

Nevada and Northeastern California Greater Sage-Grouse

Proposed
Land Use Plan Amendment and
Final Environmental Impact Statement



Volume III: Chapters 5, 6, 7, and 8

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Chapter 5

Cumulative Effects

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Changes to Chapter 5 between draft and final EIS:

- Incorporated GRSG Cumulative Effects Analysis at the WAFWA Management Zone (landscape) level, which was based on most recent science;
- Updated cumulative effects analysis to reflect the Proposed Plan; and
- Updated reasonably foreseeable future actions table to reflect current status of ongoing and pending projects.

CHAPTER 5

CUMULATIVE IMPACTS

This section presents the likely cumulative impacts on the human and natural environment that could occur from implementing the alternatives presented in **Chapter 2**, Alternatives. This section is organized by topic, similar to **Chapters 3 and 4**, Affected Environment and Environmental Consequences.

The CEQ defines a cumulative impact 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 other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.* Cumulative impacts in this context are effects on the environment that could result from implementing any individual actions associated with one of the Nevada and Northeastern California Greater Sage-Grouse LUPA/EIS alternatives, when combined with other individual actions not part of this plan, either within the planning area or outside of it. Cumulative impact analysis is required by CEQ regulations because environmental conditions result from many different factors that act together.

5.1 GREATER SAGE-GROUSE CUMULATIVE EFFECTS ANALYSIS: NEVADA AND NORTHEASTERN CALIFORNIA SUB-REGION

This cumulative effects analysis (CEA) discloses or estimates the long-term effects on Greater Sage-Grouse (GRSG) and its habitat from implementing each LUPA/EIS alternative, in conjunction with other past, present, and reasonably foreseeable future actions. In accordance with Council of Environmental Quality guidance, cumulative effects need to be analyzed in terms of the specific resource and ecosystem being affected (Council on Environmental Quality 1997b). As discussed in Chapter 1, the purpose for the proposed federal action is to identify and incorporate appropriate conservation measures to conserve, enhance, and restore GRSG habitat by reducing, eliminating, or minimizing threats to GRSG habitat. The Western Association of Fish and Wildlife

Agencies (WAFWA) delineated seven sage-grouse management zones based on populations within floristic provinces (Stiver et.al. 2006). Therefore, the cumulative effects analysis area for GRSG extends beyond the Nevada and Northeastern California Sub-region boundary and incorporates WAFWA Management Zones (MZs) III, IV, and V. MZs III, IV, and V contain all or portions of six BLM and Forest Service LUPA/RMPA planning areas and sub-regions. This includes the Nevada and Northeastern California Sub-region, the Utah Sub-region, the Oregon Sub-region, the Idaho and Southwestern Montana Sub-region, and small portions of the Lewistown and Wyoming Greater Sage-Grouse (9-Plan) planning areas.

As indicated in the Draft EIS, the CEA for the Final EIS includes quantitative analysis where possible. The analysis of BLM and Forest Service actions in MZs III, IV, and V is primarily based on MZ-wide datasets developed by the BLM National Operations Center (NOC). Where quantitative data are not available, analysis is qualitative. This analysis includes past, present, and reasonably foreseeable future actions for all land ownerships in the MZ, and evaluates the impacts of the Nevada and Northeastern California LUPA, by alternative, when added to those.

