage-grouse and discuss how any new categorical exclusions proposed in the grazing regulations revision might impact sage-grouse habitat.

the revisions to MD LG 16 omit including into the alphabetical items in MD LG 16 the clarification made in the DSEIS relative to its reliance upon the COT and NTT Reports in Appendix S-1. Specifically, Appendix S-1 allows revision of livestock management direction "to incorporate key components of the Governor's sage grouse plan into BLM Management Direction (MD)" so as to include: (a) removing the threshold and response requirement during livestock permit renewal; and (b) reiterating that grazing is guided by the C.F.R. 4100 Regulations. See DSEIS, Appendix S-1, at page APP-S-1-18. We support this approach, though the DSEIS erroneously fails to apply that approach in its revision of MD LG 16 and of MD LG 17 by not explicitly speaking to remove the threshold and response requirement during livestock permit renewal.

Grazing Author: Monroe et al. Year: 2017 Title: Patterns in greater sage-grouse population dynamics correspond with public grazing records at broad scales: Ecological Applications, v. 27, no. 4, p. 1096-1107, Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: High levels of grazing in this study represent intensities near maximum allowable levels defined by the Bureau of Land Management. Study findings did not suggest that reducing these grazing levels would benefit GRSG populations, but rather that grazing may have both positive and negative effects on GRSG, depending on timing and intensity. Study results suggest that broad-scale analyses are important to capture the range of responses that wildlife can have to land-use and livestock management. These findings could also help guide sustainable livestock management decisions, such as delaying high-level grazing until after peak vegetation productivity, in similar habitats. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; grazing management Significance: Prioritization of management actions to improve grazing in GRSG habitat.

Grazing Author: Cutting et al. Year: 2019 Title: Maladaptive nest-site selection by a sagebrush dependent species in a grazing-modified landscape: Journal of Environmental Management, v. 236, no. Epub 2019, p. 622-630 Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: These findings suggest that certain sagebrush habitats may function as ecological traps, whereas others may be undervalued, especially in an actively grazed setting. Additional fencing in these locations may lower GRSG nest survival rates. Author Highlights, " Nest survival in preferred sagebrush type was one-fourth the rate in type avoided. Nest survival was four times higher when placed >100 m away from nearest fence. Timing of graze could best achieve herbaceous requirements for successful nesting. Fence modifications along with prioritization of sagebrush type are discussed." Issue: Grazing; mitigation Significance: Recommendations to avoid ecological traps in areas subject to grazing

Grazing Author: Runge et al. Year: 2019 Title: Unintended habitat loss on private land from grazing restrictions on public rangelands: Journal of Applied Ecology, v. 56, no. 1, p. 52-62. Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: Restricting grazing on public lands could result in increased GRSG habitat loss on private land over the next 30 years. It is important to consider the connections between public land policy and private land use change. Policies that balance the need to conserve habitat on public lands with economic needs of ranchers are promising. Supersedes NTT: Yes Supersedes COT: Yes Issue: Grazing management Comments: Unintended consequences

Grazing Author: Taylor et al. Year: 2019 Title: Economic impact of sage grouse management on livestock grazing in the Western United States: Western Economics Forum, v. 17, no. 1, p. 98-114. Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: Reducing or eliminating livestock grazing on federally protected lands recognized as GRSG habitat would create negative economic impacts on both a ranch-scale and regional-scale, and may create increased economic burdens for rural communities in western states. Issue: Grazing

In addition, the DSEISs inexplicably fail to consider closure of sage-grouse allotments upon receipt of voluntarily waived grazing permits. This action was identified within one of the alternatives in each of the 2015 plans, but not carried forward into the 2018 analyses or 2019 decisions. The interest in and need for grazing permit retirement has only grown since the earlier plans, but none of the DSEISs consider the action.

Our previous comments and protests have discussed the inadequacy of current rangeland health assessments to ensure the protection and restoration of sage-grouse habitat. The BLM, as a central component of the grazing regulations revision, appears to be advocating for moving from site-specific assessments of rangeland health on a 10-year timeline to larger scale assessments at the watershed or even RMP level which may only occur every 30 years or more. The BLM, therefore, must include in its current analysis a discussion about how any changes to scale and timeframe for rangeland health assessments will impact sage-grouse habitat management and the responsiveness of agency land managers to adjust grazing practices when standards are not met.

M.3.18 Withdrawal Recommendation and SFAs (Sagebrush Focal Areas)

Lack of consultation and coordination with state and local partners is a failure that plagued the 2015 land use plan development process throughout. As a result, the U.S. District Court for the District of Nevada held that BLM and USFS violated NEPA by failing to prepare a supplemental EIS to examine the SFA designations and allow for public comment. This failure underscores the process by which the overly restrictive 2015 plans were developed and the shortcomings that could have been avoided had the agencies deferred to state plans for Greater Sage Grouse conservation.

The Idaho District Court characterized the elimination of SFAs and "downgrading" these areas to Priority Habitat Management Areas (PHMAs) as a reduction in protection for the Greater Sage Grouse, and that in removing the SFAs, the final EISs for the revised plans "failed to identify any changes on the ground - or in the science - since the COT Report that had explained the need for the SFAs and designated those areas or the highest protection from energy development and other surface disturbance."13 Here again the Court ignored the fundamental change that had occurred - the rescission of the discretionary 10-million-acre mineral withdrawal that the SFA designation was created to support in the first place. 13 Western Watersheds Project et al v. Schneider et al. Case No. CV-00083-BLM, 2019, at 11. (D. Idaho Oct. 16, 2019).

The lack of basis for the withdrawal, and the contrived SFA designation designed to support it, was fully demonstrated by the BLM's own conclusion that mining impacted less than 0.1 percent of the Sage Grouse population.14 The DEIS explained that SFAs duplicate many protections already in place in PHMAs and do not provide appreciable benefit to the Greater Sage Grouse, including addressing the primary threats of wildfire and invasive species.15 As discovered during the NEPA process commenced to facilitate the withdrawals, the purported threat to the Greater Sage Grouse as dictated by the FWS was infinitesimal compared to the overall acreage proposed to be withdrawn. The BLM DEIS noted: "The total amount of mining related disturbance in Sagebrush habitat under the No Action Alternative [no withdrawal] would be 9,554 acres . . ., or approximately one-tenth of 1 percent of the total withdrawn area."16 (Emphasis added.) Indeed, the difference in acres that could be disturbed over 20 years between no withdrawal and a withdrawal of approximately 10 million acres was a mere 6,934 acres. Due to the compelling evidence related to the relatively small footprint of anticipated and foreseeable mining activities, on October 11, 2017, BLM allowed the two-year segregation period to expire by operation of law and cancelled the proposed SFA withdrawal.17 The shortcomings of the SFA designation and lek buffers included in the 2015 land use plans and grounded in the NTT and COT reports are well documented in the administrative record, and the Idaho District court erred in finding that deviation from these mechanisms constituted a reduction in Greater Sage Grouse protection without adequate review. 14 Sagebrush Focal Areas Withdrawal Environmental Impact Statement, Idaho, Montana, Oregon, and Wyoming (Dec. 2016) at 4-71. 15 Id. 16 Id. 17 82 Fed. Reg. 195, Oct. 11, 2017 at 47248.

Gold deposits like Gravel Creek (worth a gross $3 billion and growing) and Doby George are extremely rare, costly, and difficult to find; the odds of finding another similarly promising deposit elsewhere are extremely remote. Although the withdrawal was cancelled as unnecessary (which was appropriate) the segregation of these lands effective September 24, 2015 created a significant cloud of uncertainty on the project and continued development and had a chilling effect on Western's ability to continue raising necessary funds for its development. This is yet another reason why the No Action alternative should not be adopted and the BLM should consider this effect on WEX and similarly-situated mining companies with valid existing rights in the DSEIS and should consider clarifying and confirming that such analysis must occur prior to any proposed withdrawal (based on existing law and regulations to avoid such harm in the future) in the future. WEX strongly supports and urges the BLM to adopt the provisions in the Management Alignment Alternative that eliminate the SFAs, remove any reference to any potential withdrawal of lands from mineral entry and reject in totality the No Action Alternative the adoption of which would not comport with the law.

the proposal for a potential mineral withdrawal included in the 2015 GSG LUPA was just that and not a foregone conclusion that it would be completed. As WEX argued to the Nevada District Court, we believe it was a legal shortcoming that the 2015 LUPA SEIS did not include a mineral potential report before proposing the withdrawal in the SEIS of 10 million acres of land (and was improper segmentation of the necessary NEPA processes). Once the proper NEPA analysis including the mineral potential in the area and a proper socioeconomic analysis of the impacts of such a withdrawal, the decision was clear: "the proposal to withdraw 10 million acres was unreasonable in light of the data that showed that mining affected less than 0.1 percent of Greater Sage-Grouse-occupied range." See DSEIS, Sec. 4.5.2, p.4-42 (quoting the BLM's Notice of Cancellation of Withdrawal Application and Withdrawal Proposal).

B. The Cancellation Of The Proposed SFA Withdrawal Necessitates Removal Of The SFA Designations
As previously mentioned, part of the additional management package that accompanied the designations of SFAs was the recommendation to withdraw approximately ten million acres from operation of the Mining Law. The recommendation to withdraw in the 2015 Amendments was put into action upon the issuance of the RODs/LUPAs. See 80 Fed. Reg. 57,635 (Sept. 24, 2015) (notifying the public of the proposed withdrawal of BLM and Forest Service lands identified as SFAs in Idaho, Montana, Nevada, Oregon, Utah, and Wyoming). This notice also began the two- year segregation period, which prohibited entry and location on those lands. When the 2016 DEIS for the proposed withdrawal was released, it was clear the withdrawal of approximately ten million acres was not necessary to protect the greater sage-grouse or its habitat. For instance, even if no withdrawal occurred only 9,554 acres of the approximately ten million acres proposed for withdrawal could be disturbed by mining over a 20-year period. DEIS at vii, 4-87 ("The total amount of mining related disturbance in sagebrush habitat under the No Action Alternative [i.e., no withdrawal] would be 9,554 acres …, or approximately one-tenth of 1% of the total withdrawal area." (emphasis added)). In fact, the difference in acres that could be disturbed over 20 years between no withdrawal and the withdrawal of approximately ten million acres was only 6,934 acres

Although the SFAs and the lek buffers constituted substantial changes to the proposed action, no supplemental EIS was prepared to analyze them and the public was not provided an opportunity to offer input on their use as guiding elements of the 2015 land use plans. As a result, the 2015 plans did not reflect the best scientific information available to and used by the states that are home to the Greater Sage Grouse. Comments included in the SFA EIS Scoping Report and critiques by Western governors raised serious questions regarding the scientific integrity of the SFAs and their usefulness in the stated objective of Greater Sage Grouse conservation. Commenters also noted that portions of the SFAs were not suitable as Greater Sage Grouse habitat and that certain areas included within the designation are uninhabitable by the species due to past wildfire and lack of sagebrush ecosystems, facts which would have been obvious if BLM adequately assessed these lands on the ground in concert with state and local partners. Lack of consultation and coordination with state and local partners is a failure that plagued the 2015 land use plan development process throughout. As a result, the U.S. District Court for the District of Nevada held that BLM and USFS violated NEPA by failing to prepare a supplemental EIS to examine the SFA designations and allow for public comment. This failure underscores the process by which the overly restrictive 2015 plans were developed and the shortcomings that could have been avoided had the agencies deferred to state plans for Greater Sage Grouse conservation. In addition to the procedural and scientific flaws of the SFA designation, SFAs were principally designed to support a 10-million-acre withdrawal of lands from location or entry under the General Mining Law of 1872 that was unjustified and which has since been rescinded. The Idaho District Court characterized the elimination of SFAs and "downgrading" these areas to Priority Habitat Management Areas (PHMAs) as a reduction in protection for the Greater Sage Grouse, and that in removing the SFAs, the final EISs for the revised plans "failed to identify any changes on the ground - or in the science - since the COT Report that had explained the need for the SFAs and designated those areas or the highest protection from energy development and other surface disturbance."13 Here again the Court ignored the fundamental change that had occurred - the rescission of the discretionary 10-million-acre mineral withdrawal that the SFA designation was created to support in the first place.

The lack of basis for the withdrawal, and the contrived SFA designation designed to support it, was fully demonstrated by the BLM's own conclusion that mining impacted less than 0.1 percent of the Sage Grouse population.14 The DEIS explained that SFAs duplicate many protections already in place in PHMAs and do not provide appreciable benefit to the Greater Sage Grouse, including addressing the primary threats of wildfire and invasive species.15 As discovered during the NEPA process commenced to facilitate the withdrawals, the purported threat to the Greater Sage Grouse as dictated by the FWS was infinitesimal compared to the overall acreage proposed to be withdrawn. The BLM DEIS noted: "The total amount of mining related disturbance in Sagebrush habitat under the No Action Alternative [no withdrawal] would be 9,554 acres . . ., or approximately one-tenth of 1 percent of the total withdrawn area."16 (Emphasis added.) Indeed, the difference in acres that could be disturbed over 20 years between no withdrawal and a withdrawal of approximately 10 million acres was a mere 6,934 acres. Due to the compelling evidence related to the relatively small footprint of anticipated and foreseeable mining activities, on October 11, 2017, BLM allowed the two-year segregation period to expire by operation of law and cancelled the proposed SFA withdrawal.17 The shortcomings of the SFA designation and lek buffers included in the 2015 land use plans and grounded in the NTT and COT reports are well

documented in the administrative record, and the Idaho District court erred in finding that deviation from these mechanisms constituted a reduction in Greater Sage Grouse protection without adequate review.

M.3.19 Mitigation

BLM must evaluate the impacts of not requiring compensatory mitigation and alternatives to address those impacts. To the extent BLM still considers removing the compensatory mitigation requirement and will rely on voluntary actions by operators and enforcing state requirements, the agency must consider the impacts of that change. Removing the compensatory mitigation requirement is a textbook example of a significant change that necessitates supplemental NEPA. 40 C.F.R. § 1502.9(c). Despite BLM's attempts to ignore the likely consequences, the loss of required mitigation that is enforced by BLM means that there is no consistent assurance mitigation will occur. The resulting loss of habitat must be analyzed, especially in light of the loss of population and habitat described above and in Exhibit 4 that will compound these effects. BLM must consider alternatives that will address these increased threats to sage-grouse, such as increasing reliable protections from activities that damage habitat through measures like increasing protections for lands open to leasing. See, 40 C.F.R. §1502.14. BLM must conduct compliant supplemental NEPA to address the major effects of no longer requiring compensatory mitigation.

The State will work with the BLM to recommend, when appropriate, compensatory mitigation actions that create, restore, and/or protect functional habitat or habitat corridors to offset the impacts of unavoidable permanent disturbance to sage-grouse habitat. Generally, the State will recommend for every one acre of functional sage-grouse habitat permanently disturbed by project proponents, four acres of functional habitats or corridors created, restored, and/or preserved, as identified in the amended Utah Administrative Rule R634-3. Utah's compensatory mitigation ratio accounts for direct and indirect impacts that may result from permanent disturbance, differences in habitat quality, and uncertainty related to mitigation success. This ratio reduces project costs by simplifying the analysis of these factors, while also ensuring effective conservation outcomes.

The compensatory mitigation strategy contained in the Draft SEIS and the proposal to work with the State, the BLM, and the project proponents to analyze applicant-proposed or state-imposed compensatory mitigation to offset residual impacts is the best way to balance development and conservation in alignment with the State management plan.

I feel that compensatory mitigation is inadequate to mitigate for loss of Greater Sage-Grouse. You cannot compensate for the potential loss of a species like the Greater sage-Grouse monetarily. The new plan could significantly reduce the GRSG's chances of survival, and this is a tragic loss for all of us and future generations of Americans. I believe that the BLM has a Public Trust obligation to protect the Greater Sage-Grouse for all of us.

Supplemental Draft EISs should have been issued as required by NEPA when the BLM decided to eliminate mandatory compensatory mitigation. We are opposed to the elimination of mandatory compensatory mitigation, as mandatory compensatory mitigation is a cornerstone component contributing to the 2015 FWS determination that the GRSG is "not warranted" for listing under the ESA. An attempt to offer compensatory mitigation to development proponents as voluntary and regulated only under relevant State authorities both undermines the monumental collaborative conservation effort that resulted in the 2015 FWS determination and is likely to impose disadvantageous range wide impacts to GRSG. Further, the 2020 DSEIS does not appear to provide any substantive justification for eliminating mandatory compensatory mitigation.

Elimination of mandatory compensatory mitigation is likely to impose disadvantageous range wide impacts to GRSG by transferring compensatory mitigation authority to the State level. Consistent with the myriad of issues associated with the range wide cumulative impact analysis, "the states have no legal authority to dictate how federal lands are to be managed or to impose conditions like compensatory mitigation on federal land users" (DSEIS, C-172). Further pointing out the need for Federal involvement with regards to compensatory mitigation. GRSG occupy a geographic range composed of several states and they rely on habitat connectivity to persist. Imposing a state-led and therefore piecemeal compensatory mitigation policy is sure to result in range wide fragmentation of conservation efforts because compensatory mitigation policies are variable in degree of protection between states and also subject to change over time as political factors shift and economic reality varies. The 2020 DSEIS failed to consider this concept and as a result, includes no substantive impact analysis or conclusionary justification regarding the potential benefits or detriments that such a policy modification may impose on GRSG across its range.

In addition, Section 4.13 Page 5-54 of the 2020 DSEIS presents language that suggests that there is not yet enough data regarding compensatory mitigation to provide a science-based assessment of compensatory mitigation "effectiveness or degree of benefit": "While the BLM has more than 90 RMPs, 9 strategies, and 45 agreements in active use that contain or address compensatory mitigation, the BLM has identified only limited implementation of compensatory mitigation consistent with the 2015 Greater Sage-Grouse Plans. Using data gathered in 2017, the BLM identified 13 Greater Sage-Grouse projects across 5 BLM states with a mandatory compensatory mitigation component or net gain standard implemented between October 2008 and June 2017.

In many cases, it is still too soon in the implementation of these compensatory mitigation actions to measure the effectiveness or degree of benefit each action provides." As the BLM acknowledges that the best available science shows that more information is required to provide a defensible conclusion regarding compensatory mitigation actions, it would be both irresponsible and unethical to modify the current compensatory mitigation policy until sufficient data has been collected to inform a formal NEPA analysis of the matter.

We maintain that BLM's position that it cannot require compensatory mitigation is unlawful. BLM's analysis is inaccurate and BLM has ample authority to require compensatory mitigation under FLPMA. First, IM 2019-018 relies on a Solicitor Memorandum M-37046, "Withdrawal of M-37039, "The Bureau of Land Management's Authority to Address Impacts of its Land Use Authorizations Through Mitigation." (June 30, 2017). Solicitor Memorandum M-37046 withdraws a previous Solicitor Opinion that confirmed BLM's authority to address land use authorizations through mitigation but did not conclude BLM did not have the subject authority; rather, it "attempted to answer an abstract question." In actuality, the direction in both IM 2019- 018 and the 2019 Amendments are arbitrary and capricious, and in violation of law.

To the extent BLM still considers removing the compensatory mitigation requirement and will rely on voluntary actions by operators and enforcing state requirements, the agency must consider the impacts of that change. Removing the compensatory mitigation requirement is a textbook example of a significant change that necessitates supplemental NEPA. 40 C.F.R. § 1502.9(c). Despite BLM's attempts to ignore the likely consequences, the loss of required mitigation that is enforced by BLM means that there is no consistent assurance mitigation will occur. The resulting loss of habitat must be analyzed, especially in light of the loss of population and habitat described above and in Exhibit 4 that will compound these effects. BLM must consider alternatives that will address these increased threats to sage-grouse, such as increasing reliable protections from activities that damage habitat through measures like increasing protections for lands open to leasing. See, 40 C.F.R. §1502.14. BLM must conduct compliant supplemental NEPA to address the major effects of no longer requiring compensatory mitigation. Recommendations: If BLM intends to proceed with a Supplemental EIS process, then BLM must address the flaws in the NEPA analysis connected with the 2019 Amendments, including the failures to fully assess the impacts of the changes to the 2015 Sage-grouse Plans and to consider an actual range of alternatives.

The revisions to the compensatory mitigation guidelines will likely prove to limit maintenance and/or restoration of habitat for sage-grouse. The new guidelines rely on existing policies to “fill in the blanks” when the BLM can’t. Reliance on mitigation banking may be the most economical solution for “achieving reparations”, but it is certainly not the most effective environmentally. Mitigation banking improves areas outside the area of concern, leaving the management area degraded. The no net loss concept embedded in conservation banking has proven to be, at best, modestly successful (Bull, J.W., Suttle, K.B., Gordon, A., Sing, N.J., Milner-Gulland, E.J., 2013). The implementation of a biodiversity offset by conservation banking walks a fine line between conservation and economic growth. Mitigation banking cannot be exchanged like currency to compensate for damages to the environment. Greater sage-grouse already suffer habitat loss due to climate change, suffering habitat loss due to anthropogenic, permitted events cannot be corrected indirectly by a mitigation banking system. Mitigation strategies concerning greater sage-grouse habitat areas should primarily be focused on ecological outcomes that directly correspond with greater sage-grouse populations. The mitigation banking strategy proposed by this plan is not sufficient in promoting the longevity of the species. The purpose of this EIS is to promote the conservation of sagebrush habitat for the greater sage-grouse species and to prevent the extinction of said species. The threshold of efficacy that conservation banking would have on a species bordering extinction is too small

Because priority habitat management areas (PHMAs) are discrete areas located throughout the range of sage-grouse, large-scale conservation strategies being pursued by BLM depend not only on maintaining suitable habitats within each priority area, but also in large part on maintaining the range-wide connectivity of populations among these priority areas. The loss of connectivity among sage-grouse population strongholds due to human-related or naturally occurring disturbance is a strong predictor of long-term population declines. BLM has a critical role in managing connectivity and other broad-scale issues. Yet, the agency's recent push towards project-specific evaluations and the elimination of its avoidance options (e.g., prioritization of oil and gas leasing outside of important sage-grouse habitats has been discontinued in practice by BLM [Instructional Memorandum 2018-026]) suggest that the BLM has no viable landscape-scale approach to managing impacts to sage-grouse or its habitats. Furthermore, the BLM currently is not requiring compensatory mitigation and has deferred to state plans. While deference to state authority and mitigation programs may work, we remain skeptical as to not only compliance but also effectiveness for achieving a no-net-loss standard. In other words, the lack of a broad perspective on management, restoration and mitigation will likely lead to continued degradation and loss of sage-grouse habitats as development in these habitats proceeds. The SEISs offer no analyses related to mitigation or restoration, which represents a fatal flaw in BLM's analysis of new information and circumstances.

IM No. 2018-093, however, does authorize voluntary compensatory mitigation by a project proponent. To ensure that compensatory mitigation is voluntary, the IM cautions that BLM must not explicitly or implicitly suggest that a project approval is contingent upon proposing a "voluntary" compensatory mitigation component, or that doing so would reverse or avoid an adverse finding. Importantly, the IM notes that "[e]ven if FLPMA authorizes the use of compensatory mitigation, it does not require project proponents to implement compensatory mitigation."21 Accordingly, the IM concludes that BLM will not mandate compensatory mitigation as a condition of project authorizations unless required by law. As such, compensatory mitigation, the foundation for the "net conservation gain" standard applied across the 2015 plans adopted across the range of BLM GRSG planning area, has been renounced. Similarly, On July 30, 2018 FWS formally withdrew two significant mitigation policies of the previous Administration.

The first policy, issued on Nov. 6, 2017, related to ESA compensatory mitigation policy, was withdrawn by the Endangered and Threatened Wildlife and Plants; Endangered Species Act Compensatory Mitigation Policy.19 The second, a Nov. 2016 policy, guided the Service on recommendations to mitigate impacts of activity of land and water developments on fish, wildlife, plants, and their habitats, was withdrawn by the FWS Mitigation Policy. The withdrawn policies were eleventh hour pronouncements by the previous Administration that imposed a net conservation gain standard as applied to matters particularly focused under the ESA, in addition to throughout FWS-related activities.

As justification for the policy revocation, FWS acknowledged serious concern that requiring mitigation for impacts unrelated to a project proponent's actions as potentially implicating federal constitutional concerns related to the Fifth amendment prohibition on takings.20 Additionally, according to FWS, "[t]he ESA requires neither 'net conservation benefit' nor 'no net loss,' and [FWS] has not previously required a 'net benefit' nor 'no net loss' while implementing the ESA.21 FWS recognized that, threaded between Sections 7 and 10 of ESA, "the applicant may do something less than fully minimize and mitigate the impacts of the take where to do more would not be practicable," while still advancing Section 7(a)(2) obligation to ensure that any federal activity is not likely to jeopardize the continued existence of any endangered or threatened species or result in destruction or adverse modification of habitat.22 Accordingly, there is no legal basis to impose a "net conservation gain" standard in any way in the land use planning process. The Idaho District Court ignored BLM's IM and its well-founded interpretation of the law that FLMPA does not support mandatory compensatory mitigation and the Service's withdrawal of the policies on which net conservation gain was based. It is inappropriate to conclude that the rescission of unauthorized standards can serve as a degradation in species protection under the law. By extension, it is also inappropriate to conclude that the BLM violated NEPA by failing to analyze the impacts of not implementing standards it was not authorize to implement in the first place, and which had since been rescinded.

Another difference between past and current oil and gas development, particularly in the Pinedale Planning Area, has been the implementation of extensive mitigation measures designed to reduce overall impacts to sage grouse and enhance their habitat. Mitigation measures became notable with development of the Pinedale Anticline starting in 2000 (BLM 2000, 2008a) followed by the Jonah Drilling Infill Project (BLM 2006b) and culminating in the Pinedale Resource Management Plan Record of Decision (BLM 2008b). These measures have resulted in 183,608 ha of sage grouse habitat in the Pinedale Planning Area set aside by the BLM as unavailable to oil and gas development (BLM 2008b)

The DSEIS fails to include a fresh hard look at the removal of compensatory mitigation requirements from the 2019 plans. In order to properly assess the effects of this change from the 2015 plans, the BLM must first disclose an estimated amount of money set aside for compensatory mitigation over the life of the plan, then make educated estimates of how that money might be used to improve habitats (types of projects, acreage estimates), and then take a hard look at the population increases that such projects might be expected to generate, based on monitoring data from past compensatory mitigation projects. Please provide the information on projects funded, type of compensatory mitigation project funded, acres treated, and sage-grouse population gains (or losses) that occurred subsequent to compensatory mitigation projects in which BLM is a participating, funding, or observing member. Rangewide figures for acres treated and dollars spent in the past do not inform a "hard look" at the magnitude of the impacts of making compensatory mitigation optional (or leaving it up to the state, which amounts to the same thing since federal agencies cannot compel state agencies to require compensatory mitigation). BLM asserts again in the DSEIS that vegetation treatments will offset the loss of federally-mandated compensatory mitigation, without acknowledging the past failures of such treatments or BLM's own acknowledgement that sage-grouse "did not benefit from, or were negatively affected by, prescribed fire and mechanical sagebrush removal." Oregon FEIS at 3-4. BLM also falsely claims that state mitigation programs will offset the loss of federal requirements. However, most states do not require compensatory mitigation at the same standard as the previous federal requirements. Many state programs are voluntary, narrow the circumstances in which the requirement applies, or reduce the standard by which habitat loss must be mitigated. Indeed, not all states even have their plans finalized yet. The BLM fails to disclose the potential implementation of these state mitigation plans but simultaneously fails to safeguard public lands by creating its own.

BLM also failed to acknowledge that it simultaneously amended its plans to allow operators to waive other restrictions-such as lek buffers and disturbance caps-if they "offset" impacts through state compensatory mitigation programs. See, e.g., UT 56 (MA-SSS-3B); CO 174-75 (NSO-2); ID 031; NVCA 215. As a result of these related changes, compensatory mitigation may actually facilitate habitat destruction under the 2019 Plan Amendments.

Instead of analyzing the impacts of compensatory mitigation removal, BLM punts analysis of effects to sage grouse habitats and populations in favor of vague assertions that "mitigation would continue." See, e.g. Idaho DSEIS at 4-28, Northwest Colorado DSEIS at 4-45. The closest the agency comes to a 'hard look' at mitigation effectiveness is the following: Anecdotally, the existing conservation credit systems, banks, and exchanges designed to offset impacts to Greater Sage-Grouse or its habitat have had mixed success. The BLM is aware of three mitigation banks (one commercial bank agreement in Wyoming and two single-user bank agreements with mining companies in Nevada) and one exchange system in Colorado specific to Greater Sage-Grouse currently in operation. However, the BLM does not have access to data or information that would further assess the relative benefit provided by these systems.

Furthermore, "it is speculative to assume the impacts from voluntary compensatory mitigation at the planning level without knowing the frequency with which project proponents would offer voluntary actions. The applicability and overall effectiveness of voluntary actions cannot be fully assessed until the project level when the specific location, design and impacts are known." See, e.g.Idaho DSEIS at 4-31; Wyoming DSEIS at 4-99; Northwest Colorado DSEIS at 4-47. Thus, instead of taking the legally required hard look at impacts of changing compensatory mitigation requirements, the best the BLM can muster is an admission that they have no idea. NEPA requires at least an informed estimate.

The BLM jettisoned the compensatory mitigation promised in the 2015 plans under the policy that BLM would only consider compensatory mitigation as a component of compliance with state mitigation plans, programs or authority, or when offered voluntarily. See, e.g. Idaho DSEIS at 2-3, Colorado DSEIS at 2-9. But nowhere do the plans take a comprehensive look at what the states' plans, programs or authorities are, nor the likelihood of voluntary mitigation by developers. Without this information, it is impossible to assess the overall mitigation in sage- grouse range, underscoring how destructive and uncertain these plans are.

The Idaho and Wyoming DSEISs do admit that the difference between "Net Conservation Gain" to "No Net Loss" has not been defined by BLM. Idaho DSEIS at 4-27; Wyoming DSEIS at 4-100. This is a very basic requirement of NEPA. See, e.g. Or. Natural Desert Ass'n v. Rose, 921 F.3d 1185, 1189-90 (9th Cir. 2019) (Interior Board of Land Appeals acted arbitrarily and capriciously where it changed the definition of a "route" in a travel plan, but failed to explain "what led it to alter its earlier decision or why the new approach was more consistent with the text of the Steens Act"). Moreover, BLM's DSEISs are asserting that this change is not significant: "The BLM is not proposing any action that would preclude proponents from offering compensatory mitigation; it is clarifying the BLM's reliance on voluntary compensatory mitigation consistent with federal law." But there is a significant difference between requiring "net gain" and making any gains voluntary in terms of the "adequacy" of a regulatory mechanism. See, e.g., Idaho DSEIS at 4-34; Wyoming DSEIS at 4-102. One ensures that there is offset for habitat impacts and the other doesn't. The difference is greater than or equal to every developed/degraded acre. The forthcoming SEISs must admit and analyze this truth.

M.3.20 Modifying Waivers, Exceptions, and Modifications of Fluid Minerals

Removing waivers, modifications, and exceptions from habitat protection standards, so that they will be rigorously and dependably applied;

M.3.21 Prioritization of Mineral Leasing

Finally, BLM has not evaluated the impacts of its increased leasing and permitting in sage- grouse habitat. Since 2017 and this administration's abandonment of prioritizing leasing and development outside habitat, there has been a radical increase in leasing and permitting in sage- grouse habitat. See, Oil and Gas Development on Federal Lands and Sage-Grouse Habitats October 2015 to March 2019.5 Since the beginning of this administration, more than 4 million acres of grouse habitat have been put up for lease and approximately 2.5 million acres have sold. As the court noted, "there is no indication" that the administration will proceed at any slower pace. WWP v. Schneider, 417 F.Supp.3d at 1334. Given this trend, BLM can and should evaluate the impact of ongoing leasing and permitting in habitat. 5 available at https://www.audubon.org/sites/default/files/greater_sage-grouse_habitat_reportfinal_20190725.pdf

If the hard look at the impacts of eliminating mandatory compensatory mitigation was lacking in the FEIS, the impacts analysis on the impact of prioritizing oil and gas leasing and development outside sage grouse PHMA was completely absent. The DSEISs repeat these mistakes. Under the Obama administration, approximately 5 million acres of oil and gas leases nominated by the industry inside PHMA were pulled from the auction block under this provision. How many acres of PHMA would be abandoned as a result of leasing inside PHMA over the life of the plan amendment? To what degree would sage-grouse populations decrease as a result of leasing inside PHMA? The FEIS and the DSEIS are silent. Furthermore, BLM does not even attempt to address the elimination of prioritizing project-level development outside PHMA, which is required under the 2015 ARMPAs but eliminated under the 2018/2020 EISs.

M.3.22 Greater Sage-Grouse

Analysis of GRSG population impacts from predation and hunting must be included and considered in the development of the final land use plans. The Counties urge BLM to coordinate with local governments and the U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service on these issues. In addition, any land use plans must recognize that GRSG populations respond to changes in weather. Wet or dry years are the biggest influence on populations apart from predation and hunting.

Support the development of recovery plans within 18 months of listing that includes clear objectives to reach for delisting to occur; for species already listed support the development of a recovery plan within 18 months of this document.

Require the petition of the immediate delisting of a species when population or recovery plan objectives have been met.

Support the development of local solutions (e.g., habitat management plans, conservation plans or conservation plans with assurances) to keep a species from being listed under ESA or as species of concern/species of special concern.

Include consideration of management activities on federal lands as part of the local solutions to keep a species from being listed under ESA or as a species of concern/species of special concern.

Additionally, BLM has just completed a Programmatic EIS for Fuel Breaks in the Great Basin that will guide BLM to "construct and maintain a system of up to 11,000 miles of strategically placed fuel breaks to control wildfires within a 223 million- acre area in portions of California, Idaho, Nevada, Oregon, Utah and Washington."4 As discussed in Exhibit 4, in the opinion of sage-grouse experts, this approach will require destruction of sage-grouse habitat and could result in substantial loss and/or degradation of sagebrush habitat. BLM must consider this new information when evaluating likely impacts to sage-grouse from the 2019 Amendments. 4 https://www.blm.gov/press-release/interior-improves-strategies-combat-wildfires-across-223-million-acres-great- basin

3.D. Mineral Withdrawal Simplot supports the continued exclusion of SFAs as stated in the DSEIS and the prior withdrawal of the application to designate approximately 10 million acres of public and National Forest system lands located within Idaho, Montana, Nevada, Oregon, Utah, and Wyoming as SFAs. In its 2010 finding, the FWS identified a number of specific threats to GRSG in the Great Basin Region; including the widespread present and potential impacts of wildfire, the loss of native habitat to invasive species, and conifer encroachment. Mining was not identified as a primary threat. This is further supported in the DSEIS at page ES-1: "The BLM determined that the proposal to withdraw these areas was unreasonable in light of the data that showed that mining affected less than 0.1 percent of Greater Sage-Grouse across its occupied range." The DSEIS further clarifies at page 4-76 that: "In its 2016 SFA Withdrawal EIS, the BLM quantified the possible adverse effects from locatable mineral exploration and mining on the approximately 10 million acres of SFAs proposed for withdrawal, finding that they would be limited to approximately 9,000 acres rangewide of surface disturbance over 20 years, with approximately 0.58 percent of Greater Sage-Grouse male birds possibly affected per year. The other action alternatives evaluated in the 2016 SFA Withdrawal Draft EIS similarly demonstrated negligible benefit of the proposed withdrawal to Greater Sage-Grouse and its habitat."

Because the initial purpose behind the entire BLM Sage-Grouse RMP amendment process was conditioned upon the principal goal "to avoid a potential listing" under the Endangered Species Act (ESA), the 2020 Final SEIS needs to cure the failure of the 2015 and 2019 NEPA processes by evaluating the environmental impacts of the alternatives with respect to Sage-Grouse population status and trends. The Final SEIS needs to evaluate current population status and trends and needs to disclose how the various alternatives would impact future population trends which directly affect the purported risk that Greater Sage-Grouse may face "potential listing" under the ESA.

Sage-grouse population declines and habitat loss represent significant new environmental information that bears on the management actions established in the 2015 and 2019 sage-grouse RMP amendments. BLM must address these circumstances through supplements to the EISs used to inform those RMPs as prescribed in 40 CFR 1502.9(c)(1)(ii) of the National Environmental Policy Act (NEPA). Specifically, the regulations require agencies to: "prepare supplements to either draft or final environmental impact statements if there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." The Draft SEISs released February 11, 2020 do not reflect the reality of these new circumstances and provide no scientific justification for the majority of BLM management decisions given the current situation. Accordingly, BLM must expand the scope of these SEISs to address this new information and set of circumstances facing sage-grouse and sagebrush habitat.

The documents do present treatment and restoration acres, which are important, but there is essentially no mention of acres lost and how treated/restored acres might have offset that loss. Empirical metrics for habitat loss and acres of habitat that were mitigated and those that were not are fundamental to any meaningful "hard look" at environmental consequences. It is impossible to know exactly how much habitat has been gained or lost and what the trajectory for habitat and sage-grouse populations are without the full suite of metrics.

Furthermore, there is no mention as to whether habitat treatments and restoration were effective and, critically important, when or even if sage -grouse will ever occupy them, let alone successfully reproduce effectively in the future - the true metric of successful restoration. The temporal lag in treatment effectiveness should be accounted for in analyses and discussed in detail.

Idaho DSEIS at ES-1, Wyoming DSEIS at 1-1; Northwest Colorado DSEIS at ES-1. It is also informative to note that during the course of this period of state management of sage-grouse, the once-commonplace large flocks were eliminated and the birds became so rare, and their habitats so badly impacted by human activities, that the U.S. Fish and Wildlife Service found the species 'warranted, but precluded' for listing under the Endangered Species Act. And population declines have continued, as noted elsewhere in these comments.

BLM did not consider these increased habitat protections in the 2019 plan amendments, which this SEIS incorporates by reference without significant changes. See, e.g., Idaho DSEIS at 2-17; Northwest Colorado DSEIS at ES-3. This SEIS does nothing to remedy the failure of BLM to make needed improvements in sage-grouse habitat protections,

Dr Braun is understandably alarmed; he has been concerned about the population trajectory of sage-grouse for decades. His analysis of recent trends merits a hard look and some real consideration.In his professional opinion: These recent trends add urgency...to ensure that remaining sage-grouse populations and their habitats are protected from further degradation and fragmentation, to the maximum extent possible. Natural events - including drought and wildfires - are largely beyond federal land managers' control, but will continue and likely be exacerbated by climate change into the foreseeable future. It is thus essential that human actions - over which we do have control - not be allowed to contribute further to sage-grouse declines. Braun Declaration at 12, Attachment M. Dr. Braun's insights here and in the rest of his declaration (attached at M) should be part of BLM's hard look at the proposed action and incorporated in future iterations of the SEISs.

BLM's various arguments that NTT should not apply because it does not factor in other policy considerations or BLM guidance is nothing more than a list of excuses. For instance, the existence of other BLM authorities governing designation of areas as unsuitable for coal mining does not preclude BLM from adopting NTT's suggestion that PHMAs should be designated as unsuitable, it only provides a process for doing so. Id. at F-3; See also 43 U.S.C. § 1712(a) ("Land use plans shall be developed for the public lands regardless of whether such lands previously have been classified, withdrawn, set aside, or otherwise designated for one or more uses."). And, BLM's emphasis on applying the "least restrictive constraints" on oil and gas leasing to achieve the resource protection objective ignores that constraints in State plans like Wyoming's and others are not achieving the resource protection objective of preserving sage- grouse, which is why stronger protections are necessary to prevent further population declines. Id. BLM's suggestion in responding to the NTT Report that policy considerations should dictate which sage-grouse protections are applied - not science - is the overarching reason why BLM's land-use plans are failing to adopt adequate protections for the sage-grouse.

M.3.23 Non-Greater-Sage-Grouse

Global climate change has been caused largely by emissions from burning fossil fuels, so a public agency like the BLM can be on the forefront of reducing production of fossil fuels by denying oil and gas drilling leases. Livestock production also makes a major contribution to greenhouse gas emissions, with cattle being the largest portion (GAO 2006), so there is another opportunity to reduce GHG emissions. With climate's current unpredictability, all sage grouse habitat should be managed in a manner that addresses the possibility of a drought. Another example of the interconnection of all these factors is that climate change is causing wildfires to be hotter, windier, drier, and larger (Neary, 2019). BLM must include these stresses when considering the protection of public lands for its native biota.

Grazing Author: Smith et al. Year: 2018 Title: Effects of livestock grazing on nesting sage-grouse in central Montana: Journal of Wildlife Management, v. 82, no. 7, p. 1503-1515. Implications: Modified from USGS Annotated Bibliographies (2018, 2019) or from each paper: Female sage grouse selected nest sites based on sagebrush cover and distance from roads, and nest failure was driven by precipitation. Data regarding livestock was inconclusive. The authors suggest that conservation of shrub cover and preventing additional habitat fragmentation by roads would benefit GRSG nesting habitat and nest success. Issue: Roads; livestock grazing Significance: Seasonal effects of weather on nest success; roads fragment habitat

The Utah DSEIS similarly relies mainly on the 2015 plan for its environmental baseline (UT DSEIS at 3-4 to 3-5), and provides only the same information on sage-grouse seasonal habitat and anthropogenic disturbance as the 2018 FEIS. UT DSEIS at 3-8 to 3-10. Wyoming's DSEIS relies on 2015 conditions as a baseline for most impacts, but updates fire through 2017. Wyoming DSEIS at 3-6. This lack of information overlooks the changes on the ground in the interim and fails to provide the requisite hard look at the impacts of the proposed action; each of the forthcoming SEISs should update the baseline against which they compare the impacts of the various alternatives.

Dr. Jack Connelly provided this assessment of sagebrush and vegetation manipulations efforts in 2019: 1. Further, sagebrush and vegetation manipulation efforts - including mechanized methods using aerator with seeding, harrow or chain with seeding, drill seeding, hand planting plugs, and aerial seeding - are generally harmful to sage-grouse populations, with only weak evidence (at best) suggesting some treatments might be helpful. 2. Despite this scientific information, the 2019 Idaho and Wyoming Plan

Amendments permit prescribed burns and other sagebrush treatments as acceptable vegetation management practices in sage-grouse habitat. The 2019 Idaho Plan Amendments specifically allows these sagebrush manipulation and eradication methods, noting "[w]here desirable perennial bunchgrasses or forbs are deficient in existing sagebrush stands, use appropriate mechanical, aerial, or other techniques to reestablish them (e.g., a Lawson aerator with seeding, harrow or chain with seeding, drill seeding, hand planting plugs, aerial seeding, or other appropriate techniques)." 3. BLM approved these vegetation treatment methods despite the fact that little evidence demonstrates benefits of mechanical treatments of sagebrush for sage-grouse. In my expert judgment, these practices will only continue to destroy or degrade sage-grouse habitat, with limited or no benefit to sage-grouse populations and habitat. 4. The adverse impacts flowing from BLM's vegetation treatment projects will be further exacerbated by BLM's plans for fuels management activities. According to the 2019 Idaho and Wyoming Plan Amendments, fuels management activities - including construction of firebreaks; prescribed fire; and mechanical, chemical and biological fuels management - are specifically exempted from any disturbance limitations in sage-grouse habitat. In fact, these fuels management treatments may occur within the lek buffers in key sage grouse habitat. 5. BLM's fuels treatment activities are inconsistent with the best available scientific information on sage-grouse habitat and populations, and BLM provides no sound scientific support for its actions. Instead, BLM outright misrepresents leading research on this topic… in an apparent effort to manufacture a scintilla of scientific evidence supporting its activities. For example, in the 2019 Wyoming Plan Amendments, BLM justifies a robust vegetation treatment regime by claiming that a desired condition for sage-grouse breeding and nesting habitat includes 5-25% sagebrush canopy cover... 6. Absent these gross mischaracterizations, BLM lacks any scientific evidence supporting its decision allowing 5% sagebrush cover as a "desired condition," and compelling evidence indicates 5% canopy coverage is far too low for sage-grouse nesting habitat. In my judgment, managing sagebrush landscapes for a 5% sagebrush cover will harm sage- grouse populations and habitat, under the guise of restoring or improving both. 7. Finally, in the 2019 Idaho Plan Amendments BLM reasonably limited mechanized anthropogenic disturbance in nesting habitat during the nesting season and in wintering habitat during the winter season. But BLM then emasculates the importance of this reasonable and necessary conservation measure by exempting fuels and vegetation treatments "specifically designed to improve or protect Greater Sage-Grouse habitat." BLM cites no scientific authority supporting this exemption, and in my experience any activity that disturbs nesting hens is likely to result in nest abandonment and/or increased nest predation. Thus, BLM must prohibit all mechanized anthropogenic disturbance in breeding and winter habitat during the breeding and winter season. (Internal citations omitted, entire declaration provided in Attachment N). Dr. Connelly's expert opinion on the matter should be heeded, and the forthcoming iterations of the SEIS should explain why BLM believes that its use of scientifically inadequate protections in sage-grouse habitat is sufficient.