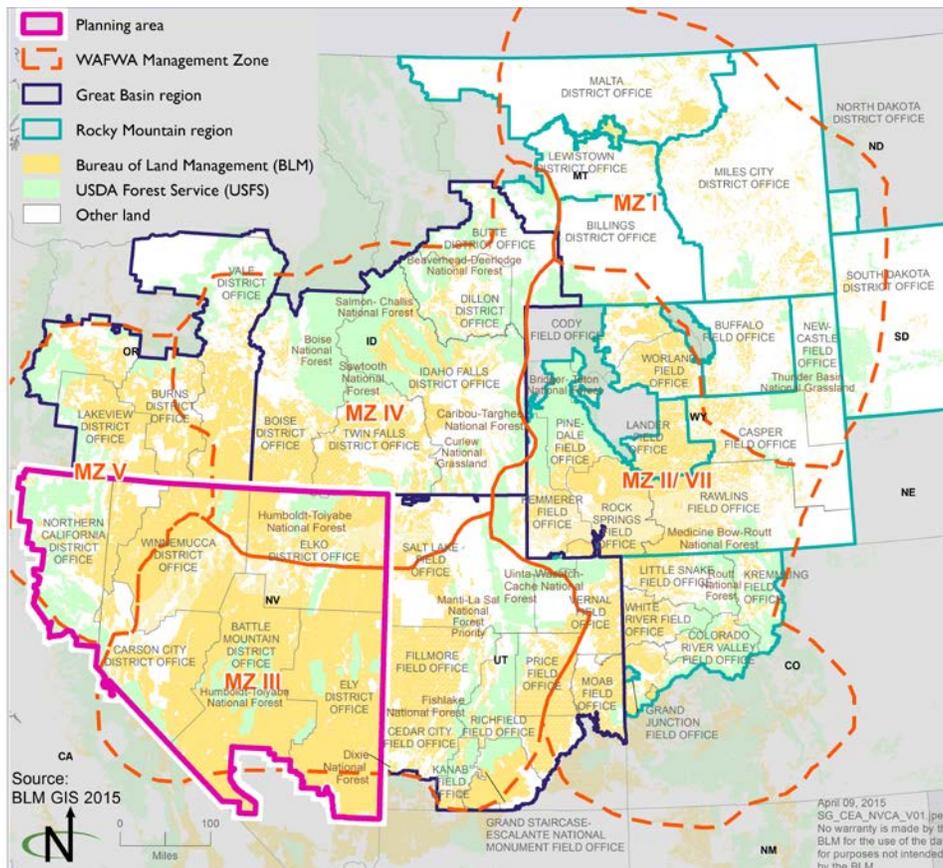
The analysis of nonfederal lands and actions includes a review and analysis of the following:

- State plans
- Coordination with states and agencies during consistency reviews
- Additional data from non-BLM-administered lands

Figure 5-1 shows the boundaries of the WAFWA Management Zones and the BLM and Forest Service planning areas and sub-regions. The Nevada and Northeastern California Sub-region contains a substantial portion of the priority habitat management areas (PHMA) and general habitat management areas (GHMA) within MZ III (6,291,000 acres of PHMA out of 9,280,000 total acres in MZ III or 68 percent of PHMA; and 3,808,700 acres of GHMA out of 4,774,200 total acres in MZ III or 80 percent of GHMA) (Manier et al. 2013, p. 118). The remaining PHMA and GHMA within MZ III are contained within the Utah Sub-region, the only other sub-region within MZ III. As a result, actions in the Nevada and Northeastern California Sub-region may have a relatively large cumulative impact in terms of number of acres and populations of GRSG compared to those actions in the Utah sub-region.

The Nevada and Northeastern California Sub-region contains relatively little PHMA and GHMA in MZ IV compared to the total PHMA and GHMA within MZ IV (5,839,300 acres of PHMA out of 22,105,600 total acres in MZ IV or 26 percent of PHMA; and 1,397,200 acres of GHMA out of 10,128,500 total acres in MZ IV or 14 percent of GHMA) (Manier et al. 2013, p. 118). The remaining

Figure 5-1
WAFWA Management Zone in the Nevada and Northeastern Subregion BLM and Forest Service Planning Area



PHMA and GHMA within MZ IV are contained within five other sub-regions or planning areas, including the Idaho and Southwestern Montana Sub-region, which is by far the largest sub-region within MZ IV. As a result, actions in the Nevada and Northeastern California Sub-region may have a relatively small cumulative impact in terms of number of acres and population of GRSG compared to those actions in other, larger sub-regions within MZ IV, particularly the Idaho and Southwestern Montana Sub-region.

The Nevada and Northeastern California Sub-region contains approximately half of the PHMA and a relatively small amount of the GHMA within MZ V (4,032,900 acres of PHMA out of 7,289,000 total acres in MZ V or 55 percent of PHMA; and 635,000 acres of GHMA out of 5,759,900 total acres in MZ V or 11 percent of GHMA) (Manier et al. 2013, p. 118). The remaining PHMA and GHMA within MZ V are contained within the Oregon Sub-region, the only other sub-region within MZ V. As a result, actions in the Nevada and Northeastern California Sub-region within PHMA may have a similar cumulative impact in terms of number of acres and population of GRSG compared to those actions in the Oregon Sub-region. Actions in the Nevada and Northeastern

California Sub-region within GHMA will likely have a much smaller cumulative impact in terms of number of acres and population of GRSG compared to those actions in the Oregon Sub-region in GHMA.

Section 5.1.1, Methods, provides a description of the methodology used for this cumulative effects analysis. **Section 5.1.2** lists assumptions used in the analysis. **Section 5.1.3** describes existing conditions in WAFWA MZ III and in the Nevada and Northeastern California Sub-region. **Section 5.1.4** provides a broad-scale description of regional efforts to manage GRSG habitat in MZ III. **Section 5.1.5** discusses the relevant cumulative actions in MZ III that will be analyzed in this CEA. **Section 5.1.6** analyzes threats to GRSG and its habitat in MZ III and discusses the potential cumulative effects resulting from each threat for each alternative. **Section 5.1.7** describes existing conditions in WAFWA MZ IV. **Section 5.1.8** provides a broad-scale description of regional efforts to manage GRSG and its habitat in MZ IV. **Section 5.1.9** discusses the relevant cumulative actions in MZ IV that will be analyzed in this CEA. **Section 5.1.10** analyzes threats to GRSG and its habitat in MZ IV and discusses the potential cumulative effects resulting from each threat for each alternative. **Section 5.1.11** describes existing conditions in WAFWA MZ V. **Section 5.1.12** provides a broad-scale description of regional efforts to manage GRSG habitat in MZ V. **Section 5.1.13** discusses the relevant cumulative actions in MZ V that will be analyzed in this CEA. **Section 5.1.14** analyzes threats to GRSG and its habitat in MZ V and discusses the potential cumulative effects resulting from each threat for each alternative. **Section 5.1.15**, Conclusions, determines the cumulative effects on GRSG and its habitat as a result of implementing each alternative in combination with other private, local, regional, state, and federal past, present, and reasonably foreseeable future actions in MZs III, IV and V. **Section 5.1.16** lists a selection of some of the larger projects from the reasonably foreseeable future actions tables in the RMPAs/LUPAs for MZs III, IV, and V.

5.1.1 Methods

The CEA uses the following methods:

- Data from the USGS publication Summary of Science, Activities, Programs, and Policies That Influence the Range-Wide Conservation of Greater Sage-Grouse (Manier et al. 2013) establishes the reference condition against which the alternatives and other past, present, and reasonably foreseeable future actions are compared. Data from this publication are presented in terms of priority habitat and general habitat.
- The USFWS's 12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (USFWS 2010a) and the USFWS publication Conservation Objectives: Final Report (i.e., the COT report; USFWS 2013a) were reviewed to identify the primary threats facing

GRSG in each WAFWA MZ. Table 2 of the COT report lists threats to GRSG that are present and widespread in each population in the MZ.

- For MZs III, IV, and V, the list of threats that are directly or indirectly affected by the BLM and Forest Service actions are wildfire, spread of invasive plants, conifer encroachment, infrastructure development, livestock grazing and free-roaming equids, conversion to agriculture, energy development, mining, and recreation (USFWS 2013a). Three other threats listed in the COT report, sagebrush eradication, isolation/small population size, and urbanization, affect GRSG populations in MZs III, IV, and V. While they are not addressed separately in this analysis, they are discussed as elements of other threats.
- Predation was not included as a threat in the final COT report and was not identified by USFWS as a significant threat to GRSG populations (USFWS 2010a). Predation is a natural occurrence that may be enhanced by human habitat modifications such as construction of infrastructure that may increase opportunities for nesting and perching or increase exposure of GRSG nests. In such altered habitats, predators may exert an undue influence on GRSG populations. Predation is discussed in this CEA in the context of these other threats.
- Sagebrush eradication is a component of many threats. Isolation/small population size is not analyzed separately, because no management actions directly address this threat. These two threats are discussed as a component of other threats and in the conclusions.
- Not all the threats discussed in this analysis represent major threats to GRSG in each sub-region in the MZ, but each poses a present and widespread threat to at least one population within the MZ.
- Each threat is analyzed, and a brief conclusion for each threat is provided.
 - The BLM NOC compiled MZ-wide datasets for quantifiable actions in all proposed BLM and Forest Service GRSG LUPA/EISs in MZs III, IV, and V. Forest Service data are included in MZs III and IV. These datasets provide a means by which to quantify cumulative impacts resulting from direct impacts of the threats identified in the COT report.
 - Data and information were gathered from other federal, state, and local agencies and tribal governments, where available, and were used to inform the analysis of cumulative impacts on GRSG from each of the threats in MZs III, IV, and V.