M.3.24 Fluid Minerals

The Center for Biological Diversity's Michael Saul also provided a revealing declaration in the preliminary injunction briefings. Attachment P. For example, Mr. Saul reviewed impacts in sage-grouse habitat that occurred between the 2019 Plan Amendments (in March) and his declaration (in June). He determined that BLM approved at least 5 oil and gas projects with 51 Applications to Drill (APDs) in Utah, 21 projects and 44 APDs in Wyoming, 1 project with 31 wells for oil and gas development in Colorado, and mining and destructive infrastructure projects in Idaho and Nevada. These were just some of the known impacts in designated sage-grouse habitat of the 2019 DSEISs prior to their injunction. The BLM must analyze and disclose the effects of these projects as the current environmental baseline and take a hard look at their impacts on sage-grouse habitat. The SEISs must discuss these and the remaining data in Mr. Saul's declaration in forthcoming iterations in order to redress their failings under NEPA.

In 2019, a new report (Gardner, et al. 2019) analyzed oil and gas development on federal lands and sage-grouse habitats from the implementation of the 2015 plans through March 2019. This research demonstrated that drilling in designated sage-grouse habitat increased by 2.98 times between February 2017 and March 2019 compared with the October 2015 to January 2017 time frame. This was a rate higher than drilling on all public lands across all states during the same periods. This demonstrates that oil and gas development has shifted towards PHMA in all states since January 2017, following the removal of SFA restrictions and prioritizations due to BLM's abrupt cancellation of SFA designations. The data from Gardner, et al., should be analyzed and disclosed in any forthcoming environmental analyses completed pursuant to the BLM's plans.

BLM continues to omit numerous large-scale oil and gas developments in key sage- grouse habitat from its DSEIS analyses. These activities are occurring throughout the range of sage-grouse, including lands beyond those covered by the 2019 plan revisions. This includes all the states where sage-grouse presently occur or could recover, and across the land tenure. The failure to consider the current conditions and likely foreseeable future actions on Forest Service lands, state lands, and private lands is a serious omission. As discussed above, these impacts are significant, merit a hard look, and a discussion of each plan's impacts should include the cumulative effects of all the activities in the range.

The Nevada/CA and Wyoming DSEISs do not specify dates in their oil and gas Past leasing sections but do include a June 2018 lease sale in their Future Pending sections, so their leasing acreages are nearly two years out of date.26 BLM in both states routinely offers thousands of acres of designated sage-grouse habitat management areas during oil and gas lease auctions. The NW Colorado DSEIS provides no oil and gas leasing acreage information in its cumulative effects summary at all, nor did BLM include this information in the NW Colorado 2018 FEIS. See NW Colorado DSEIS at App-2-1 to App-2-2, 2018 FEIS at App-2-1 to App-2-2. BLM did not even provide oil and gas leasing acreage in the 2015 NW Colorado FEIS, instead merely stating: "The BLM routinely offers land parcels for competitive oil and gas leasing to allow exploration and development of oil and gas resources for public sale. Continued leasing is necessary for oil and gas companies to seek new areas for oil and gas production or to develop previously inaccessible/uneconomical reserves." NW Colorado 2015 FEIS at 5-5. The continued omission of oil and gas leasing acreages demonstrates that BLM has never considered the actual quantity and physical location of oil and gas leasing in Colorado sage-grouse habitat as part of the cumulative effects NEPA analysis the agency was required to conduct for the NW Colorado grouse plans. 26 See Wyoming DSEIS at D-14

M.3.25 Fire and Fuels

Wildland fires also continue to be an immediate and pervasive threat to sage-grouse, especially throughout western portions of the species' range. As discussed in our protest and in the attached sage-grouse scientists' letter, data indicates that fires on BLM lands are increasing, with 3 million acres burned in Idaho, Nevada and Utah. Once again, BLM should take into account the substantial losses of habitat and likely continued losses due to fire in evaluating the impacts of proposed changes. Additionally, BLM has just completed a Programmatic EIS for Fuel Breaks in the Great Basin that will guide BLM to "construct and maintain a system of up to 11,000 miles of strategically placed fuel breaks to control wildfires within a 223 million- acre area in portions of California, Idaho, Nevada, Oregon, Utah and

Washington."4 As discussed in Exhibit 4, in the opinion of sage-grouse experts, this approach will require destruction of sage-grouse habitat and could result in substantial loss and/or degradation of sagebrush habitat. BLM must consider this new information when evaluating likely impacts to sage-grouse from the 2019 Amendments. 4 https://www.blm.gov/press-release/interior-improves-strategies-combat-wildfires-across-223-million-acres-great- basin

Mitigation-Wildfire Author: Stenvoorden et al. Year: 2019 Title: The potential importance of unburned islands as refugia for the persistence of wildlife species in fire-prone ecosystems: Ecology and Evolution, DOI: 10.1002/ece3.5432. Implications: Population dynamics of leks located within fire perimeters are negatively impacted. Unburned islands play an important role as refugia, and maintaining unburned vegetation may be vital for the success of GRSG populations after a wildfire event. The recovery of natural vegetation postfire may also benefit GRSG populations. Supersedes NTT: Yes Supersedes COT: Yes Issue: Wildfire; fire suppression Significance: Prioritization of fiire suppression to maintain unburned refugia and enhance pos- wild fire restoration

Mitigation-Wildfire Author: Shinneman et al. Year: 2019 Title: The ecological uncertainty of wildfire fuel breaks: examples from the sagebrush steppe: Frontiers in Ecology and Environment, v. 17, no. 5, p. 279-289. Implications: To produce a robust cost-benefit analysis regarding fuel break effectiveness and ecological impacts, more research is needed. The authors suggest several specific research questions that could provide useful information to policy and decision-makers "to disentangle their ecological costs and benefits." Supersedes NTT: Yes Supersedes COT: Yes Issue: wildfire; fuel breaks Significance: Ecological cost benefit analysis of fuel breaks Comments: Ecological cost benefit analysis of fuel breaks

Mitigation-Wildfire Author: Foster et al. Year: 2019 Title: Greater sage-grouse vital rates after wildfire: Journal of Wildlife Management, v. 83, no. 1, p. 121-134. Implications: GRSG continued to use areas within the wildlife perimeter, but had lower nest and adult survival rates compared to other reported values for GRSG in the Great Basin. Apparent decreased nest site fidelity within the fire perimeter may relate to increased habitat fragmentation. Increased nest survival in the second year may relate to increased vegetation in the burned area. Findings suggest that fire suppression activities to maintain intact habitat patches may be a critical tool for managers of GRSG populations and habitat in landscapes prone to fire. Supersedes NTT: Yes Supersedes COT: Yes Issue: Wildfire; mitigation strategy Significance: Improved Wildfire firefighting strategy to benefit GRSG.

Mitigation-Wildfire Author: Shinneman et al. Year: 2018 Title: A conservation paradox in the great basin-altering sagebrush landscapes with fuel breaks to reduce habitat loss from wildfire: US Geological Survey, v. XXX, no. XXX, p. XXX*Open File Report. Implications: The authors conclude that more research is needed to document fuel break effectiveness, effects on plant communities, and effect on wildlife. However, they suggest that installing fuel breaks in an effort to protect intact sagebrush habitat may provide long-term benefits to sagebrush-associated species, even if these benefits come at a cost to some individual species at local scales. Supersedes NTT: Yes Supersedes COT: Yes Issue: Wildfire; fuel breaks Significance: Supports the reality that historical habitat was not a vast sagebrush sea, but rather an ecosystem made up of sagbrush islands. Comments:Suggest additional review due to significance as a mitigation measure.

Mitigation-Wildfire Author: Foster et al. Year: 2018 Title: Potential effects of GPS transmitters on greater sage-grouse survival in a post-fire landscape: Wildlife Biology, v. 2018, no. 1, p. 1-5. Implications: Survival rates measured in this post-fire study were much lower than observed in other studies in the

Great Basin, though they did eventually increase to comparable levels (after the conclusion of this study). If the slightly lower survival rates of birds with GPS versus VHF devices observed in this study are confirmed (5% lower survival), they are of concern because of the increasing use of GPS units and the potential for effects of this magnitude to affect population growth rates. Findings from this study were limited by small sample sizes. Supersedes NTT: Yes Supersedes COT: Yes Issue: Post-fire study; GPS transmitters affect survival Significance: GPS transmitters reduce survival compared to VHF transmitters Comments: Authors appropriately recognize that the GPS may have biased the conclusions. As such, this study better informs future study designs

Mitigation-Wildfire Author: Ellsworth et al. Year: 2016 Title: Ecosystem resilience is evident 17 years after fire in Wyoming big sagebrush ecosystems: Ecosphere, v. 7, no. 12, article e01618, 12 p., https://doi.org/10.1002/ecs2.1618. Implications: Results demonstrate post-fire resiliance of the xeric Wyoming big sagebrush system, possibly because of its high quality and presence of unburned patches within the fire perimeter. The conditions are representative of xeric Wyoming big sagebrush communties prior to the invasion of cheatgrass, where there were islands of sagebrush left after fire which helps the system recover from fire and provide habitat for GRSG. Controlled burning of some xeric sagebrush systems that are in goodcondition and dominated by natives may have benefits for ecosystem heterogeneity and herbaceous cover. Authors conclude, "Our results illustrate that management of all habitat components, including natural disturbance and a mosaic of successional stages, is important for persistent resilience and that suppression of all fires in the sagebrush steppe may create long-term losses of heterogeneity in good condition Wyoming big sagebrush ecosystems." Supersedes NTT: Yes Supersedes COT: Yes Issue: Wildfire; mitigation strategy Significance: Selective use of prescribed fire

Mitigation-Wildfire Author: Coates et al. Year: 2016 Title: Wildfire, climate, and invasive grass interactions negatively impact an indicator species by reshaping sagebrush ecosystems: Proceedings of the National Academy of Sciences of the United States of America, v. 113, no. 45, p. 12745-12750. Implications: The authors describe, "Using three decades of sage-grouse population count, wildfire, and climate data within a modeling framework that allowed for variable postfire recovery of sagebrush, we provide quantitative evidence that links long-term declines of sage-grouse to chronic effects of wildfire. Projected declines may be slowed or halted by targeting fire suppression in remaining areas of intact sagebrush with high densities of breeding sage-grouse." Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; targeted wildfire supression Significance: Prioritization of fire suppression to minimize deleterious effects to GRSG Comments: Important preplanning strategy to reduce threat of wildfire.

Mitigation-Wildfire Author: Davis and Crawford Year: 2015 Title: Case study-Short-term response of greater sage- grouse habitats to wildfire in mountain big sagebrush communities: Wildlife Society Bulletin, v. 39, no. 1, p. 129-137. Implications: The authors sought to identify the short-term (<11 year) response of GRSG nesting and brood-rearing habitats to wildfire. In mountain big sagebrush communities where sagebrush is abundant, the understory is composed of adequate native perennial grasses and forbs, and invasive annual grasses are limited, prescribed burning may be a useful tool for improving GRSG nesting and brood-rearing habitat. The application of fire treatments in less mesic sagebrush communities with fewer forbs may not produce the desired results, which emphasizes that management decisions need to be made in light of existing conditions and documented GRSG seasonal habitat needs. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; prescribed fire

Significance: Selective use of prescribed fire to improve GRSG habitat. Comments: Supresedes NTT because fire treatments may benefit higher elevation mountain big sagebrush communities i.e. not a one-size-fits-all strategy.

Indeed, from 2016-2019 fires burned approximately 3 million acres of BLM administered lands in Idaho, Nevada and Utah alone, representing a 43% increase in annual acres burned on BLM lands in these states compared to the previous 4-year period (2012-15; data from the Great Basin Coordination Center). Also, the BLM estimates that more than 2 million acres of designated sage-grouse habitat management areas burned between 2015 and 2017 in Idaho, Nevada, Utah and Wyoming. Importantly, trends generated from 2004-2015 data suggest that wildfire rates are increasing, and the median annual area burned is projected to increase 5-11 times across several states in the range of sage-grouse over the next two decades. These trends coupled with other habitat losses from development (which remain poorly documented) and other perturbations simply cannot be ignored and must be addressed through these supplemental analyses.

Dr. Haak's analysis determined that "core areas in Wyoming, Idaho, and Nevada are particularly at risk, having experienced large wildfires and increasing threats from energy development in just over three years." Haak 2019 at 27, attached. In sum, the analysis found: Since there has been no overlap between lands impacted by wildfire and those now marked for oil and gas development, the impact from these two factors is additive. Range-wide nearly three million hectares (over 7,000,000 acres) of currently occupied habitat, including almost 1.6 million hectares (over 3,800,000 acres) of priority habitat, have had a change of status since adoption of the 2015 Plan. This represents 5% of the priority habitat as defined by the PACs. A significant loss in just three years. Haak at 29, Attachment O. This is exactly the type of analysis that BLM could have undertaken - but didn't - in the 2019 amendments in order to take a hard look at the current conditions and likely effects of its proposed action. The SEISs must discuss these and the remaining data in Dr. Haak's declaration and report on them in forthcoming iterations in order to redress their failings under NEPA.

M.3.26 Vegetation

Improved Habitat Mapping and Assessment Author: Gibson et al. Year: 2016 Title: Evaluating vegetation effects on animal demographics-The role of plant phenology and sampling bias: Ecology and Evolution, v. 6, no. 11, p. 3621-3631. Implications: Statistical artifacts can confound interpretations of the importance of vegetation to GRSG nest survival. Researchers should consider the confounding effects of plant phenology when planning animal demography studies. The authors provide techniques for date corrections between hatching and nest-fate measurement. Supersedes NTT: Yes Issue: Technique refinement; nesting studies

Habitat Improvement Author: Lockyer et al. Year: 2015 Title: Nest-site selection and reproductive success of greater sage-grouse in a fire-affected habitat of northwestern Nevada: Journal of Wildlife Management, v. 79, no. 5, p. 785-797, Implications: Habitat management for all shrub species, rather than just sagebrush, may confer the greatest benefits to GRSG. Reproductive success of GRSG may be improved by maintaining perennial grasses and >40 percent shrub cover within 0.8 ha of nest sites. Cheatgrass control may also improve nest success. GRSG may benefit from postfire restoration that recovers shrubs and perennial grasses. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; habitat management Significance: Prioritization of management

Soil and soil biocrusts are the foundation of the sage steppe, providing many services to the plants which evolved with these crusts (Belnap 1994). The biocrusts are fragile, quickly broken under a cow hoof or tire, but when intact are more likely to exclude cheatgrass. Excluding livestock allows recovery (Zhang 2020, Ponzetti et al. 2007, Root et al. 2019, Reisner et al. 2013, Belnap et al., 1994). Soil disturbance increases cheatgrass which increases wildfire spread which increases cheatgrass. Limiting or removing causes of disturbance will allow soil and plants a chance to recover their original function.

Cheatgrass - All surface-disturbing activities tend to promote the spread of weeds (BLM 2005). In a 2006 Science review of dozens of published studies, the researchers observed that "native herbivores strongly suppressed, whereas exotic herbivores strongly enhanced, the relative abundance of exotic plants" (Parker et al. 2006). Cheatgrass is incompatible with or detrimental to all other renewable uses listed by FLPMA, uses such as "recreation, watershed, wildlife and fish, and natural scenic, scientific and historical values." 43 U.S.C. § 1702 (c). Yet by continuing grazing, drilling leases, treatments and other disturbances, the BLM insists on promoting cheatgrass, degrading sage steppe and habitat for sage grouse.

Since January 2017, BLM leased over 2.4 million acres and issued 3,570 drilling permits in sage-grouse habitat. Over decades, the activity under leases has actively removed and fragmented sage grouse habitat.

Habitat Improvement Author: Baxter et al. Year: 2017 Title: Baxter, J.J., Baxter, R.J., Dahlgren, D.K., and Larsen, R.T., 2017, Resource selection by greater sage-grouse reveals preference for mechanically-altered habitats: Rangeland Ecology and Management, v. 70, no. 4, p. 493-503. Implications: Dense patches of sagebrush were mechanically treated annually by using either a chain harrow or brushhog mower in treatment sites. An increase in forb cover after treatment was expected but not observed, potentially because of lower annual precipitation levels after treatment, competition with grasses, or a lag effect of treatment. A significant increase in use of habitat in and near (within 90 meters) treated mountain big sagebrush sites by brooding GRSG suggests that such treatments may be beneficial to GRSG. Issue: Technique refinement Significance: Habitat restoration Comments: Habitat improvement but Survival and recruitment were not assessed

Habitat Improvement Author: Carlisle et al. Year: 2018 Title: Nontarget effects on songbirds from habitat manipulation for greater sage-grouse: implications for the umbrella species concept: Condor, v. 120, no. 2, p. 439-455. Implications: The authors suggest that sagebrush mowing treatments intended to benefit GRSG, an ostensive umbrella species at a broad spatial scale, could have negative effects on co-occurring species at more localized scales, especially if mowing treatments are widespread. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement Significance: Prioritization of management actions; Unintended consequences Comments: The NTT, COT, and LUPs completely fail to take into account other species and can have negative impacts on other species at a local level. The one-size fits all, single species managemnt approach has proven adverse effects to other species.

Other Mitigation Author: Wing and Messmer Year: 2016 Title: Impact of sagebrush nutrients and monoterpenes on greater sage-grouse vital rates: Human-Wildlife Interactions, v. 10, no. 2, p. 157-168. Implications: Study results confirmed the importance of black sagebrush as pre-nesting season forage and suggested that any forage selection related to monoterpenes may reflect some aspect of an individual monoterpene rather than the total concentration of all monoterpenes. Study results should be interpreted cautiously because of the small sample size, single year, and single study site. Supersedes NTT: Yes Supersedes COT: Yes Issue: black sagebrush; GRSG forage

Mitigation-Restoration of Habitat - Pinyon-Juniper removal Author: Davies and Bates Year: 2019 Title: Longer-term evaluation of sagebrush restoration after juniper control and herbaceous vegetation trade-offs: Rangeland Ecology & Management, v. 72, no. 2, p. 260-265. Implications: Following juniper control in dense stands that lack sagebrush, mountain big sagebrush re-establishment is likely to be accelerated by seeding, whereas herbaceous vegetation cover may be reduced. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; pinion-juniper removal and sagebrush restoration

Mitigation-Restoration of Habitat - Pinyon-Juniper removal Author: Reinhardt et al. Year: 2017 Title: The authors conclude that the optimization framework and models used in this study illustrate an approach, increasingly available to land managers, which can augment or complement standard expert-based approaches to planning and prioritization. Such approaches could reduce planning and implementation time for landscape-scale conifer removal treatments. Topics: broad-scale habitat characteristics, conifer expansion, new geospatial data, habitat restoration or reclamation Implications: Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; conifer removal Significance: Prioritization of management Comments: Improved methodology

Mitigation-Restoration of Habitat - Pinyon-Juniper removal Author: Prochazka et al. Year: 2017 Title: Encounters with pinyon-juniper influence riskier movements in greater sage-grouse across the Great Basin: Rangeland Ecology and Management, v. 70, p. 39-49. Implications: The authors conclude that GRSG are negatively affected by pinyon-juniper encroachment because this habitat type stimulates faster, high-risk movements, such as flight, which likely attract visual predators. Further, the study quantifies age-specific GRSG mortality risk when individuals move through landscapes containing pinyon-juniper stands. Supersedes NTT: Yes Supersedes COT: Yes Issue: Pinion-juniper; predation risk Significance: Pinion-juniper; predation risk Comments: Cause and effect mechanism explaining predation risk

Mitigation-Restoration of Habitat - Pinyon-Juniper removal Author: Coates et al. Year: 2017 Title: Pinyon and juniper encroachment into sagebrush ecosystems impacts distribution and survival of greater sage-grouse: Rangeland Ecology and Management, v. 70, no. 1, p. 25-38. Implications: From the authors: "Collectively, these results provide clear evidence that local sage-grouse distributions and demographic rates are influenced by pinyon-juniper, especially in habitats with higher primary productivity but relatively low and seemingly benign tree cover. Such areas may function as ecological traps that convey attractive resources but adversely affect populationvital rates. To increase sage-grouse survival, our model predictions support reducing actual pinyon-junipercover as low as 1.5%, which is lower than the published target of 4.0%." Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; Improved standards for pinyon-juniper removal Significance: New threshold for pinion-juniper removalprovided greater benefits to GRSG

Mitigation-Restoration of Habitat - Pinyon-Juniper removal Author: Farzan et al. Year: 2015 Title: Western juniper management-Assessing strategies for improving greater sage-grouse habitat and rangeland productivity: Environmental Management, v. 56, no. 3, p. 675-683. Implications: The study showed that juniper removal can benefit both GRSG and cattle forage production, but the benefits depend on site characteristics and how sites were selected. Sites chosen to maximize forage did not substantially benefit GRSG. Sites chosen for GRSG habitat did benefit forage production, but larger habitat treatments had decreasing returns on investment. The benefits achieved for either goal were altered by agency coordination, budgetary constraints, and wildfire. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; pinyon-juniper removal Significance: Management can be prioritized to benefit GRSG habitat and cattle forage Comments: Management actions can have a dual purpose

Habitat Improvement Author: Ricca et al. Year: 2018 Title: A conservation planning tool for greater sage-grouse using indices of species distribution, resilience, and resistance: Ecological Applications, v. 28, no. 4, p. 878-896. Implications: The CPT could help resource managers evaluate potential costs and benefits of treatments in particular locations in order to facilitate restoration prioritization decisions across landscapes used by GRSG. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; habitat restoration Significance: Prioritization of management; new planning tool Comments: An improved planning tool. Also undermines the argument that habitats cannot be restored by recognizing the BLM prioritization process for restoring lands needs improvement. This tool can help with that.

Habitat Improvement Author: Gustafson et al. Year: 2018 Title: Using object-based image analysis to conduct high-resolution conifer extraction at regional spatial scales: International Journal of Applied Earth Observation and Geoinformation, v. 73, p. 148 - 155. Implications: The maps produced can help to inform land managers on where to target pinyon-juniper treatment in order to aid sagebrush restoration and GRSG conservation. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement; habitat mapping; Pinion-juniper treatment Significance: Habitat mapping; habitat restoration Comments: Potential technique for offset mitigation

Habitat Improvement Author: Gustafson et al. Year: 2018 Title: Using object-based image analysis to conduct high-resolution conifer extraction at regional spatial scales: International Journal of Applied Earth Observation and Geoinformation, v. 73, p. 148 - 155. Implications: The maps produced can help to inform land managers on where to target pinyon-juniper treatment in order to aid sagebrush restoration and GRSG conservation. Supersedes NTT: Yes Supersedes COT: Yes Issue: Technique refinement Significance: Prioritization of management actions; Unintended consequences Comments: The NTT, COT, and LUPs completely fail to take into account other species and can have negative impacts on other species at a local level. The one-size fits all, single species managemnt approach has proven adverse effects to other species

The USFS has been providing the public with a monitoring report regarding the implementation of the 2015 ARMPAs and the extent to which it is affecting designated sage- grouse habitat on forest lands.12 Table 5 in the 2019 report is particularly illustrative of rangewide conditions, but BLM's DSEISs do not contain any such tabulation of impacts an disturbance13(We note too that the Forest Service report offsets habitat destruction with "restoration" projects that are unproven and potentially damaging. See "Vegetation Treatments," below). 12 https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd695213.pdf 13 Surface disturbance is defined according to the RMPA's parameters, which does not include livestock disturbance (i.e. areas of livestock concrentation, miles of fencing, water structures, etc.). We disagree with this definition of surface disturbance and recognize that USFS is underestimating the impacts of authorized activities.

In terms of taking a hard look at the impacts of vegetation treatment, the DSEIS adds basically no new analysis to the analyses underlying the 2015 ARMPAs. See Idaho DSEIS at 4-28; NV/CA DSEIS at 4-3 to 4-10; 4-40 to 4-46; Wyoming DSEIS at 4-92; UT DSEIS at 4-41 to 4-67;

Having tallied these acreage figures, the BLM has shown that it has identified areas "treated in recent years," theoretically for sage-grouse habitat enhancement. But where is the hard look at the results of these treatments? Did viable sagebrush habitats meeting minimum sage-grouse habitat requirements result, and if so over how many acres? Did disturbed areas with little or no habitat value for sage-grouse result, and if so, where, and over how many acres? Did cheatgrass infestations increase on lands "treated" for habitat enhancement (or other) purposes, and if so, over how many acres? How many of these vegetation projects have also been designed to create supplementary forage for livestock? The DSEIS is silent on these questions, but the BLM is obligated to analyze and disclose this information to the public.

For example, we are concerned that juniper-removal projects in sage-grouse habitat may result in expansion of cheatgrass (Evans and Young 1985, Bates et al. 2005). This is particularly concerning where such projects involve mature juniper woodlands with little sagebrush understory. BLM has failed to adequately analyze the differences in impacts of invasive species resulting from juniper removal in stands of different densities and ages. Based on our review of the science, juniper removal (using hand-cutting and jackpot burning) in areas where junipers are sparse and young and sagebrush-grass understory is healthy (without a large component of cheatgrass) does not result in severe cheatgrass expansion when the area is protected from livestock grazing for two-plus years post-treatment, whereas projects that do not meet these criteria pose major cheatgrass risks and are likely to result in the further degradation, rather than restoration, of sage-grouse habitats.

BLM is also developing new categorical exclusions for pinyon-juniper treatments in sage-grouse habitat, one of which will allow for the clearcutting of pinyon and juniper trees over large areas up to 10,000 acres. Because these projects will be conducted under a categorical exclusion, there is likely to be very little analysis of long-term impacts to sage-grouse as a result of the associated disturbance to such large landscapes, increased human presence, and the potential increase in invasive plants such as cheatgrass. The BLM must analyze the potentially large increase in the number of projects that will be conducted and consider the cumulative impacts of the expected number of projects across such a substantial portion of sage-grouse habitat. The analysis must include a hard look at the potential negative side effects of these projects (e.g. increased fire occurrence through the spread of cheatgrass; See Fusco et. al. 2019b) and how they will impact sage-grouse habitat and populations in the longer term.

M.3.27 Guidance and Policy

Local governments are charged with protecting the health, safety and welfare of their citizens and serve as custodians of vital information including the cultural, social, economic and historical data necessary to fully evaluate the effects of any proposed actions which must be considered in order to compile an accurate NEPA review. The Counties were therefore dismayed that the BLM did not involve said Counties in the development of this SEIS. As cooperating agencies, the Counties should be involved throughout the NEPA process, including the preparation of this SEIS which was made necessary thanks to the Winmill Decision. See 40 CFR § 1501.6 (regarding the involvement of cooperating agencies). BLM must thoroughly consider these plans and alternatives and coordinate with the Counties on the final land use plans.

All decisions to permanently close an area needs to be done only after a thorough public outreach process that includes engagement of all local government agencies affected. The same outreach and engagement should be required for the closure of any road or trail, primitive or otherwise, that has not been through a comprehensive travel management plan process.

Placing these multiple-use, foundation-level plans at the mercy of a single-policy agenda destroys their utility. Single purpose initiatives, such as sage-grouse conservation, should be pursued within the framework of existing resource management plans, rather than becoming the reason for their constant revision. In other words, policy initiatives should be subordinate to multiple-use management plans, rather than the plans existing at the mercy of each new policy initiative. The 2019 land use plans revisions sought to restore the planning process consistent with the multiple-use mandate, and discontinue the single-purpose planning model that defined the 2015 plans.

In addition to other resource values, FLPMA specifically directs BLM to manage public lands "in a manner that recognizes the Nation's need for domestic sources of minerals…" FLMPA Sec. 102(a)(12). Unfortunately, the multiple-use management objective and FLMPA's directive to manage lands in a manner that recognizes the Nation's need for minerals became an afterthought in the development of the 2015 land use plans as FWS continued to dictate management objectives for the stated purpose of Greater Sage Grouse conservation above all other land uses covered by the plans.

The failure to revise the plan amendments toward true conservation does not follow BLM's internal policies that mandate species protection. BLM Manual 6840 "provide[s] policy and guidance for the conservation of BLM special status species and the ecosystems upon which they depend on BLM-administered lands."3 Its objective for species that are not currently listed under the Endangered Species Act (ESA) is 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." Id. The BLM's State Director (the signatory of this Amendment) has the additional responsibility of "[e]nsuring that when BLM engages in the planning process, land use plans and subsequent implementation-level plans identify appropriate outcomes, strategies, restoration opportunities, use restrictions, and management actions necessary to conserve and/or recover listed species, as well as provisions for the conservation of Bureau sensitive species," and "[e]nsuring that land use and implementation plans fully address appropriate conservation of BLM special status species." The BLM SSP requires the agency to take action to prevent listing. 3 https://www.blm.gov/sites/blm.gov/files/uploads/mediacenter_blmpolicymanual6840.pdf

M.3.28 Statutes and Regulations

NEPA requires that agencies "prepare, circulate, and file a supplement to a statement in the same fashion (exclusive of scoping) as a draft and final statement unless alternative procedures are approved by the Council." 40 CFR § 1502.9(c)(4). Although the Draft EISs that supported the 2019 Amendments were issued for a 90-day comment period, BLM only issued this Draft SEIS for 45 days. While BLM extended the comment period for an additional 45 days on the date that the original comment period expired, this last minute action does not evidence good faith compliance with NEPA's requirements. We also note that BLM failed to conduct scoping as part of this supplemental NEPA process. Although scoping is not absolutely required when completing supplemental analysis, a scoping period is commonly offered during supplemental NEPA, especially when such supplemental analysis was in response to a court order. See, 40 CFR § 1502.9(c)(4);Notice of Availability of the Draft Amendment to the Approved

Resource Management Plan for the Miles City Field Office, Montana, and the Associated Supplemental Draft Environmental Impact Statement, 84 Fed. Reg. 22,516 (May 17, 2019); Notice of Availability for the Draft Supplemental Environmental Impact Statement and Potential Amendment for the Approved Resource Management Plan for the Buffalo Field Office, Wyoming, 84 Fed. Reg. 22,515 (May 17, 2019). The intent of scoping is to focus the analysis on significant issues and reasonable alternatives, to eliminate extraneous discussion, and to reduce the length of the EIS. By skipping this opportunity to solicit public input and influence the scope of supplemental analysis, BLM has further undermined this process.

The breadth of proposed regulatory changes currently being contemplated and finalized by the BLM demonstrate the absolute uncertainty of implementation of any aspect of the plans that is deferred to site-specific or future actions. Where BLM provides for management flexibility in implementation at the permitting or site-specific level, the SEISs must admit that the decision-making may be done outside of current levels and expectations of public participation and without in depth environmental analyses. The agency can't have it both ways: the ARMPAs can't rely on subsequent decision-making to implement the science and simultaneously be cutting the science out of subsequent decision-making.

No Notice and Comment on Eleventh-Hour Changes to the 2015 Plans In the last 60-90 days of the NEPA process on the 2015 Plans, DOI significantly altered their preferred alternative to include new regulatory measures relative to: GRSG "strongholds" or "focal areas"; the involvement of the USFWS and state wildlife agencies in granting waivers, modifications or exceptions to no surface occupancy areas ("NSOs"); so-called hard or soft triggers; and overall, a switch from managing lands to management of a species above all other considerations. The public, including the Counties, did not have an opportunity to review or comment on these significant eleventh-hour changes. Despite these significant flaws and issues, the agencies failed to revise the NW CO DEIS or the Reports. Given the importance federal law ascribes to the public's input with regard to rulemaking processes (see also 5 U.S.C. § 553, 40 C.F.R. § 1506.6, 40 C.F.R. § 1502.9(b); 40 CFR § 1503.1),18 it is clear that the agency's failure not only to obtain public comments on the "eleventh hour" changes introduced in the 2015 BLM FEIS, but also to incorporate local guidance and input received throughout the 2015 Plans' NEPA process, has resulted in regulation and land management which both omits and overrides the public's input in violation of federal law. 18 See also, Perez v. Mortg. Bankers Ass'n, 135 S.Ct. 1199, 1203 (2015) ("An agency must consider and respond to significant comments received during the period for public comment.")

Caerus believes that any plan should recognize the Bureau of Land Management's ("BLM") statutory mandate to manage public lands to accomplish multiple-use and sustained yield and should also explicitly recognize the valid existing rights ofleases acquired before the 2015 Plan was finalized.

Mentioned within the DEIS regarding FLPMA, Congress provided BLM with “discretion” and “authority” to manage public lands for multiple use and sustained yield. These terms need to be explained in detail further to define their purpose and state which direct authorities are able to be utilized in the multiple-use goal. Along with definitions, BLM contains “broad” responsibilities to manage public lands & resources similar to the Department of Interior (DOI) which has broad responsibilities to manage federal lands and resources.

Within ES.2, “By implementing these land use plan conservation measures and continuing to exercise its discretion to approve future project proposals under appropriate terms and conditions or deny them where appropriate, the BLM can adequately protect Greater Sage-Grouse and its habitat while meeting its general obligation under FLPMA to manage public lands under principles of multiple use and sustained yield". Again, the terms of discretion and using words such as general does not portray the urgency and specific determination behind the BLM's missions and goals.

FLPMA specifically directs BLM to manage public lands "in a manner that recognizes the Nation's need for domestic sources of minerals…" FLMPA Sec. 102(a)(12). Unfortunately, the multiple-use management objective and FLMPA's directive to manage lands in a manner that recognizes the Nation's need for minerals became an afterthought in the development of the 2015 land use plans as FWS continued to dictate management objectives for the stated purpose of Greater Sage Grouse conservation above all other land uses covered by the plans. Placing these multiple-use, foundation-level plans at the mercy of a single-policy agenda destroys their utility. Single purpose initiatives, such as sage-grouse conservation, should be pursued within the framework of existing resource management plans, rather than becoming the reason for their constant revision. In other words, policy initiatives should be subordinate to multiple-use management plans, rather than the plans existing at the mercy of each new policy initiative. The 2019 land use plans revisions sought to restore the planning process consistent with the multiple-use mandate, and discontinue the single-purpose planning model that defined the 2015 plans.

the Idaho District Court found that discarding the "net conservation gain" standard and mandatory compensatory mitigation used in the 2015 plans, and which was central to FWS's not warranted decisions, eliminated protections without justification.18 Despite this opinion, it has been well established that the net conservation gain standard and compelling mandatory compensatory mitigation is beyond the authority of the BLM under FLMPA. On July 24, 2018, BLM provided specific policy direction on the issue of compensatory mitigation through issuance of Instruction Memorandum (IM) No. 2018-093. Specifically, BLM directed that compensatory mitigation cannot be required as a condition for the use of public lands nor can BLM accept any monetary payment to mitigate the impacts of any proposed action. In all instances, BLM must refrain from authorizing any activity that causes unnecessary or undue degradation (UUD), pursuant to Section 302 of FLPMA. 18 Western Watersheds Project et al v. Schneider et al. Case No. CV-00083-BLM, 2019, at 12, 24. (D. Idaho Oct. 16, 2019).

FWS recognized that, threaded between Sections 7 and 10 of ESA, "the applicant may do something less than fully minimize and mitigate the impacts of the take where to do more would not be practicable," while still advancing Section 7(a)(2) obligation to ensure that any federal activity is not likely to jeopardize the continued existence of any endangered or threatened species or result in destruction or adverse modification of habitat.22 Accordingly, there is no legal basis to impose a "net conservation gain" standard in any way in the land use planning process. 22 See National Wildlife Federation v. Norton, 306 F. Supp. 2d 920, 928 (E.D. Cal. 2004).

1. FLPMA has an over-arching non-degradation mandate. https://www.blm.gov/or/regulations/files/FLPMA.pdf 2. Neither FLPMA nor the Taylor Grazing Act mandates any particular level or frequency of livestock grazing or even that any particular lands be used for livestock. 43 U.S.C. § 315-315(r)(2000) 3. FLPMA expressly authorizes the BLM to "totally eliminate" any of the enumerated "principal uses" 43 U.S.C. § 1712 (e) and, specifically, to discontinue grazing to devote public lands to a "public purpose." 43 U.S.C. § 1752 (b)(2),(g) 4. FLPMA's definition of multiple use calls for management that "takes into account the long term needs of future generations for

renewable and nonrenewable resources, to meet the present and future needs of the American people. 43 U.S.C. § 1702 (c) 5. FLPMA defines sustained yield as "the achievement and maintenance in perpetuity (my emphasis) of a high-level annual or regular periodic output of the various renewable resources of the public lands consistent with multiple use. 43 U.S.C. § 1702(h) 6. In its planning directives, FLPMA requires the BLM to give priority to the designation and protection of areas of critical environmental concern. 43 U.S.C. § 1702 (c). The ACECs should be based in science. 7. FLPMA requires "consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output." 43 U.S.C. § 1702 (c). For instance, only 1.9% of US beef comes from BLM public lands (Kuhn 2020), and BLM public lands grazing accounts for only 0.41% of U.S. livestock receipts (Department of Interior Fiscal Year 2012 Economic Report).

The Multiple-Use Sustained-Yield Act lists standards and guidelines for management of public lands: 16 U.S.C. § 1604(g) (2000) * Suitability * Inventory of renewable resources, including soil and water * Consideration of economic and environmental aspects * Providing for diversity of plants and animal communities based on the suitability of the specific area How has BLM management incorporated these standards and guidelines? Loss of sagebrush and its many dependent species is a major environmental concern, yet there is little evidence the BLM is serious about the conservation of this habitat, even with its many documents concerning sage grouse habitat. The BLM should insure evaluation of the effects of each management system so that it will not result in substantial and permanent impairment of the productivity of the land. The maintenance of viable ecosystems is essential to providing a sustained yield of all federal land uses. Multiple use and sustained yield cannot be separated.

Multiple use, as incorporated in existing law, is not synonymous with commodity extraction, but rather requires a balancing of commodity uses, noncommodity uses, and environmental protection (Hardt 1994). The purpose of this balancing exercise, according to the Interior Board of Land Appeals court, is to ensure that "'all BLM decisions are in the public interest (National Wildlife Federation v. BLM Management. 140 IBLA 85. 101 1997). Maintaining sage grouse is in the public interest and is a noncommodity value on public land. Note: The Executive Summary for this DSEIS emphasizes the role of state agencies in the responsibility for sage grouse, but state agencies have little or no jurisdiction over the management of the ground, ie. habitat, which is the whole point of federal public land management documents like this one.

The BLM 2018 Public Land Statistics Report (online), reporting on the condition of a sample of 2665 riparian areas under its jurisdiction in Nevada, found: Proper Functional Condition - 33% Functional at Risk - 49% Non-functional - 17% Twenty years ago the BLM warned that a "large part of the Great Basin lies on the brink of ecological collapse," and the BLM attributed the "downward spiral of ecological conditions" on 75 million acres of public lands in the Great Basin to invasive plant species (primarily cheatgrass) and fire, and it related both fire and vegetative conditions to livestock grazing. (BLM 2000). Why does the BLM now ignore this causative relationship and the science supporting it?

We are in the midst of a national emergency around COVID-19, which is making it exceptionally difficult for people to participate in comment processes. Proceeding with lease sales would violate the public participation requirements of the Federal Land Policy and Management Act (FLPMA) and National Environmental Policy Act. In particular, FLPMA requires that BLM conduct land use planning processes "with public notice" and must provide "the public adequate notice and an opportunity to comment upon the formulation of standards and criteria for, and to participate in, the preparation and execution of plans and programs for, and the management of, the public lands." 43 U.S.C. §§ 1712(a), 1739(e). NEPA requires that "environmental information is available to public officials and citizens before decisions are made and before actions are taken" and reiterates that "public scrutiny is essential to implementing NEPA." 40 C.F.R. § 1500.1(b). Further, NEPA obligates the BLM to "[m]ake diligent efforts to involve the public in preparing and implementing their NEPA procedures." 40 C.F.R. § 1506.6(a).

Moving forward with comment periods and decisions when the public is unable to properly participate violates the requirements of NEPA and FLPMA. BLM's public rooms are closed (making it difficult to conduct research), and state and local orders are encouraging people to stay at home and limiting travel. Notably, Oregon ranks 34th for broadband for internet access,1 compounding the challenges with participating in this process. Broadband internet is particularly problematic in rural areas of the state, exacerbating the challenges of participation in areas likely to be affected by leasing and other activities authorized by the proposed amendments. 1 Ranking is based on the % of the population with access to +25 mbps wired broadband (see https://broadbandnow.com/Colorado).

Members of Congress, attorneys general, and state and local governments have submitted requests that the federal government pause or extend public comment periods for rulemaking efforts and other processes during the novel coronavirus pandemic.2 Administrative actions and public comment periods for other federal agency actions are being suspended or extended for "to be determined" amounts of time due to the national emergency.3 BLM should heed these many indications that it is not responsible to move forward with this process. 2 See, e.g., letter from fourteen House of Representatives Committee Chairs to Office of Management and Budget , Acting Director Russell Vought, submitted April 1, 2020: https://www.eenews.net/assets/2020/04/02/document_gw_08.pdf; letter from Senators Wyden, Merkley, and Udall to Secretary Bernhardt requesting a pause on comment periods, submitted April 3, 2020: https://www.wyden.senate.gov/imo/media/doc/040320%20Letter%20on%20DOI%20comment%20periods.pdf; letter from state attorney generals to Office of Management and Budget, Acting Director Russell Vought, submitted March 31, 2020: https://portal.ct.gov/-/media/AG/Press_Releases/2019/COVID-19-Rule-Delay-Letter--- Final.pdf?la=en; Letter from various state and local government organizations requesting a pause on all public comment and rulemaking processes, submitted March 20, 2020: https://www.nga.org/letters-nga/state-and-local- government-organizations-seek-pause-on-public-comments-on-rulemaking-processes/ 3 For example, DOI's Interior Board of Land Appeals extended all filing deadlines by 60 days in response to COVID-19; the Daniel Boone National Forest Supervisor suspended the public objection period for its planning effort in light of COVID-19; and the U.S. Forest Service extended a public comment period for the Nantahala and Pisgah forest plan revision with the length of time to be determined (available at: https://www.fs.usda.gov/detail/nfsnc/home/?cid=stelprdb5397660).

Although the Draft EISs that supported the 2019 Amendments were issued for a 90-day comment period, BLM only issued this Draft SEIS for 45 days. While BLM extended the comment period for an additional 45 days on the date that the original comment period expired, this last minute action does not evidence good faith compliance with NEPA's requirements.

We also note that BLM failed to conduct scoping as part of this supplemental NEPA process. Although scoping is not absolutely required when completing supplemental analysis, a scoping period is commonly offered during supplemental NEPA, especially when such supplemental analysis was in response to a court order. See, 40 CFR § 1502.9(c)(4);Notice of Availability of the Draft Amendment to the Approved Resource Management Plan for the Miles City Field Office, Montana, and the Associated Supplemental Draft Environmental Impact Statement, 84 Fed. Reg. 22,516 (May 17, 2019); Notice of Availability for the Draft Supplemental Environmental Impact Statement and Potential Amendment for the Approved Resource Management Plan for the Buffalo Field Office, Wyoming, 84 Fed. Reg. 22,515 (May 17, 2019). The intent of scoping is to focus the analysis on significant issues and reasonable alternatives, to eliminate extraneous discussion, and to reduce the length of the EIS. By skipping this opportunity to solicit public input and influence the scope of supplemental analysis, BLM has further undermined this process.

The Richardson court clarified that providing members of the public with an opportunity to comment, does not fulfill the purposes of NEPA if further analysis was not provided, stating: "[a] public comment period is beneficial only to the extent the public has meaningful information on which to comment." 565 F.3d at 708. Commenters on the 2019 Plan Amendments raised concerns with BLM's reliance on previous analysis and incorporation by reference. BLM did not change its approach in the 2019 Amendments and did not do so in the Draft Supplemental EISs. Instead, as noted above, BLM states that it will determine after the comment period on the Draft Supplemental EISs if it should conduct any new analysis of alternatives or information. Recommendation: If BLM intends to proceed with a Supplemental EIS process, then BLM must provide sufficient opportunities for meaningful public engagement, including a 90-day comment period on a Draft Supplemental EIS.

As summarized above and by the BLM, the WWP v. Schneider court identified four significant failings in the BLM's NEPA analysis in the 2010 Plan Amendment. BLM failed to remedy these violations and still needs to do so. Since BLM did not address these flaws, which we raised repeatedly in our comments and protest on the 2019 Amendments, we incorporate those by reference and have attached our protest and overarching comments on the Draft Amendments for easy reference as Exhibits 1 and 2.

BLM must take a "hard look" at the environmental consequences or a proposed action, and the requisite environmental analysis "must be appropriate to the action in question." Metcalf v. Daley, 214 F.3d 1135, 1151 (9th Cir. 2000); Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 348 (1989). The court found that BLM did not take the requisite hard look, noting its failure to respond to FWS and EPA concerns and finding "when the BLM substantially reduces protections for sage grouse contrary to the best science and the concerns of other agencies, there must be some analysis and justification - a hard look - in the NEPA documents." WWP v. Schneider, 417 F.Supp.3d at 1332. However, BLM did not conduct a new analysis to remedy this failure. Instead, BLM claims the "DSEIS also clarifies how the BLM considered comments, including those of other federal agencies and experts (including EPA), when developing its 2019 planning decisions." Oregon Draft SEIS, p. ES-3. Instead of addressing the need for an actual response in this Draft Supplemental EIS, BLM just notes that it "responded to each of EPA's comments and made corrections and/or changes in the 2018 FEISs" and states those responses "can be found in the administrative record." Id.

BLM removed the requirement for compensatory mitigation through the 2019 Amendments without providing an opportunity for public comment. As we have repeatedly pointed out and the court noted, "FWS relied on the mandatory compensatory mitigation provisions of the 2015 Plans to make its finding that an ESA listing was not warranted." WWP v. Schneider, 417 F.Supp.3d at 1333. The court found that "BLM's elimination of mandatory compensatory mitigation through the Final EISs appears to constitute both a "substantial changes" to its proposed action and "significant new circumstances" under 40 C.F.R. § 1502.9(c), requiring that BLM have issued a supplemental draft EIS for public review and comment before finalizing changes." WWP v. Schneider, 417 F.Supp.3d at 1333. By refusing to disclose its Proposed Action until after all opportunity for comment has passed, an agency insulates its decision-making process from public scrutiny. Such a result renders NEPA's procedures meaningless." State of Cal. v. Block, 690 F.2d 753, 771 (9th Cir. 1982). Yet in the Draft Supplemental EIS, BLM implies that it would not consider the comments received or complete supplemental analysis on this topic, stating: This clarification simply aligns the 2018 Proposed Plan Amendment with BLM policy and the scope of compensatory mitigation authority expressly provided by FLPMA. Any analysis of compensatory mitigation relating to future projects is speculative at this level of land use planning; therefore, analysis of compensatory mitigation is more appropriate for future project-specific NEPA. Nevada Draft SEIS, p. 4-43 - 4-44.

In considering the argument that a net conservation gain standard for compensatory mitigation violated FLPMA, the court stated: The FEIS states that if actions by third parties result in habitat loss and degradation, even after applying avoidance and minimization measures, then compensatory mitigation projects will be used to provide a net conservation gain to the sage-grouse. The Agencies' goals to enhance, conserve, and restore sage-grouse habitat and to increase the abundance and distribution of the species, they argue, is best met by the net conservation gain strategy because it permits disturbances so long as habitat loss is both mitigated and counteracted through restorative projects. If anything, this strategy demonstrates that the Agencies allow some degradation to public land to occur for multiple use purposes, but that degradation caused to sage-grouse habitat on that land be counteracted. The Court fails to see how BLM's decision to implement this standard is arbitrary and capricious. Moreover, the Court cannot find that BLM did not consider all relevant factors in choosing this strategy… Western Exploration, LLC v. U.S. Department of the Interior, at 747. BLM's conclusions in IM 2019-018, cannot be supported by applicable law, as reviewed in Solicitor's Opinion M-37039 (Dec. 21, 2016) (attached and incorporated by reference as Exhibit 5). As detailed in M-37039, FLPMA and other applicable laws allow BLM to require compensatory mitigation. Taking the opposite approach based on a misreading of the law is both arbitrary and capricious and contrary to law, and moreover may violate FLPMA's requirement to avoid unnecessary or undue degradation. Abandoning compensatory mitigation as a tool to prevent habitat degradation would violate this requirement. As noted above, the unnecessary and undue degradation standard prohibits degradation beyond that which is avoidable through appropriate mitigation and reasonably available techniques. TRCP, 661 F.3d at 76-77; Colo. Env. Coal, 165 IBLA at 229. Offsite compensatory mitigation is a well-established, reasonable and appropriate tool that has long been used to limit damage to public lands. Refusing to use that tool fails to meet FLPMA's requirement that BLM avoid unnecessary or undue degradation.

Based on the weakened protections in the 2019 Amendments and the increased harm to sagebrush habitat related to wildfires and oil and gas development, the changes from the 2015 Sage-grouse Plans will affect numerous other plants and wildlife species, including those that are listed as threatened or endangered under the ESA. Since these are new risks of harm, arising out of BLM's changes in policy and amendments to the 2015 Plans, BLM cannot rely on findings from the 2015 ESA consultations. The ESA requires that BLM again undertake consultation with FWS under the ESA. Recommendation: If BLM intends to proceed with a Supplemental EIS process, then BLM must address the failure to consult under the ESA.

While issuing six Draft Supplemental EISs for comment, BLM has not actually undertaken a supplemental NEPA process. The agency has failed to provide a sufficient timeframe or structure for meaningful public input. Further, the environmental documents generally re-state (and often exactly re-state) the conclusions from the 2019 Amendments without conducting any additional analysis or taking into account new information and changed circumstances. BLM must thoroughly evaluate the real environmental effects of the 2019 Amendments. Because the 2019 Amendments undermine the key components of the 2015 Sage-grouse Plans that FWS relied on to justify finding the sage-grouse no longer warranted under the ESA, BLM must evaluate alternatives that will not jeopardize the survival of the species. In addition, BLM must consult with FWS regarding the impacts of the changes to the 2015 Sage-grouse Plans on species listed under the ESA.

Although the court in WWP v. Schneider held that BLM must consider impacts from the changes proposed in the 2019 Amendments, BLM glosses over these impacts in the Draft Supplemental EISs. For example, the Utah Draft Supplemental EIS states: At most, the prioritization objective could potentially result in temporarily deferring a parcel in PHMA from leasing to a later sale, but only in instances of large lease sales where staff capacity would be incapable of analyzing all the nominated parcels. Because the mineral leasing prioritization objective provides no certain or durable protection to PHMA, its removal would not increase threats, since the no surface occupancy stipulation is still in effect. Utah Draft SEIS, p. 4-52. Similarly, in the Northwest Colorado Draft Supplemental EIS, BLM acknowledges that the Management Alignment Alternative makes approximately 224,200 acres available for fluid mineral leasing that are closed under the No-Action Alternative. The Draft Supplemental EIS also acknowledges that "criteria for waivers, exceptions, and modifications in PHMA beyond 1 mile from active leks to allow for surface occupancy in cases where specific mitigation standards are met in consultation with CPW and/or it can be demonstrated that, due to topography, no impact on Greater Sage-Grouse or Greater Sage-Grouse habitat would occur," affecting these same acres. Northwest Colorado Draft SEIS, pp. 4-41 - 4-42. Nonetheless, BLM simply concludes, again: "Although the additional acres would be available to leasing, their impact on Greater Sage-Grouse would be similar to the No-Action Alternative" because "surface disturbance, fragmentation, and indirect habitat loss would not be expected to increase due to restrictions on surface disturbance." Northwest Colorado Draft SEIS, p. 4-42. In both situations, BLM concluded that there would be no increase in threats, although the new approaches are qualitatively different. The agency's conclusory statements eliminate the opportunity for rational decision-making; the decision is stated without explanation and does not allow for BLM or the public to be fully informed.

FLPMA unquestionably provides BLM with ample support for requiring compensatory mitigation, including its direction to manage public lands in a manner to ensure the protection of ecological and environmental values, preservation and protection of certain public lands in their natural condition, and provision of food and habitat for wildlife;6 and to "manage the public lands under principles of multiple use and sustained yield".7 The principles of multiple use and sustained yield pervade and underpin each of BLM's authorities under FLPMA, including the policies governing the Act,8 the development of land use plans,9 the authorization of specific projects,10 and the granting of rights of way.11 While FLPMA does not elevate certain uses over others, it does delegate discretion to the BLM to determine whether and how to develop or conserve resources, including whether to require enhancement of resources and values through means such as compensatory mitigation.12 In sum, these statutory policies encompass the protection of environmental and ecological values on the public lands and the provision of food and habitat for fish and wildlife and are furthered by the implementation of the mitigation hierarchy, including compensatory mitigation, to protect and preserve habitat for the sage grouse. 6 43 U.S.C. § 1701(a)(8). Among other things, public resources should be managed to "protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values" and "provide food and habitat for fish and wildlife". 7 43 U.S.C. § 1732(a). 8 43 U.S.C. § 1701(a)(7). 9 43 U.S.C. § 1712(c)(1). 10 43 U.S.C. § 1732(a). 11 43 U.S.C. § 1765(a)(i). 12 P. L. 94-579 (Oct. 21, 1976) (stating an intent "[t]o establish public land policy; to establish guidelines for its administration; to provide for the management, protection, development, and enhancement of the public lands; and for other purposes." (emphasis added)). Additional authority also exists for the use of the mitigation hierarchy in issuing project-specific authorizations. For example, project-specific authorizations must be "in accordance with the land use plans,"13 so if the land use plans adopt the mitigation hierarchy or other mitigation principles for the sage grouse under the various authorities described above, the project authorization must follow those principles. Moreover, in issuing project-specific authorizations, BLM may attach "such terms and conditions" as are consistent with FLPMA and other applicable law.14 This general authority also confers broad discretion on BLM to impose mitigation requirements on project applicants, including compensatory mitigation in appropriate circumstances.15 13 43 U.S.C. 1732(a). 14 43 U.S.C. § 1732(b). 15 BLM also has authority and/or obligations to ensure that all its operations protect natural resources and environmental quality, through statutes such as the Mineral Leasing Act of 1920, 30 U.S.C. 181 et seq.; see also Independent Petroleum Assn. of America v. DeWitt, 279 F.3d 1036 (D.C. Cir. 2002) (Act grants "rather sweeping authority" to BLM, or NEPA, 42 U.S.C. 4321; see also 40 C.F.R. § 1505.2(c), which requires consideration of mitigation alternatives where appropriate. In addition, BLM's authority under FLPMA is broader than that exercised by purely land use or regulatory agencies such as EPA or zoning boards, because BLM [has authority] to act as both a regulatory and as a proprietor. Accordingly, BLM can take action using all the tools provided by FLPMA for managing the public lands, including issuing regulations, developing land use plans, implementing land use plans or in permitting decisions. 43 U.S.C. §§ 1712(a), 1732(a), 1732(b). Finally, as a distinct authority, BLM also has the obligation to ensure that project-specific authorizations do not result in "undue or unnecessary degradation." FLPMA states that BLM "shall, by regulation or otherwise, take any action necessary to prevent unnecessary or undue degradation of the lands."16 A number of cases have found that BLM met its obligation to prevent unnecessary or undue degradation based, in part, on its imposition of compensatory mitigation. See e.g., Theodore Roosevelt Conservation Partnership v. Salazar ("TRCP"), 616 F.3d 497, 518 (D.C. Cir. 2010) (BLM decision to authorize up to 4,399 natural gas wells from 600 drilling pads did not result in "unnecessary or undue degradation" in light of substantial mitigation required from permittees, including prohibition of new development outside core area until comparable acreage in the core was restored to functional habitat, and a monitoring and mitigation fund of up to $36 million); see also Gardner v. United States Bureau of Land Management, 638 F.3d 1217, 1222 (9th Cir. 2011) (FLPMA provides BLM "with a great deal of discretion in deciding how to achieve the objectives" of preventing "unnecessary or undue degradation of public lands.") 16 43 USC § 1732(b).

The FLPMA requires that BLM conduct land management based on multiple use and sustained yield so that their various resource values are utilized in the combination that will best meet the present and future needs of the American people and that balances diverse resource uses. 8 FLPMA's multiple use directive informs Secretarial Order (SO) 3349, issued on March 29, 2017, ordering agencies to reexamine practices "to better balance conservation strategies and policies with the equally legitimate need of creating jobs for hard-working American families." On June 7, 2017, the Secretary issued Secretarial Order 3353 which aimed to enhance cooperation among eleven western states and the BLM in managing Sage-grouse, created the Sage-grouse Technical Review team, and generated the six plan amendments. The County worked with NACO and provided scoping comments, participated in multiple cooperating agency meetings and phone calls, commented on the Preliminary Draft EISs and Draft EIS, and participated in the Protest Process prior to the March 2019 signing of the Record of Decision.9

The Idaho District court granting the motion to preliminarily enjoin the 2019 plans relies in large part on the assumption that the 2015 plans were based on the sound science, specifically the findings and suggestions contained in the 2011 National Technical Team (NTT) and 2013 Conservation Technical Team (COT) Reports.11 The Idaho District Court incorrectly assumed in its decision that the NTT and COT reports represent the best available science, and therefore, any deviation from these reports amounts to an unjustified reduction in protection for the Sage Grouse.12 This reliance on the NTT and COT Reports is misplaced. 11 See Western Watersheds Project et al v. Schneider et al. Case No. CV-00083-BLM, 2019, at 11, 17. (D. Idaho Oct. 16, 2019). 12 Id. The 2011 NTT Report and the 2013 COT Report did not receive adequate peer review and suffered from a number of substantive flaws including: ignoring substantial threats such to the Greater Sage Grouse such as predation in favor of unsupported conjectures regarding human impact; failure to account for natural population fluctuations due to weather patterns; not using the best available science, and were policy rather than science driven. These flawed reports suggested the adoption of equally flawed measures that became central to the 2015 planning effort including the designation of Sage Brush Focal Areas (SFAs) and the establishment of lek buffers.

The Idaho District Court ignored BLM's IM and its well-founded interpretation of the law that FLMPA does not support mandatory compensatory mitigation and the Service's withdrawal of the policies on which net conservation gain was based. It is inappropriate to conclude that the rescission of unauthorized standards can serve as a degradation in species protection under the law. By extension, it is also inappropriate to conclude that the BLM violated NEPA by failing to analyze the impacts of not implementing standards it was not authorize to implement in the first place, and which had since been rescinded.

Single-Purpose Land Use Plans Violate FLPMA and NFMA Multiple Use Mandate BLM and USFS are charged with managing lands under their jurisdiction for multipleuse and sustained yield under the guiding principles of FLPMA and NFMA. BLM's multiple-use management objective states that: "The objective of resource management planning by the Bureau of Land Management is to maximize resource values for the public through a rational, consistently applied set of regulations and procedures which promote the concept of multiple use management and ensure participation by the public, state and local governments, Indian tribes and appropriate Federal agencies. Resource management plans are designed to guide and control future management actions and the development of subsequent, more detailed and limited scope plans for resources and uses." 43 CFR § 1601.0-2.

Statements in the DSEISs are revelatory in their admission that BLM hasn't actually changed anything from the 2018 FEIS, but the agency instead seeks to provide exculpatory evidence to overturn the court's decision. For example, the DSEIS's "Introduction to Chapter 4, Environmental Consequences," (Idaho at 4-1) states, "The purpose of this chapter is to describe to the decision-maker and the public the differences between the entire range of alternatives considered in 2018, including the 2018 Draft Plan (Management Alignment Alternative), the 2018 Proposed Plan Amendment, as well as the range of alternatives incorporated by reference from the 2015 plan amendments. It is meant to clarify that Greater Sage-Grouse management was comprehensively analyzed in 2018 through multiple NEPA and planning processes." This assumes that the court's injunction simply missed something that was already in the 2018 plans rather than that the Court accurately identified the BLM's failure to properly analyze and disclose the effects of a range of alternatives in the 2018 plans. Simply, the DSEIS reads more like an excuse for the 2018 FEIS's inadequacies than any real attempt to remedy the inadequacies the litigation identified. This is not the purpose of NEPA.

FLPMA mandates that the Secretary of Interior "shall" take any action necessary to prevent "unnecessary or undue degradation" of public lands. Id. § 1732(b). FLPMA further provides that BLM public lands "shall" be managed "for multiple use and sustained yield." Id. § 1732(a). The definition of "multiple use" calls for "harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output." Id. § 1702(c) (emphasis added). Both the "non-impairment" and "unnecessary and undue degradation" provisions constrain BLM's discretion in adopting or revising its land use plans. This prohibition on permanent impairment of the environment in FLPMA's definition of multiple-use is unique and purposeful. Instead of using the definition of multiple-use from the Multiple-Use Sustained-Yield Act, as it did in enacting NFMA, Congress chose to weave this environmental protection mandate into FLPMA's multiple-use provisions. See H. R. Rep. No. 94-583, 94th Cong. 1st Sess. (Dec. 18, 1975). BLM's 2019 amendments violate these mandates by allowing unnecessary/undue degradation and permanent impairment of greater sage-grouse habitat and populations. As we explain in more detail below, recent population data and triggers demonstrate that the 2015 protections are not having the desired effect of recovering sage-grouse populations and habitats. In the face of this data demonstrating that the existing regulatory mechanisms are insufficient to sustain the sage-grouse species, it is clear that further weakening the plans will only hasten this species' decline toward extinction and permanently impair BLM's ability, should ESA listing be necessary, to later recover the species.

Under FLPMA, the BLM must "use a systematic interdisciplinary approach to achieve integrated consideration of physical, biological, economic, and other sciences;" "consider the relative scarcity of the values involved and the availability of alternative means (including recycling) and sites for realization of those values;" and "weigh long-term benefits to the public against short-term benefits." 43 U.S.C. § 1712. The DSEISs do none of these things and instead seek to justify decisions to open public lands and sage-grouse habitat to more industrial and extractive uses, contrary to the science, and contrary to the broad interest in conserving the Sagebrush Sea and the numerous sensitive, imperiled, and rare species found there.

The current plans do not comport with the COT Report recommendations-which were themselves weakened due to political influence-instead representing the very minimum that is necessary for the agency to do. Since these proposed actions are inconsistent with the COT's recommendations, the 2019 plans fail to comply with FLPMA's overarching mandate.

For these and other reasons already outlined in the protests of 2019 and the comments of 2018, the BLM's DSEISs fail to reconcile the proposed actions with the mandates of FLPMA.

In Western Watersheds Project v. Schneider, 1:16-cv-083-BLM (D. Idaho), the court specifically addressed the fact that BLM issued six separate EISs in 2019 rather than provide one cumulative effects analysis covering the broad, multi-state range of the sage-grouse. See Attachment A. The BLM persists in this error by issuing now six separate DSEISs.

As examples, reasonably foreseeable future actions that should be analyzed in the SEIS are the revisions underway to the CEQ NEPA rules and the BLM's grazing regulations. To the extent that any of the ARMPA provisions rely on future NEPA processes, the agency must admit the extent to which those NEPA processes may no longer be required. For example, the ARMPAs rely on assessments of habitat conditions and impacts of livestock grazing at the time of permit renewal and land health evaluation, but BLM is proposing to revise the processes of permit renewal and the spatial and temporal extent of land health evaluations.37 Though BLM's plans here are not entirely clear, it is clear that changing the underlying management of grazing - the most widespread extractive use in sage-grouse habitat - will affect the authority and enforceability of the ARMPAs. 37 https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projec tId=1500093

The Council on Environmental Quality's proposed NEPA regulations could also reduce the level of environmental analysis performed for oil and gas lease sales, exploration, and development through encouraging greater use of Categorical Exclusions, as well as elimination of NEPA analysis for actions deemed to be "non-discretionary." The proposed regulations could also reduce the NEPA analysis that mining exploration and development currently undergoes, again related to elimination of NEPA analysis for "non-discretionary" actions. As a result, oil and gas and mining impacts to greater sage-grouse could occur without the level of NEPA scrutiny they currently require, which BLM must address in these SEISs

It is likely that there are additional regulatory changes with impacts to sage-grouse that BLM has not considered in these extremely brief and conclusory DSEISs. In taking the required hard look at the impacts of the Plans, BLM must fully consider all anticipated regulatory changes that could apply to sage-grouse habitats.

Also demonstrating the political purpose of the Plan revision process, BLM seems to argue that its plan to craft management of federal lands around state plans is required to comply with FLPMA. The EISs quote selectively (and incompletely) from FLPMA, claiming that FLPMA directs "BLM to develop its land use plans to 'be consistent with State and local plans to the maximum extent'" and to "resolve, 'to the extent practical, inconsistencies between Federal and non-Federal government plans.'" ID DSEIS at S-1-2 to S-1-3 (quoting 43 U.S.C. § 1712(c)(9)); and see Northwest Colorado DSEIS at App-3-2. These partial quotes mischaracterize BLM's responsibilities under FLPMA, which directs: In implementing this directive, the Secretary shall, to the extent he finds practical, keep apprised of State, local, and tribal land use plans; assure that consideration is given to those State, local, and tribal plans that are germane in the development of land use plans for public lands; assist in resolving, to the extent practical, inconsistencies between Federal and non-Federal Government plans...Land use plans of the Secretary under this section shall be consistent with State and local plans to the maximum extent he finds consistent with Federal law and the purposes of this Act.

BLM must only develop its land use plans to be consistent with State plans "to the extent...consistent with Federal law and the purposes of [FLPMA]" and must only resolve inconsistencies between Federal and non-Federal Government plans "to the extent practical." Id. As we have explained, repeatedly, in previous comments and Court filings, aligning BLM's approach with the States' is not "practical" or "consistent with Federal Law and the purposes of" FLPMA because it departs drastically from what the best available science shows is necessary to protect sage-grouse. In 2015, both BLM and FWS determined that the alternatives favored by certain states did "not incorporate adequate regulatory mechanisms . . . to conserve, enhance, and restore [greater sage-grouse] and its habitat." BLM has provided no rational explanation for why it now believes that these weaker plans are suddenly adequate to conserve sage-grouse populations, nor has it consulted with the USFWS on this point. If the purpose of the sage-grouse plan amendments is to provide adequate habitat protections on Federal lands to prevent sage-grouse from needing protection under the ESA, BLM must implement the measures that science shows are required. Indeed, that State plans fail to require or implement those measures is exactly why federal action is necessary.

NEPA requires EISs to "[s]tate whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not." 40 CFR§ 1505.2. BLM has again violated this requirement. It is clear that many other means of protecting sage-grouse are available. BLM has a duty under NEPA to disclose these measures and its rationales for rejecting them.

The BLM has failed to consult with the Fish and Wildlife Service about the impacts of the proposed plan. The ESA requires that an agency must consult whenever an action "may affect" a listed species or its critical habitat. See 50 C.F.R. § 402.14(a). The sage-grouse plan revisions will affect millions of acres and hundreds of species' habitats, but the BLM failed to consult with FWS over the effects of the plan on any listed or proposed-to-be-listed endangered or threatened species. This violates Section 7 of the ESA and must be remedied before a new decision on the SEISs is issued. See also Pidot (2018) for an assessment of the 2015 and 2019 plans with regard to their adequacy under the ESA and Timmer et al. (2019) for a discussion of sage-grouse as an umbrella species for sagebrush songbirds.

M.4 NEVADA/NORTHEASTERN CALIFORNIA-SPECIFIC COMMENT EXCERPTS

M.4.1 Issues dismissed from detailed analysis

The 2015 and 2019 NEPA documentation devoted voluminous space to the current status of the affected environment and to the expected environmental consequences of the various alternatives under consideration for almost everything under the sun, except for the status and environmental consequences with respect to current Sage-Grouse population levels and trends. Thus, the 2015 and 2019 analyses failed to evaluate the environmental impacts associated with the issues that most directly relate to the overall purpose that was initially identified for the Sage-Grouse RMP amendment process.

BLM promises to "work with local cattlemen associations to improve sagebrush rangeland conditions through actions such as controlling invasive species, improving mesic areas, …." [p.20] This would be asking livestock owners to voluntarily reduce their income, either by lowering the stocking rate or by hiring more employees to move the stock more frequently. But there is no mandatory requirement for actual habitat improvement, only a request which may or may not be obeyed by permittees up to the point of loss of income. "Improvements" should always be evaluated by increased sage grouse presence.

We believe that any additional analysis of cumulative effects is unnecessary. Additional analysis of cumulative effects would only serve to introduce even more speculation into the decision-making process while wasting more time, effort, and money.

Section: 1.4 Page: 1-13 Paragraph/Line/Figure/Table: P2, last bullet Comment: The topic of "Habitat assessment framework" should be carried forward for analysis, given the requirement of use of the State of Nevada's HQT to quantify impacts and mitigation to habitat.

Just because hunting and predation are outside of BLM jurisdiction does not mean that the analysis and subsequently identified mitigation are unnecessary or not required. How can BLM address all connected GRSG impacts and actions without analyzing predators and hunting effects and identifying proper mitigation? The full picture will not be answered and the analysis falls short in disclosing what can be done, holistically, to address GRSG conservation. It can be demonstrably argued that predation, previously identified as a USFWS-identified threat is a significant issue and that analysis of this issue is necessary to make a reasoned choice between alternatives, especially since the Nevada State Plan includes scientifically-based predator control. Predation and predator control are significant issues that should be analyzed.

M.4.2 Habitat Boundary/Habitat Management Area Designations

Section: 2.5 Page: 2-16 Paragraph/Line/Figure/Table: Table 2-2b, Issue: Modifying Habitat Management Area Designations Sub-issue 2, Habitat management area designations flexibility Comment: Revise Topic from "Habitat management area designations flexibility" to "Future habitat management area designations refinement with new best available science." Again, BLM must select the Management Alignment Alternative based on the requirement to use best available science. For the Management Alignment Alternative, it is important that local government agencies are given a seat at the table in future updates. As noted above, BLM is required to coordinate and consult with local governments as well. And, it's just good business to do so. The local agencies often have local information that is imperative to the process. Also make it clear that any habitat category changes must be through a vote of the SEC. This requires a public process through NV Open Meeting Law. Right now, this section does not make it clear that the State Plan mandates changes be made through the SEC. To address these comments, please revise the language in the second paragraph to read "The review and refinement process would be scientifically based and occur through the Nevada Sagebrush Ecosystem Program process which would include review and input from the SETT, NDOW, BLM, USFS, and USFWS and local government agencies, especially related to local knowledge, and approval from the SEC." No-Action Alternative: Once again, we would stress that this alternative's reliance on Coates et al. 2014 relies on outdated information, and not "best available science" as described in the above comments.

The 2019 Proposed Plan proposes to update the Habitat Management Area boundaries for Priority Habitat Management Area, General Habitat Management Area, and Other Habitat Management Area to reflect the best available science, and outlines a process for periodically revising these boundaries in the future, as new data becomes available. This would ensure that current and future renditions of HMA boundaries accurately reflect Greater Sage-Grouse habitat on the ground and guide management actions appropriately. Recommendation: The EPA recommends that the FSEIS discuss how PHMA and GHMA boundaries will be adjusted in the near term if they are degraded by catastrophic fire or major infestation of invasive species to ensure there is adequate viable habitat until the next evaluation and potential adjustment related to PHMA adequacy.

We note for Greater Sage-Grouse Management Zones III and V, the DSEIS indicates that combined with development and unplanned natural events and disturbances, smaller populations continue to be at risk with the potential of extirpation (pps. 4-66, 70). Recommendation: We recommend that FSEIS expand on this issue and apply the mitigation hierarchy of avoidance, minimize, and mitigation to the fullest extent possible to avoid loss of these vulnerable populations.

The NV/CA DSEIS states that while "BLM Nevada and California are unable to implement the 2019 Adaptive Management Strategy" because of the 2019 preliminary injunction, the State of Nevada's implementation of the same strategy "identified population triggers have been tripped in the Nevada and Northeastern Sub-region." NV/CA DSEIS at 3-8. However, it does not provide any additional information on which PACs exceeded triggers, or by how much. However, the information from the State of Nevada's Sagebrush Ecosystem Program's Fall 2019 Adaptive Management Trigger Summary shows that, in fact, 18 PMUs in Nevada and NE California had met population triggers in 2019.11 In Nevada, seven populations have tripped habitat triggers: Gollaher, Tuscarora, North Fork, Lone Willow, Virginia/Pahrah, Desert, and Santa Rosa. 11
http://sagebrusheco.nv.gov/uploadedFiles/sagebrusheconvgov/content/Resour

For Nevada and Northeast California, the NV/CA DSEIS simply repeats the 2018 FEIS's brief analysis of the impacts from proposed updates to the HMA boundaries, providing no new information or consideration of how it would affect sage-grouse. NV/CA DSEIS at 4-41 to 4-42.

M.4.3 Habitat Objectives

Section: 3.1.1 Page: 3-3 Paragraph/Line/Figure/Table: Bullets 2 & 3 Comment: Please include better language about conifer encroachment so that it is recognized and addressed as the primary threat it is and so that the Habitat Objectives can be adjusted accordingly based on the best available science. While the EIS does specify previously omitted science related to pinyon/juniper and sage grouse avoidance, the EIS fails to identify that this science demonstrate a higher threat of conifer encroachment than previously recognized. Most importantly, this science directly refutes the Habitat Objectives in the No Action Alternative and justifies changes. For instance, the No Action Alternative Habitat Objectives call for <3% phase I for general habitat and <5% phase 1 for winter habitat. Phase I is defined in the ARMPA as 0 to 25% cover of trees. Yet, Baruch-Mordo et al. (2013) found that grouse abandon their leks at only 4% cover. USGS found this important enough to include in their synthesis even though it was prior to 2015. Other forthcoming or newly available research confirms our position. Additionally, not specifically discussed in the EIS is reference to Severson et al. (which is in the USGS reports and discussed). Severson et al. concluded that "Despite conventional wisdom that female grouse are strongly tied to the same nesting sites every year, sage grouse hens were quick to consider restored habitat nearby, and nested both in and near sagebrush stands cleared of juniper. Within two to four years after juniper cutting, sage grouse moved in to cut areas, and the probability of nesting in and near treated sites increased 22% each year after cutting. After four years, the number of sage grouse nesting in and near the restored areas increased 29% (relative to the control area). Additionally, birds were much more likely to nest in or near restored sites: for every 0.6 miles from a cut area, the probability of nesting decreased 43%. In short, removing junipers dramatically increased the availability of nesting habitat, and hens proved quite willing to take advantage of good habitat as it became available" (as reported in Sage Grouse Initiative, Conifer Removal Boosts Sage Grouse Success, Science to Solutions Series Number 12, at 4 (2017)). Finally, Sandford et al. also reported in the aforementioned Sage Grouse Initiative 2017: "[N]est success declined with every 0.6 miles farther away" from areas where trees were removed. "In one documented instance, a marked female nested within a treatment even before mechanical harvesters had completed the cut, and then successfully hatched a brood; Sandford et al.

2015" . . . "Most hens (86%) kept broods close to restored habitats and avoided areas with trees, and hens that used areas cleared of conifers were most likely to successfully fledge their broods."

The logical legal prescription for BLM management is that of a public trust required to manage public lands for multiple use and sustained yield, including wildlife. Yet BLM management has resulted in substantial if not permanent impairment of much of public land. Species like sage grouse and other sage obligate species have been in decline, some for many decades. The causes of habitat decline under BLM management must be eliminated, minimized or reversed, and not continued as proposed in the DSEIS.

M.4.4 Adaptive Management

In another example, in the NV/CA DSEIS, BLM provides only very general information on lek status (active or inactive) by Management Zone/population, and only through 2017. NV/CA DSEIS at 3-7. It does not provide any discussion of adaptive management or population triggers during any period since 2015.

Section: 2.5 Page: 2-17 Paragraph/Line/Figure/Table: Table 2-2b, Issue: Adaptive Management Comment: No-Action Alternative: The Adaptive Management Framework described in No-Action Alternative and contained in Appendix J of the 2015 ARMPA is NOT Adaptive Management as described by the DOIs own guidance document, see Figure 1.1 below from DOI 2009. Figure 1.1: Diagram of the management process: Assess problem --> Design --> Implement --> Monitor --> Evaluate --> Adjust --> (back to Assess problem) This is particularly true of the Hard Trigger response that automatically implements a host of allocation decisions that may or may not be warranted based on the cause of reaching a hard trigger. Once the hard trigger responses are implemented there is no iterative implementation or path for reversing those automatic implementations. The scale of the response is also not well defined. Particular aspects of the Adaptive Management Approach not included that are currently under No-Action Alternative, and as described in DOI 2009 include: * Assessment of Problem (particularly on Hard Trigger Response as there is no casual factor analysis); * Design (particularly on Hard Trigger Response as responses are "hard wired" in at the RMP level); * Monitor; * Evaluate; and, * Adjust As such, the BLM should reject No-Action Alternative, and ensure that all Adaptive Management Process components listed in Figure 1.1 above are incorporated into RMPA. Management Alignment Alternative: We support BLM's adoption of the State's Adaptive Management Plan as approved by the Sagebrush Ecosystem Council at its July 17, 2018 meeting and working with us to further refine this process to be true Adaptive Management. Previous Unaddressed Comment on 2019 RMPA?: BLANK

According to the DSEIS, the State of Nevada implemented an adaptive management strategy as part of its Greater Sage-Grouse Conservation Plan and the latest run of their model results identified that population triggers have been tripped in the Nevada and Northeastern Sub-region (p. 3-8). We are aware that both hard and soft triggers for habitat and population have been tripped since 2016 for various Population Management Units. The DSEIS does not include information about how these triggers for adaptive management would relate to the BLM's Plan. Recommendation: In the FSEIS provide the following information for each of the PMUs that would be affected by the BLM's Plan Amendment: * the type of adaptive management trigger; * the reason/causal factor causing the trigger to be tripped; * how the BLM is implementing its current adaptive management strategy; and * what steps are being taken on the ground to respond to these affected PMUs. The DSEIS states "the adaptive management strategy presented in the Proposed Plan Amendment has been modified to better align with the strategy approved by the State of Nevada's Sagebrush Ecosystem Council on July 17, 2018 and August 30, 2018.

Habitat triggers have been replaced with a system of adaptive management warnings. Impacts on Greater Sage-Grouse and its habitat from this change to the adaptive management strategy would be beneficial, providing the ability to detect declining populations and/or habitat and change management on the ground with other Federal, state, and local partners. These warnings would also allow BLM to assess the threats that are present and widespread across the Nevada and Northeastern California Sub-region, which are wildfire and invasive plant species" (p. 4-42). Recommendations: In the FSEIS, compare the adaptive management plan in the 2015 approved resource management plan amendment to the 2019 adaptive management strategies for the affected PMUs and analyze these results to determine if they provide the same level of conservation protection and whether the 2019 plan is as beneficial.

Finally, the Sage-Grouse RMP amendments have been serving as incentives to implement other beneficial management tools, including adaptive management, outcome-based grazing, invasive woody species abatement, and targeted grazing treatments to diminish annual weed infestations by creating fuel breaks and fuel reduction projects. We discourage the BLM from putting the development and use of these tools in appropriate circumstance at risk. Abandoning the ongoing Sage-Grouse RMP amendment process and starting over with an entirely new EIS process to evaluate Sage-Grouse habitat conservation and management could delay or eliminate the ongoing efforts to develop and implement these important management tools as mechanisms to accomplish goals and objectives of the Sage-Grouse habitat conservation programs.

M.4.5 Mitigation

Section: 1.1 4.5.3 Page: 1-4 4-43 - 4-44 Topic: Compensatory Mitigation Comment: Through the State of Nevada's Regulations NAC 232.400-480, effective October 30, 2019, offsite mitigation for anthropogenic disturbances on public lands is no longer voluntary and must be completed through the Sagebrush Ecosystem Program's Conservation Credit System. Additionally, there is a Memorandum of Understanding between the Bureau of Land Management in Nevada and California and the State of Nevada's Department of Conservation and Natural Resources and Department of Wildlife dated August 22, 2019 that outlines the partnership and responsibilities between the BLM and the State in regards to incorporation into NEPA review, land-use authorization process, and implementation of the Conservation Credit System. Since this plan encompasses most of Nevada and a small portion of California, this writing should not be boilerplate for an entire region but specific and contemporary to Nevada and NE California to reflect the commitments of the BLM to require projects to meet all State and Local laws and regulations, including the requirement to complete compensatory mitigation requirements through Nevada's Conservation Credit System and the approval from the Governor appointed, Sagebrush Ecosystem Council.

Section: 2.6 Page: 2-19 Topic: Detailed analysis of 2019 alternatives - Mitigation issue Comment: "The BLM would not deny a proposed authorization in Greater Sage-Grouse habitat solely on the grounds that the proponent has not proposed or agreed to undertake voluntary compensatory mitigation. " In Nevada, mitigation in GRSG habitat is not voluntary. It is required by state regulation, and the proposed language presents ambiguity in the enforcement of compatibility with state requirements. The SETT recommends clarifying that mitigation is only voluntary if there are no direct and indirect impacts to GRSG habitat.

Section: 2.6 Page: 2-20 Topic: Detailed analysis of 2019 alternatives - Allocation Exception Process Comment: The proposed plan amendment granting exceptions states: "In cases where exceptions may be granted for projects with a residual impact, voluntary compensatory mitigation consistent with the State's management goals could be one mechanism by which a proponent achieves the RMPA goals, objectives, and exception criteria." This language is concerning to the SETT because the above language seems to conflate what the BLM views as voluntary compensatory mitigation vs. what is required by state law. The BLM has stated within this plan (see comment above) that it will not deny projects if voluntary mitigation is not offered, however under the exception allocation process it states that voluntary mitigation can be used to achieve RMPA goals." This creates the possibility (or certainly the perception) that projects may proceed regardless of mitigation status. The SETT requests clarifying language indicating the inability for projects to proceed if state requirements for mitigation are not met.

Section: Appendix B Page: B-27 Comment: "In cases where exceptions may be granted for projects with a residual impact, compensatory mitigation consistent with the State's mitigation policies, programs, and regulations such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law)" The SETT recommends adoption of the tracked changes above and the replacement of the language highlighted with the codified regulation which is Nevada Administrative Code (NAC) 232.400 - 232.480 in both sections ii and v., and elsewhere in the document where the Executive Order is cited.

Section: Appendix B.6.3 Page: B-27 Comment: The COT objectives for energy development will be ineffective if the allocation exception process regarding mitigating residual impacts remains unclear with respect to voluntary mitigation and the ability of the BLM to enforce mitigation requirements. For example, the COT objective states "should be designed to ensure that it will not impinge upon stable or increasing Greater Sage-Grouse population trends" but if the BLM allows a project to proceed without mitigation on the opinion that mitigation in sage-grouse habitat is voluntary, projects will continue to impede the ability of the CCS to improve GRSG population trends. The SETT strongly recommends the clarification of language regarding voluntary mitigation reflected in the comments above.

Throughout document there is a need to update State required mitigation from the Governor's orders to it being codified under Revised Nevada Statutes.

"Outcome-based" management should have a dedicated BLM team that surveys sage grouse populations and their habitat every season. That should be the main standard of management actions, and not thousands of pages of documents and continuation of actions which cause the very disturbances that reduce and extirpate sage grouse populations.

Pre-surveys should be done on every location now scheduled to receive treatments. This information is crucial to achieve the stated goal of improving sage grouse habitat. What species are present in what density before the treatment and following the treatment for 10 years? The resulting data - the evidence for the efficacy of BLM's treatments to improve sage grouse habitat. - should be reported.

Although monitoring is discussed in Appendix M, there were no specifics given for "the Habitat Objectives for Greater Sage-Grouse". What precisely will be measured should be stated in the DSEIS. The Plan should have specific, measurable objectives that are enforced everywhere, so that actual habitat conditions can be improved. Habitat requirements for sage grouse are well-known and simple: grass height, forb species, sizes and density of sagebrush, availability and cover of water sources.

Soil biocrust cover should be quantified and monitored, and granted heightened consideration in rangeland decision support tools (Fick et al. 2019).

We support efforts under the 2020 DSEISs to modify BLM RMP mitigation strategies to align with applicable State mitigation strategies. These efforts are compatible with the overall intent of the preferred Management Alignment Alternative which would better align the BLM's RMP direction with the State Sage-Grouse conservation programs and management guidelines. It is only logical that the concept of aligning BLM RMP direction with State Sage-Grouse management direction should include alignment with State mitigation strategies.

Alternative under the 2020 DSEISs because amendments that better align the BLM's RMP direction with the State Sage-Grouse conservation programs will minimize potential conflicts between BLM and State Sage-Grouse conservation efforts and management guidelines. Such alignment between BLM RMP direction and the State Sage-Grouse conservation programs should include alignment between BLM and State mitigation strategies, including compensatory mitigation strategies

The Nevada Conservation Plan and associated regulatory framework (see Nevada Administrative Code 232.400 - 480 inclusive) requires compensatory mitigation for anthropogenic disturbances on public lands in accordance with state and local requirements. The State of Nevada, through the Department of Conservation and Natural Resources, Department of Wildlife, and Bureau of Land Management, have entered into a Memorandum of Understanding detailing the relationship between the three entities in the context of federal land use, the Nevada Conservation Plan, the Conservation Credit System, and NEPA review. The DSEIS, throughout Section 2.6, should reflect these Nevada-specific requirements and the protections they provide to habitat and the species.

Discuss how the BLM will use the warnings from the affected PMUs to assess threats across the Nevada and Northeastern California Sub-region. We understand that monitoring reports have not been finalized (BLM staff conversation 3/12/20). On- the-ground data will help evaluate the effectiveness of existing conservations measures and assess the current health of the Greater Sage-Grouse populations and habitat. Recommendation: If available, include this monitoring data in the FSEIS.

After internal review, the BLM concluded that the Federal Land Policy and Management Act does not explicitly mandate or authorize the BLM to require public land users to implement compensatory mitigation as a condition of obtaining authorization for the use of the public lands (IM 2018-093, Compensatory Mitigation, July 24, 2018). While we understand this change, the DSEIS does not contain analysis of how the removal of mandatory compensatory mitigation will impact the Greater Sage-Grouse population numbers and if voluntary mitigation would further the goal of achieving a net gain standard supporting the USFWS determination that protection was not warranted.

EPA is aware of the 2019 Memorandum of Understanding between the State of Nevada and the Nevada and California Bureau of Land Management to implement the State of Nevada Conservation Credit System and outline a process where it is incorporated into environmental reviews for BLM-administered public lands with Greater Sage-Grouse habitat. The MOU also directs the BLM to include mitigation that is part of a state plan, program or authorization in all of its NEPA alternative analysis and to cooperate with the States to determine appropriate project design and alignment with States' policies and requirements, including those regarding compensatory mitigation, consistent with federal law. Recommendations: In the FSEIS, we recommend the following: * Include the signed MOU as an appendix. * Disclose how the Nevada state compensatory mitigation standards will be applied to each of the Greater Sage-Grouse Habitat Management Areas. * Describe how the mitigation strategy will be applied to populations and/or habitats -ie lek cluster, biologically significant units, Habitat Management Areas or Management Zones - when adjacent land is not available for compensatory mitigation. * The State of Nevada issued Executive Order 2018-32 establishing use of the Nevada Greater Sage-Grouse Conservation Plan and Credit system requiring mitigation for anthropogenic disturbances on federal and state lands; however, it is unclear whether the State of California has the same requirements. While California BLM signed the MOU, the State of Nevada does not have administrative jurisdiction over BLM lands in California. Since the DSEIS does not contain CA Department of Fish and Wildlife Greater Sage-Grouse policies, include a discussion of whether a net conservation standard will be achievable for the California Greater Sage-Grouse sub populations. Include the State of California's Greater Sage-Grouse guidance and discuss whether the California BLM will implement voluntary mitigation. * According to the 2018 Nevada Greater Sage-Grouse Conservation Plan, livestock operations and agricultural activities and infrastructure related to ranch and farm businesses (e.g. water troughs, fences, etc.) are not included in the definition of anthropogenic disturbance and associated conservation policies. Discuss the implications of this exception and how it relates to mitigating impacts to Greater Sage-Grouse populations from grazing in Priority Habitat Management Areas and General Habitat Management Areas. * According the MOU, the Nevada Department of Wildlife has statutory authority for protecting and managing fish, wildlife, and plants within their administrative jurisdiction in the State of Nevada, except where specifically preempted by federal law. Identify instances where the federal law would preempt the State of Nevada's jurisdiction. *Include information from the state plan that details how monitoring will be conducted and how success will be determined. *Surface-disturbing activities could result in unavoidable adverse impacts; although these impacts would be mitigated to the extent possible, unavoidable impacts would be inevitable under both the No-Action and Management Alignment alternatives and the Proposed Plan Amendment (p. 4-72). Clarify how the unavoidable impacts would be mitigated in California.

AEMA recognizes that compensatory mitigation was one factor considered by the USFWS' in its decision to not list sage grouse under the Endangered Species Act (hereinafter ESA). However, the ESA requires that multiple factors be considered before making a determination on whether to list a species or not. While adequacy of regulatory mechanisms (or lack thereof) was the driver in this planning process in 2012, it would be inappropriate to equate use of compensatory mitigation as the silver bullet to protect sage grouse and avoid a listing. This line of thought fails to consider the multitude of other actions taken to improve habit and reduce disturbances to sage grouse at all levels of government. Moreover, there is not enough data on effectiveness of compensatory mitigation, specific to sage grouse, which would support implementing it on a widespread basis.

Compensatory Mitigation The primary intent of the 2019 ARMPA revision was to increase alignment with the states; however, there are still inconsistencies between the ARMPA and Nevada's regulation on offsite compensatory mitigation for anthropogenic disturbances on public lands. Compensatory mitigation is no longer voluntary and must be completed through the State of Nevada Sagebrush Ecosystem Program's Conservation Credit System, administered by the SETT. Since the 2019 ARMPA encompasses most of Nevada and a small portion of California, ARMPA language should not be generalized for an entire region but include specific details that are directly reflective of requirements within Nevada and NE California. Inserting the word "voluntary" in the 2019 ARMPA adds confusion during the project planning process and is inconsistent with the State of Nevada's Greater Sage-Grouse

Conservation Plan and regulations. Additional clarification should reflect BLM's commitment to require that projects meet all applicable state laws and regulations whether through updating ARMPA language to reflect Nevada's regulatory environment, or by providing additional guidance once the 2019 ARMPA goes into effect.

the 2019 alternatives analysis for mitigation states "The BLM would not deny a proposed authorization in Greater Sage-Grouse habitat solely on the grounds that the proponent has not proposed or agreed to undertake voluntary compensatory mitigation." This directly conflicts with requirements that BLM comply with state laws and regulations and could effectively allow BLM to permit projects that are out of compliance with state mitigation regulations. Numerous conversations relative to this issue occurred between BLM and the State of Nevada during the 2019 ARMPA revision, with repeated assurances that BLM would comply with state laws and regulations. This statement appears to contradict those assurances and should be removed or clarified.

NDOW also strongly recommends the BLM include further clarification on what constitutes "mitigation". BLM Instruction Memorandum (IM) 2019-018 on Compensatory Mitigation is specific to offsite compensatory mitigation; however, there is continued confusion with IM and how it is applied within the 2019 ARMPA. Most commonly this results in a misinterpretation of the IM to mean that no mitigation is required. NDOW has observed this misinterpretation on nearly every project located in sage-grouse habitat in Nevada since IM 2019-018 was published. Stipulations within the 2015 ARMPA that require mitigation measures on-site are not being followed because there is continued confusion of what falls under "mitigation" and the intent of IM 2019-018. Should the 2019 ARMPA go into effect, clarification on this issue through additional guidance or an Instructional Memorandum is necessary to ensure this confusion is resolved

There continues to be a high level of uncertainty regarding the Allocation Exception Process outlined in both the 2015 and 2019 ARMPAs. Questions remain regarding the level of coordination required between BLM and the State of Nevada, including NDOW and SETT, when reviewing a possible exception, waiver, or modification. Additionally, the current language has been interpreted that if a proponent chose to mitigate through the Conservation Credit System, they could be granted an exception, waiver, or modification to management decisions including No Surface Occupancy and seasonal timing limitations. Currently, the Conservation Credit System is not capable of calculating and accounting for anything other than compensatory mitigation for anthropogenic activities specifically listed in Table 1 of the Conservation Credit System User Guide (v1_6_Final), and cannot account for credits used to circumvent avoidance and minimization measures described through required stipulations in the 2015 ARMPA or management decisions in the 2019 ARMPA.

M.4.6 Lek Buffers

Section: 1.4 Page: 1-11 Paragraph/Line/Figure/Table: Table 1-3, Modifying Lek Buffers Comment: We still assert that any use of lek buffers and associated modifications must be included for analysis in this SEIS, not left for clarification through plan maintenance, because lek buffers were not fully analyzed in the previous EIS nor provided for public review and consideration.

Based on the Administrative Record from the previous EIS, lek buffers were initially discussed during August 2014 agency meetings. The USGS was directed to do a "quick literature search to harvest the latest research results on buffers to contrast with what we currently have in our administrative draft proposed plans." WO_0000196. In September 2014, Deputy Assistant Secretary Jim Lyons acknowledged the failure to use "best available science" in analyze lek buffers in the DEIS. WO_0001457. Additionally, a DOI biologist expressed concerns that "the way the buffers have been written into the document as [required design features] really makes them management measures not analyzed in the drafts" and "avoiding the NEPA process by including un-analyzed management actions in an appendix". WO_0048001. Finally, the Solicitor's office had concerns about the new studies requiring an SEIS: "It will be important for the agency to have a record showing how it evaluated the USGS studies and why it determined that a supplemental analysis was not warranted." GBR_0010440, GBR_0010453. If BLM believes this issue was properly analyzed with no supplemental analysis previously, BLM needs to cite to the previous analysis and document it here. Previous Unaddressed Comment on 2019 RMPA?: Yes

Section: 1.4 Page: 1-11 Paragraph/Line/Figure/Table: Table 1-3, Modifying Lek Buffers Comment: This EIS must document that the cited USGS OFR 2014-1239 report recognized that the area around a lek that is sensitive for sage grouse is not always a simple "radii" buffer and that "logical and scientifically justifiable departures…based on local data and other factors may be warranted when implementing buffer protections…" (p. 2). The USGS report states that "We do not make specific management recommendations but instead provide summarized information, citations, and interpretation of findings available in scientific literature. We also recognize 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" (p. 1, emphasis added). The report clarifies that that impacts to leks are due to "influence of roads and infrastructure with topography and habitat conditions (visibility and audibility)…" (p. 6). In simple terms, even if within a lek buffer, if a human disturbance cannot be seen nor heard by sage grouse on the lek because of topography and other natural conditions, that area of the lek buffer could be clipped from the buffer. conditions, that area of the lek buffer could be clipped from the buffer. In the previous Administrative Record, the principal author of the USGS lek buffer report recognized the importance of locality in cautioning that the results of his literature search conducted for BLM to justify the new lek buffers did not provide a "simple, one- size-fits-all solution that was based solely on science" explaining that many of the complications are not "specified biologically" explaining that "scientific results will not provide all answers needed to" render the BLM's desired outcome: In the end, trying to balance political and conservation desires and needs with what we understand to be the basic biological requirements of the species of concern (Sage- grouse in this case) is the hard work…our collective ability to "respect biological requirements" for conservation while allowing for nuances based on social impetus (e.g., NSO or closure of seasonal habitats in one state versus strict use of buffers and seasonal closures/limits in another state could both be viable options for protection of nesting habitat) that can incorporate local understanding and social needs is the task at hand." WO_0035879. Also as referenced in the Administrative Record, there was addition of the new and universally applicable 1.2-mile buffer zone for fences that was not supported by the USGS report. In an April 2015 e-mail between Michael Bean, Sarah Greenberger, and Jim Lyons: "…the USGS report identifies only certain types of fences in certain types of terrain as a collision risk. By imposing a buffer requirement for all types of fences in all types of terrain, the BLM will impose a restriction for which the report offers no basis…If we want to anchor our plans in the USGS report, then the way to do that is to require that new fences (of the types described in the report) be placed at least 1.2 miles from leks in flat or rolling terrain . . . that is probably better than the alternative of lumping all fences together, regardless of type and location." WO 29247, WO 29250 (emphasis added). Despite the acknowledgement that the universal 1.2-mile buffer requirement for all fences does not adhere to the recommendations of the 2014 USGS study, it continues to be a requirement that has no scientific basis. In discussing roads, the USGS Report includes the following observations: "…it is important to recognize that . . . not all roads have the same effect…the influence of individual roads or networks of roads on sage-grouse habitat use and demographic parameters remains a research need. This is a good example of the challenge associated with making clear interpretations of the effect area (and therefore, a definitive buffer distance) for these types of infrastructure" (pp. 5-8). The USGS Report does not recommend uniform or prescriptive lek buffer distances and instead presents a range of lek-buffers. The USGS report does not support the categorical 1.2-mile buffer requirement for all fences. Site specific factors need to be taken consideration such as line of site between the lek and project, topographical relief, quality of site- specific habitat, current bird activity, probability of sage-grouse nesting within the entire radius area, duration of the project/use and project/use intensity. Previous Unaddressed Comment on 2019 RMPA?: Yes

The 2019 Proposed Plan replaces Management Decisions SSS 2(D) and SSS 3(C) from the 2015 ARMPA/Record of Decision to apply pre-determined lek buffers for activities in PHMAs and GHMAs with will assess and address impacts through project specific analysis. In addition, the statement that "any residual impacts within the lek buffer-distances are addressed through compensatory mitigation measures sufficient to ensure a net conservation gain" was removed. In both plans the BLM adopted the lower end of the interpreted range of lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse - A Review (Open File Report 2014-1239.) Recommendations: Evaluate whether the above changes to lek buffer-distances provide the same level of regulatory certainty and whether these changes would reduce the certainty that setbacks from disturbance would be required. Explain how the BLM or the State of Nevada would determine if residual impacts would lead to compensatory mitigation, including whether cumulative impacts of residual effects occurring across the range would be considered. Given the USGS report's caution regarding the potential under representation of habitats in lek- based designations and the considerable variability in buffers, clarify in the FSEIS the basis for determining that project specific analyses should rely on the lower end of the lek buffer distances as the default, rather than, for example, establishing the upper end of the suggested range as the default and allowing departures downward when justified by the application of local data and best available science. Include updated scientific information since 2015 that would support justifiable departures when implementing buffer protections and project level impact analysis.

M.4.7 Fire and Invasive Species

Wildland Fire Statistics Table 3-4 has a table showing fire statistics for the covered area in the years between 2015 and 2017. Statistics just from Elko County only bolster the point that wildland fire needs to be a priority for any managing agency. During the 2018 fire year approximately 660,240 acres burned in 138 fires, harming Elko County's livestock grazing capacity as well as affecting hunting seasons for Elko County's coveted Elk, antelope and deer hunts, as well as destroying habitat for game birds such as sage grouse and chukar. During the period from 2009 to date approximately 1,537,132 acres of land in Elko County have burned. In the 2018 wildfire season wildfire cost the BLM alone $24 million dollars to contain. This current system is unsustainable both from an ecological and fiscal perspective

On page 4-59, the DSEIS states that the interagency Western Association of Fish and Wildlife Agencies' Wildfire and Invasive Species Working Group (including the BLM) "found that all of the original challenges related to control and reduction of the invasive annual grass/fire cycle were still relevant (policy, fiscal, and science challenges) and they pointed to three new gaps involving program capacity, resource specialists, and developing guidelines on drought and climate adaptation to manage sagebrush ecosystems." Recommendation: Since wildfire and invasive species continue to be the biggest threats and stressors to the Great Basin Greater Sage-Grouse population, discuss in the FSEIS if the these three gaps will impact the BLM's ability to protect, maintain and/or restore habitats needed to maintain healthy ecosystems which support Greater Sage-Grouse populations throughout their life cycles.

M.4.8 Alternatives - Other

Section: 2.5 Page: 2-18 Paragraph/Line/Figure/Table: Table 2-2b, Issue: Mitigation Comment: No-Action Alternative: The No Action Alternative remains ambiguous in its definition and application of "Net Conservation Gain" and has no consistent way of quantifying impacts and applying mitigation. As such, BLM must reject the No-Action Alternative. Management Alignment Alternative: The first paragraph must clarify, for consistency sake, if the BLM is implementing an "avoid, minimize and compensate" or "avoid, minimize and mitigate", and better define what it means in terms of the difference between "compensate" and "mitigate" and how these would be applied. The State is very clear in terms of requiring mitigation of all anthropogenic disturbance as determined through the CCS. In paragraph 2, we support utilizing the State's Habitat Quantification Tool (HQT) as a consistent means of tracking changes to habitat quantity and quality. The BLM references the State's "net conservation gain" standard, but to fully align with the State, the BLM must also adopt the State's definition where "Net conservation gain is defined as the State's objective to maintain the current quantity and quality of sage-grouse habitat within the Service Area at the state-wide level by protecting existing sage-grouse habitat or by mitigating for loss due to anthropogenic disturbances. Mitigation requirements are determined by the Conservation Credit System. This objective will be measured by the credit to debit ratio." Currently, it is unclear as to whether the BLM is proposing to adopt this definition and apply this standard. Please clarify. Paragraph 3 is very ambiguous in terms of the statement that "…mitigation would be considered subject to the federal regulations governing the authorization…" whereas the State is very clear in that "Mitigation will be required for all anthropogenic disturbances impacting sage-grouse habitat within the Service Area." Clarification needs to be provided in terms of how the BLM plans to align with the State Plan in circumstances where "…federal regulations governing the authorization…" do NOT allow for or mandate 'mitigation' following avoidance and minimization, and such authorizations should be clearly disclosed. In paragraph 4, for consistency sake, we support the use of the State's HQT and/or CCS to determine mitigation that meets the State's objective to "…maintain the current quantity and quality of sage-grouse habitat…" when it is determined that additional mitigation, in addition to avoidance and minimization actions, would be required in order to actually "maintain the current quantity and quality of GRSG habitat". Previous Unaddressed Comment on 2019 RMPA?: Yes

Section: 2.5 Page: 2-20 Paragraph/Line/Figure/Table: Table 2-2b, Issue: Allocation Exception Process Comment: No-Action Alternative: We do not support this approach as it is inconsistent with the Nevada Sage-grouse Conservation Plan as well as our County Plans and Policies, inconsistent among allocations, and does not clearly provide exceptions for the following: emergency actions; issues related to human health and safety; and, standard administrative functions performed by local government for public benefit. Proposed Plan Amendment: It also needs to be clarified that mitigation through the CCS is not voluntary in Nevada, it is mandatory. v. Please remove the language "and would have no adverse impacts on Greater Sage-Grouse and its habitat." This language belies the exception and would require some kind of undue application and analysis process with BLM to move forward with "routine administrative functions" that occur and have historically occurred virtually every single day. Previous Unaddressed Comment on 2019 RMPA?: BLANK

Section: 2.5 Page: 2-22 Paragraph/Line/Figure/Table: Table 2-2b, Issue: Seasonal Timing Restrictions Comment: No-Action Alternative: We not support this approach as there is no exception for the following: emergency actions; issues related to human health and safety; and, standard administrative functions performed by local government for public benefit. There is also no ability to provide an exception for activities within a 4-mile buffer of leks, even if topographic, vegetative or existing infrastructure are resulting in no impact to the lek. Proposed Plan Amendment: v. Please remove the language "and would have no adverse impacts on Greater Sage-Grouse and its habitat." This language belies the exception and would require some kind of undue application and analysis process with BLM to move forward with "routine administrative functions" that occur and have historically occurred virtually every single day. Previous Unaddressed Comment on 2019 RMPA?: Yes

M.4.9 Alternatives

Nevada Draft SEIS, p. ES-4. The court has already found that BLM failed to conduct sufficient analysis and must evaluate additional alternatives, but instead of providing the public with a Draft SEIS that addresses these findings, BLM is simply restating its previous position.

M.4.10 New Alternative

Alternatives 1. Every alternative should include in its measurable objectives an increase in sage grouse populations. 2. The DSEIS is to address four specific issues: the range of alternatives, need to take a hard look at environmental impacts, cumulative effects analysis, and the BLM's approach to compensatory mitigation. But reporting the impacts and the cumulative effects and then taking action to actually protect sage grouse are different. Where are the mandatory protections on the ground that should be triggered by the conditions that are present in HPMA and GMHA? None of the alternatives require removal of impacts. 3. "During scoping, some commenters asked the BLM to consider alternatives with additional constraints on land uses and ground-disturbing development activities to protect Greater Sage-Grouse habitat. These constraints are beyond those in the current management plan." [page 35]. If constraints on land uses are "beyond those in the current management plan", this whole process is a waste of time because it does not deal with the primary causes of decline - human disturbance. 4. An alternative should be included that requires protection of the remaining sage grouse, including a closure of all PHMA to grazing, mining and new roads. 5. An alternative should be included that focused on increasing sage grouse populations, including a closure of all GMHA to grazing, mining and new roads.

Another reasonable alternative BLM could (and we previously argued should) analyze would be full adoption of the State of Nevada Sage Grouse Conservation Plan (newly amended). BLM's Management Alignment Alternative did not fully adopt the Nevada Plan. It only adopted parts of the Nevada Plan such as the Conservation Credit System and Adaptive Management Process.

Another reasonable alternative ELM could (and we previously argued should) analyze would be full adoption of the State of Nevada Sage Grouse Conservation Plan (newly amended). ELM's Management Alignment Alternative did not fully adopt the Nevada Plan. It only adopted parts of the Nevada Plan such as the Conservation Credit System and Adaptive Management Process.

An Additional Alternative should have considered that the planning direction for livestock grazing was conformance with 43 C.F.R. Part 4100, Subpart 4180. The DSEIS welcomes comments on whether Nevada BLM should consider additional alternatives, stating: The DSEIS, including any comments that the agency receives, will help the BLM determine whether its 2015 and 2019 land use planning and NEPA processes have sufficiently addressed Greater Sage-Grouse habitat conservation or whether the BLM should initiate a new land use planning process to consider additional alternatives or new information. DSEIS at PDF page 5 of 1008 (emphasis supplied); see also DSEIS at ES-3 (wherein the DSEIS states that "BLM now seeks additional comment from the public on compensatory mitigation"). Here, the DSEIS persist in failing to evaluate an alternative relative to livestock grazing on public lands which relies upon the continued implementation of 43 C.F.R. subpart 4180, even though repeated comments were made as to such point. Subpart 4180 itself is a regulatory mechanism to both manage sage-grouse and to preclude listing by USFWS. Specifically, the DSEIS, Appendix C, Section C.4.14 (Land Health Assessment), at page C-215, identifies as Issue #5, Recommendation 12, that: Any decision from this process would be amend all Plans to remove any elements as related to permitted livestock grazing, and to defer GRSG management to the BLM via continued implementation of 43 C.F.R. Part 4100, subpart 4180. Id..4 However, the DSEIS did not consider or otherwise provide any rational basis for not doing just that as the management direction for livestock grazing on the public lands. 4 The DSEIS, Appendix C, at page C-70, noted a comment that "[t]he Department (FWS and BLM) previously manipulated the status of GRSG, suggesting therefrom a false view that something more is needed relating to permitted livestock grazing upon the public lands in the Western United States, beyond what is already in place. E.g. 43 C.F.R. Part 4100, subpart 4180. This manipulation must stop and the Department must provide a sound statement as to the status of GRSG". The DSEIS, Appendix C, at page C-148, noted another comment that stated that "[a]ny decision from this process should amend all Plans to remove any elements as related to permitted livestock grazing, and to defer GRSG management to the BLM via continued implementation of 43 C.F.R. Part 4100, subpart 4180". The DSEIS, Appendix C, at page C-148, noted another comment that stated that "BLM grazing regulations via 43 C.F.R. 4180.2(c) already requires BLM to make management changes in order for allotments determined to not be meeting rangeland health standards to move towards meeting". The DSEIS, Appendix C, at page C-154, noted another comment that stated that "[a]ny decision from this process would be to amend all Plans to remove any elements as related to permitted livestock grazing, and to defer GRSG management to the BLM via continued implementation of 43 C.F.R. Part 4100, subpart 4180". See also DSEIS, Appendix C, at page C-155.

An Additional Alternative should have considered that the planning direction for livestock grazing was the 2009 Elko County Public Lands Policy Plan, the 2020 Idaho DSEIS, and/or the 2020 Utah DSEIS. The DSEIS welcomes comments on whether Nevada BLM should consider additional alternatives, stating: The DSEIS, including any comments that the agency receives, will help the BLM determine whether its 2015 and 2019 land use planning and NEPA processes have sufficiently addressed Greater Sage-Grouse habitat conservation or whether the BLM should initiate a new land use planning process to consider additional alternatives or new information. DSEIS at PDF page 5 of 1008 (emphasis supplied); see also DSEIS at ES-3 (wherein the DSEIS states that "BLM now seeks additional comment from the public on compensatory mitigation"). Here, the DSEIS failed to evaluate an alternative relative to livestock grazing on public lands which relies upon the 2008 Elko County Public Lands Policy Plan, the Idaho DSEIS5 and/or the Utah DSEIS,6 as well our comments thereto to the Idaho ARMPA and to the Nevada ARMPA, which are attached hereto and incorporated herein as Attachment Nos. 1, 2, 3, 4, 5. We share this comment because -- while the DSEIS's Executive Summary at ES-2 affirms its commitment "to working directly with local communities on sagebrush conservation effort -- we find the DSEIS considered and assessed alternatives that were not the compatible with working directly with local communities. See also Section V. below. 5 2020 Idaho DSEIS released February 14, 2020. https://eplanning.blm.gov/epl-front-office/projects/lup/103344/20013028/250017826/ID_GRSG_DSEIS_Feb-2020_508.pdf (last checked 5/20/2020 @ 10:47 A.M.). 6 2020 Utah DSEIS released February 19, 2020. https://eplanning.blm.gov/epl-front- office/projects/lup/103346/20013189/250018002/UT_GRSG_DSEIS_Feb-2020.pdf (last checked 5/20/2020 @ 10:49 A.M.).

Another reasonable alternative the BLM could analyze would be full adoption of the State of Nevada Sage grouse Conservation Plan (newly amended). The BLM's Management Alignment Alternative did not fully adopt the Nevada Plan; it only adopted parts of the Nevada Plan such as the Conservation Credit System and Adaptive Management Process.

M.4.11 Preferred Alternative

WEX appreciates the BLM's approach in the Management Alignment Alternative that appears to promote and require use of the best available information to create proper designation of any actual habitat based on that which will benefit the species, where that information must be based on ground-truthing making clear that the range wide mapping/analysis is solely for purposes of generally designating a starting point of what is believed to be habitat - subject to site-specific and best available science. The Management Alignment approach to consider site specific information and also honor valid existing rights and consider existing authorized uses and disturbance also is legally appropriate and critical. Proposals such as the No Action Alternative to limit development now not only violate the U.S. Mining Law, they provide no meaningful benefit to the greater sage grouse or its habitat in the area

M.4.12 Range of Alternatives

Page 2-283, Alternative B, this is not the place to discuss the validity exams or buy outs this needs to be removed from the table and the plan completely. The IM sited WO IM 2008-204 is for fluid leasable minerals and specifically excludes Locatable Minerals.

Section: 2.6 Page: 2-18 Topic: Detailed analysis of 2019 alternatives Comment: "In all Greater Sage-Grouse habitat, before authorizing third-party actions that result in habitat loss and degradation within the State of Nevada, the BLM will complete the following steps, in alignment with the State of Nevada's Greater Sage-Grouse Conservation Plan (2014, as amended), including avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions:" The SETT recommends changing "in all Greater Sage-Grouse habitat" to "within 6 km of sage grouse habitat" in order to reflect the anthropogenic disturbance indirect impacts which may have relevance to projects that are less than or equal to 6km outside of habitat.

Page 2-283, Alternative B, this is not the place to discuss the validity exams or buy outs this needs to be removed from the table and the plan completely. The IM sited WO IM 2008-204 is for fluid leasable minerals and specifically excludes Locatable Minerals.

In this new DSEIS, BLM has added near 300 pages of analyses of alternatives. However, these alternatives were considered in the 2015 LUPA process and decision, not as alternatives in the 2019 RMPA process or in this DSEIS process. It is unclear how including these alternatives will cure the likely

NEPA violation described in the Preliminary Injunction. "The stated goals of a project necessarily dictate the range of 'reasonable' alternatives. Id. An agency need not consider alternatives that are 'unlikely to be implemented or those inconsistent with its basic policy objectives.' Id"15 Presumably this set of alternatives, like the No Action Alternative would not comport with the purpose and need of the 2019 RMPA because the 2019 RMPA purpose and need comport with new science and new policy implemented after the 2015 effort. 15 Id. at 20.

While NACO overwhelmingly supports the Management Alignment Alternative, we are concerned that the BLM has not satisfied one of the primary concerns that generated this DSEIS. In its October 2019 decision, the United States District Court for the District of Idaho found, that it is more likely than not that the BLM failed to take a "hard look" when it failed to consider a range of reasonable alternatives in its analysis. Specifically, the Court found that the only other alternative BLM considered - the No Action Alternative - wasn't truly an alternative at all because it did not align with the stated Purpose and Need of the EIS and therefore had no chance of being implemented: "However, the "No Action" alternative was not in fact an alternative but was included only for comparison purposes because the BLM had decided that it would not meet the three purposes and needs listed above. See, e.g., ID ROD at 1-9. The Final EISs thus only considered BLM's preferred outcome."16 No new analysis has been added to the DSEIS to demonstrate how the No Action Alternative is now a reasonable alternative and how it comports with the purpose and need of the 2019 RMPA. 16 Western Watersheds Project et al v. Schneider et al. No. 1:2016cv00083 - Document 189 (D. Idaho 2019)

In this new DSEIS, BLM has added near 300 pages of analyses of alternatives. However, these alternatives were considered in the 2015 LUPA process and decision, not as alternatives in the 2019 RMPA process or in this DSEIS process. It is unclear how including these alternatives will cure the likely NEPA violation described in the Preliminary Injunction. "The stated goals of a project necessarily dictate the range of 'reasonable' alternatives. Id. An agency need not consider alternatives that are 'unlikely to be implemented or those inconsistent with its basic policy objectives.' Id" Presumably this set of alternatives, like the No Action Alternative would not corn port with the purpose and need of the 2019 RMPA because the 2019 RMPA purpose and need comport with new science and new policy implemented after the 2015 effort. While LANDER COUNTY overwhelmingly supports the Management Alignment Alternative, we are concerned that the ELM has not satisfied one of the primary concerns that generated this DSEIS. In its October 2019 decision, the United States District Court for the District of Idaho found that it is more likely than not that the BLM failed to take a "hard look" when it failed to consider a range of reasonable alternatives in its analysis. Specifically, the Court found that the only other alternative BLM considered - the No Action Alternative - wasn't truly an alternative at all because it did not align with the stated Purpose and Need of the EIS and therefore had no chance of being implemented: "However, the "No Action" alternative was not in fact an alternative but was included only for comparison purposes because the ELM had decided that it would not meet the three purposes and needs listed above. See, e.g., ID ROD at 1-9. The Final EISs thus only considered BLM's preferred outcome." No new analysis has been added to the DSEIS to demonstrate how the No Action Alternative is now a reasonable alternative and how it comports with the purpose and need of the 2019 RMPA.

a total of 8 alternatives were considered and analyzed in detail during the Sage-Grouse plan amendment process between 2015 and 2020. This is an adequate and appropriate range of alternatives given the scope of the DSEIS and the original scope of the 2015 and 2019 Sage-Grouse RMP amendment processes. There is no need to undertake the massive effort and expense of a totally new planning process because the BLM has already sufficiently addressed Greater Sage-Grouse habitat conservation.

In general, Nevada Farm Bureau supported and (continues to support) the goals and management approaches of the 2019 Resource Management Plan Amendment and agrees that the Management Alignment Alternative is the preferred alternative for Nevada. We maintain however, that the full Nevada Sage Grouse Conservation Plan, as adopted by the Nevada Sagebrush Ecosystem Council should have been considered in the process as the preferred alternative. This should have been given the proper evaluation that the collaboration process, including stakeholders and federal agencies in developing the Nevada Plan.

The IMDO identified a wholesale failure to consider reasonable alternatives: "the Final EISs identified the purpose and need of the 2019 BLM Plan Amendments asfollows: (1) to enhance cooperation and coordination with the states, (2) to align with Dept. of Interior and BLM policy directives issued since 2015, and (3) to incorporate measures to better align with state conservation plans. To achieve these purposes, each Draft EIS identified two alternatives: (1) the "No Action" alternative (i.e., keeping the 2015 Plans intact), and (2) BLM's preferred "Management Alignment Alternative," (i.e., proposed modifications for each state). The Final EISs modified the "Management Alignment Alternative" slightly, to arrive at the Proposed Plan Amendments approved in the RODs. However, the "No Action" alternative was not in fact an alternative but was included only for comparison purposes because the BLM had decided that it would not meet the three purposes and needs listed above. The Final EISs thus only considered BLM's preferred outcome" (IMDO, Page 20)."

Instead, the 2020 DSEIS offers over 200 pages of tables depicting "143 alternatives considered in 18 EISs" (2020 DSEIS, Page 1) only to ultimately settle on (1) the "No Action" alternative (i.e., keeping the 2015 Plans intact), (2) the "Management Alignment Alternative," (i.e., proposed modifications for each state), and (3) the "Proposed Plan Amendment" (i.e., BLM's proposed approach for meeting the purpose and need consistent with the agencies' legal and policy mandates). Concisely, a gross and unreasonable preponderance of "considerations" where copied and pasted in an effort to attempt to demonstrate "consideration of reasonable alternatives" only to ultimately present the very same "alternatives" identified as unreasonable by the IMDO.

In this sense, the IMDO findings regarding this matter have not been rectified, as the "No Action" alternative is still, in fact, not an alternative but included only for comparison purposes, as both the nearly identical BLM preferred "Management Alignment Alternative" and "Proposed Plan Amendment" options demonstrate that the 2020 DSEIS thus only considers the BLM's preferred outcome.

Thus, a total of 8 alternatives were considered and analyzed in detail during the Sage- Grouse plan amendment process between 2015 and 2020. This is an adequate and appropriate range of alternatives given the scope of the DSEIS and the original scope of the 2015 and 2019 Sage-Grouse RMP amendment processes. There is no need to undertake the massive effort and expense of a totally new planning process because the BLM has already sufficiently addressed Greater Sage-Grouse habitat conservation.

We believe that the range of alternatives considered under the 2020 DSEIS is both adequate and appropriate. We support the preferred Management Alignment Alternative under the 2020 DSEIS because amendments that better align the BLM's RMP direction with the State Sage-Grouse conservation programs will minimize potential conflicts between BLM and State Sage-Grouse conservation efforts and management guidelines. Such alignment between BLM RMP direction and the State Sage-Grouse conservation programs should include alignment between BLM and State mitigation strategies, including compensatory mitigation strategies.

In its October 2019 decision, the United States District Court for the District of Idaho found that it is more likely than not that the BLM failed to take a "hard look" when it failed to consider a range of reasonable alternatives in its analysis. Specifically, it found that the only other alternative the BLM considered - the No Action Alternative - wasn't truly an alternative at all because it did not align with the state's Purpose and Need of the EIS and therefore had no chance ofbeing implemented: "However, the "No Action" alternative was not in fact an alternative but was included only for comparison purposes because the BLM had decided that it would not meet the three purposes and needs listed above. See, e.g., ID ROD at 1-9. The Final EISs thus only considered BLM's preferred outcome."14 No new analysis has been added to the DSEIS to demonstrate how the No Action Alternative is now a reasonable alternative and how it comports with the purpose and need of the 2019 RMPA.

M.4.13 Assumptions and Methodology

Removal of the SFAs and the strict protective measures that they mandate in addition to the removal of over 1 million acres of various HMA designations requires an in-depth analysis of environmental consequences. At a minimum, Chapter 4 should include tables for each W AFW A MZ outlining the direct and indirect impacts that modifications of HMAs and their respective stipulations would impose on Greater Sage-Grouse, Vegetation, Land Use and Realty, Renewable Energy, Minerals and Energy, Socioeconomics, Livestock Grazing, and Comprehensive Travel Management.

M.4.14 Sage-Grouse

The Final SEIS needs to evaluate current population status and trends and needs to disclose how the various alternatives would impact future population trends which directly affect the purported risk that Greater Sage-Grouse may face "potential listing" under the ESA.

Title Page. The numbers presented are range-wide not CA-NV specific. This is misleading given the plan is the CA-NV RMP. Suggest either using plan specific numbers or clearly indicating on the cover page the numbers are Range-wide.

Title Page. The habitat investment numbers would be more informative is they were broken down by federal, state and partner dollars.

age ES-2 4th Paragraph. Are these statistics for range-wide or CA-NV? This is a question I have throughout the document as it skips between CA-NV specific information and rangewide. Suggest making entire EIS just for CA-NV.

"The BLM continues to prioritize efforts to conserve Greater Sage-Grouse and restore sagebrush habitat and increase the amount of acres treated in every Fiscal Year." [p.14] Treatments are approved under the pretense of improving habitat, yet treated land amounts to killing sage grouse every year because the treated areas are useless for cover, food or breeding. Disturbance is the main cause of degradation of sage grouse habitat. (Connelly et al., 2019, Braun 2019, Hess, 2012).

At the contemporary rate of decline, the 116-year projection for the California and Nevada population of Sage-Grouse to decline to the number that puts the species at risk for long-term extinction stretches well beyond the "foreseeable" future. Thus, a reasoned evaluation of available population status and trend data indicates that the Nevada/N. California population of Greater Sage-Grouse (assuming no other populations existed elsewhere) could not qualify the species for listing even as a "threatened" species as defined by the ESA for another 116 years. Because the 2010 FWS Findings had identified an annual rate of decline range-wide of 1.4 percent, without more recent, State specific data the time frame for the Idaho Sage-Grouse population (estimated at 98,700 adults in 2007) to be projected to reach this risk level would be much longer, at 199 years.

(1) The 2019 Plan Amendments contained substantial reductions in protections for the sage grouse (compared to the 2015 Plans) without justification. We believe that the 2020 DSEIS does little to nothing to address this complaint, as the 2020 DSEIS Management Alignment Alternative (BLM preferred alternative, MAA) still results in substantial reductions in protections for GRSG without providing any substantive science-based justification.

The concept of a "hard look" relative to the matter at hand is plainly described in the IMDO, Page 22: "the EPA expressed several concerns about the proposed 2019 Plan Amendments. Those Amendments weakened many of the protections that the FWS relied upon in finding that an ESA listing was not warranted. The weakening of protections is contrary to the science contained in the NTT [BLM National Technical Team] and COT [FWS Conservation Objectives Team] Reports. Certainly, the BLM is entitled to align its actions with the State plans, but when the BLM substantially reduces protections for sage grouse contrary to the best science and the concerns of other agencies, there must be some analysis and justification - a hard look - in the NEPA documents." In this respect, the 2020 DSEIS fails to provide the required "hard look."

The 2015 and 2019 NEPA documentation devoted voluminous space to the current status of the affected environment and to the expected environmental consequences of the various alternatives under consideration for almost everything under the sun, except for the status and environmental consequences with respect to current Sage-Grouse population levels and trends. Thus, the 2015 and 2019 analyses failed to evaluate the environmental impacts associated with the issues that most directly relate to the overall purpose that was initially identified for the Sage-Grouse RMP amendment process.

Because the initial purpose behind the entire BLM Sage-Grouse RMP amendment process was conditioned upon the principal goal "to avoid a potential listing" under the Endangered Species Act (ESA), the 2020 Final SEIS needs to cure the failure of the 2015 and 2019 NEPA processes by evaluating the environmental impacts of the alternatives with respect to Sage-Grouse population status and trends. The Final SEIS needs to evaluate current population status and trends and needs to disclose how the various alternatives would impact future population trends which directly affect the purported risk that Greater Sage-Grouse may face "potential listing" under the ESA.

The Nevada/N. California 2020 DSEIS provides some substantive information regarding Sage-Grouse population levels and trends from 2000 through 2016. That DSEIS reports for that period that Greater Sage-Grouse populations "across Nevada and northeastern California have declined at an average rate of 3.86 percent annually over the last 17 years." The DSEIS states that the reported 3.86 percent annual rate of population decline "corresponds to other estimates documented for Greater Sage- Grouse in the Great Basin (Garton et al. 2011; Coates et al. 2016a)." See DSEIS, pages 3-7 and 3-8. Nonetheless, the Nevada/N. California 2020 DSEIS again fails to disclose how that information relates to the initial project purpose "to avoid a potential listing" under the ESA when evaluating environmental impacts for any of the alternatives considered.

The U.S. Fish and Wildlife Service (FWS) provided an estimate for the total population of Greater Sage-Grouse in California and Nevada as of 2004 in their 2010 Findings regarding petitions to list Sage-Grouse under the ESA. The 2010 FWS Findings estimated that the 2004 Sage-Grouse population for California and Nevada was 88,000 breeding adults. See 2010 FWS Findings, page 19921. The 2010 FWS Findings also identified Sage-Grouse populations below 50 breeding adults "as being at short-term risk of extinction" and populations below 500 breeding adults "as being at long-term risk for extinction." See 2010 FWS Findings, page 13959. Given the average annual rate of decline of 3.86 percent (reported by the Nevada/N. California 2020 DSEIS) and a 2004 population of 88,000 adult Sage-Grouse in California and Nevada (reported by the 2010 FWS Findings), the Sage-Grouse population in California and Nevada would not be expected to decline below the 500 level that the FWS reported as the number at which a specific Sage-Grouse population is at risk for long-term extinction until the year 2136. That is 116 years from now. The ESA defines an "endangered species" as "any species which is in danger of extinction throughout all or a significant portion of its range" and defines a "threatened species" as "any species which is likely to become an endangered species within the foreseeable future...". See ESA, definitions (6) and (20). Thus, to qualify as "endangered" under the ESA a species must be at risk of extinction in the short-term, while a "threatened" species faces endangerment within the "foreseeable" future. At the contemporary rate of decline, the 116-year projection for the California and Nevada population of Sage-Grouse to decline to the number that puts the species at risk for long-term extinction stretches well beyond the "foreseeable" future. Thus, a reasoned evaluation of available population status and trend data indicates that the Nevada/N. California population of Greater Sage-Grouse (assuming no other populations existed elsewhere) could not qualify the species for listing even as a "threatened" species as defined by the ESA for another 116 years. The evaluation of Sage-Grouse population and trend data available for Nevada/N. California discussed above indicates that implementation of the initial No Action Alternative to retain the RMP direction that was in place prior to the 2015 amendment process, the updated No Action Alternative to retain the 2015 RMP amendments as approved, or the preferred Management Alignment Alternative under the 2020 DSEIS would each achieve the initial purpose for the BLM Sage-Grouse RMP amendment process through the foreseeable future, i.e. "to avoid a potential listing" of the Greater Sage-Grouse under the ESA.

We contend that the BLM's 2020 Final SEIS needs to include evaluations of the environmental impacts of the alternatives with respect to Sage-Grouse population status and trends. These evaluations are needed to address the overall purpose that was originally identified for the BLM Sage-Grouse RMP amendment process by the 2011 NOI that initiated the whole amendment process, namely "to avoid a potential listing" of Greater Sage-Grouse under the ESA.

M.4.15 Non-Sage-Grouse

The DSEISs' analyses of habitat impacts and conditions are very scant and completely inadequate to meet the "hard look" standard of NEPA. For example, in the NV/CA DSEIS, BLM "acknowledges that there have been changes to the landscape since 2015," but dismisses these as "relatively minimal." NV/CA DSEIS at 3-1. While it briefly mentions several categories of habitat disturbance since the 2015 plans were adopted (fire and "conservation actions" - conifer removal, fuel breaks, invasive species removal, "habitat protection," and "habitat restoration"), the information it provides on these is only through 2017. NV/CA DSEIS at 3-8 to 3-9. However, BLM explicitly admits that "no new information on affected environment is provided" for: Riparian Areas and Wetlands, Fish, Wildlife, and Special Status Species, Wild Horses and Burros, Water Resources, Lands with Wilderness Characteristics, Climate Change, Recreation, Visual Resources, Special Designations, Soils, and Air Quality. NV/CA DSEIS at 3-6.

M.4.16 Livestock Grazing

Contradictory goals in the DSEIS: 1. Increase health of sage steppe 2. Support of livestock. A thousand pages of words, as in the DSEIS, cannot not save the sage grouse - unless livestock are removed and water removal is prohibited. In other words, human activity must back off and allow the birds their own undisturbed home.

Treatments for cheatgrass are proposed to continue in the DSEIS, yet livestock themselves create conditions for and spread of invasive weeds. Grazing cheatgrass in May did not prevent a fire in July 2005 that burned over 1600 acres in northern Nevada, all of which had been heavily grazed for over 100 years and continues to be heavily grazed. Heavy cover of cheatgrass continues in the burned area EXCEPT for inside exclosures, as seen in the photographs below.

The NV/CA DSEIS provides no new information in the Affected Environment section on livestock grazing, failing to disclose current conditions and information about land health conditions and permits. NV/CA DSEIS at 3-5. Instead, the DSEIS continues to rely on sections of the 2015 plan as its baseline. Id. The NV/CA DSEIS likewise provides scant new analysis of impacts of livestock grazing, and none from livestock grazing to public resources like Riparian Areas and Wetland, Fish, Wildlife, and Special Status Species, Soils, Water Resources, Special Designations, Lands with Wilderness Characteristics, and Recreation, as noted above. NV/CA DSEIS at 3-6, 4-51. While BLM states that it has "reviewed new information to verify that the analysis in the 2015 Final EIS remains sound" (NV/CA DSEIS at 4-3), nowhere does it further describe or analyze this new information. For example, BLM does not acknowledge or discuss significant new policies and approaches toward grazing that it has implemented or taken concrete action toward employing, especially its emphasis on outcome-based grazing through multiple demonstration projects, and "targeted" grazing, including the issuance of a state-wide environmental assessment to authorize targeted grazing, and at least one district-wide EA for dormant season grazing use in Elko District. These are not listed as ongoing or reasonably foreseeable actions in Appendix H. These actions have the potential to modify or extend grazing seasons of use, increase stocking rate, and modify or increase permitted and authorized livestock numbers from those in place in 2015.

M.4.17 Fluid Minerals

Sage grouse are dependent on large tracts of undisturbed sage steppe, yet BLM continues to approve the chief threats: public lands grazing and oil & gas drilling, and wants now to increase those threats.

M.4.18 Travel and Transportation Management

d. Travel and Transportation Restrictions Cannot Interfere with Mining Rights BLM cannot interfere with access to mineral exploration and development. The travel and transportation management restrictions found in the 2015 Amendments (and the No Action Alternative) purporting to limit access for locatable mineral activities authorized by the Mining Law, are unlawful because they conflict with the rights granted by § 22 of the General Mining Law and 30 U.S.C. 612(b) (Surface Use Act), which guarantee the right to use and occupy federal lands open to mineral entry, with or without a mining claim, for prospecting, mining and processing and all uses reasonably incident thereto, including but not limited to ancillary use rights, and rights of and associated with ingress and egress. The seasonal and year-round travel and transportation restrictions included in the No Action Alternative, if applied to locatable mineral activities, would violate rights granted by the Mining Law (30 U.S.C. § 22), including rights of ingress and egress. 43 U.S.C § 1732(b). Thus, FLPMA's land use planning process may not impair the rights of locators, including rights of ingress or egress. BLM should remove the travel management restrictions from the RODs/LUPAs, or at the very least clarify that transportation and travel management restrictions do not apply to locatable mineral operations. BLM's discretion is limited to preventing unnecessary or undue degradation.

M.5 FEDERAL AGENCY COMMENTS

Comments from the EPA are summarized and responded to in Sections N.1.25, N.2.2, N.2.4, N.2.5, and N.2.6

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