- The tables in this cumulative analysis display the number of acres across the entire MZ and the percentage of those acres that are located within the Nevada and Northeastern California Sub-region. To calculate the total number of acres in the MZ, the number of acres in the other BLM and Forest Service Proposed Plans across the MZ are added to the number of acres in the applicable Nevada and Northeastern California LUPA alternative. For example, the total number of acres for Alternative A includes all of the other Proposed Plans in the MZ plus Nevada and Northeastern California LUPA Alternative A.
- A discussion is provided for each alternative in **Section 5.1.15**. Each alternative considers the cumulative impacts on GRSG from each of the threats. It also considers whether those threats can be ameliorated by implementing that particular alternative in conjunction with past, present, and reasonably foreseeable non-BLM and non-Forest Service actions in MZs III, IV, and V.
- The list of relevant cumulative BLM and Forest Service actions in **Sections 5.1.5, 5.1.9, and 5.1.13** were derived from each proposed BLM and Forest Service GRSG LUPA/EIS in MZs III, IV, and V to provide an overview of the ongoing and proposed land uses there.
- Baseline data that are consistent across planning areas and that analyze cumulative effects for each alternative, including the No Action Alternative and Proposed Plan, are used in this analysis.
- This analysis uses the most recent information available. For purposes of this analysis, the BLM and Forest Service have determined that the Proposed Plans for the other ongoing GRSG planning efforts in MZs III, IV, and V are reasonably foreseeable future actions.
- PHMA and GHMA were developed to protect the best habitat and highest population density of GRSG. Although Alternative A does not designate PHMA or GHMA, spatial GIS data were clipped to these boundaries to allow for a consistent comparison across all alternatives.

5.1.2 Assumptions

This cumulative analysis uses the same assumptions and indicators as those established for the analysis of direct and indirect effects on GRSG as discussed in **Section 4.4.9**. In addition, the following assumptions have been made:

- The timeframe for this analysis is 20 years.

- The CEA area extends beyond the Nevada and Northeastern California Sub-region and encompasses all of WAFWA MZs III, IV, and V; the quantitative impact analysis focuses on impacts across the MZs. The MZ is the appropriate scope for this analysis because it encompasses areas with similar floristic conditions containing important GRSG habitat.
- The magnitude of each threat to GRSG would vary geographically and may have more or less impact on GRSG and its habitat in some parts of the MZs, depending on such factors as climate, land use patterns, and topography.
- All acres in this analysis are presented by PHMA and GHMA, consistent with the analysis of direct and indirect impacts earlier in this EIS. The exception to this is quantitative data for the Summary of Science, Activities, Programs, and Policies That Influence the Range-Wide Conservation of Greater Sage-Grouse (Manier et al. 2013), which used Preliminary Priority Habitat (PPH) and Preliminary General Habitat (PGH) to describe GRSG habitat. Where Manier et al. (2013) data are used in this CEA, “priority habitat” refers to PPH and “general habitat” refers to PGH.
- A management action or alternative would result in a net conservation gain to GRSG and its habitat if there is an actual benefit or gain above baseline conditions. Baseline conditions are defined as the pre-existing condition of a defined area and/or resource that can be quantified by an appropriate metric(s). During environmental reviews, the baseline is considered the affected environment that exists at the time of the review’s initiation and is used to compare predictions of the effects of the Proposed Plan or the effects of a reasonable range of alternative actions.
- The CEA quantitatively analyzes impacts on GRSG and its habitat in the MZ. Impacts on threats to GRSG habitat are likely to correspond to impacts on threats to GRSG populations within the MZs, since reductions or alterations in habitat could affect reproductive success through reductions in available cover, forage, or nest sites. Human activity could cause disturbance to GRSG and its habitat, preventing them from mating or successfully rearing offspring. Human activities also could increase opportunities for predation, disease, or other stressors (Connelly et al. 2004; USFWS 2010a; Manier et al. 2013).

5.1.3 Existing Conditions in WAFWA MZ III and the Nevada and Northeastern California Sub-Region

This section summarizes existing conditions and past and present actions for the Nevada and Northeastern California Sub-region (provided in more detail in

Chapter 3) and for MZ III as a whole. Reasonably foreseeable future actions are discussed in **Section 5.1.5**.

GRSG Habitat and Populations

MZ III consists of seven GRSG populations in Nevada and Utah (USFWS 2013a, p. 19-22), including Northeast Interior Utah, Sheeprock, Emery, and South Central Utah in Utah, and Northwest Interior Nevada, Southern Great Basin, and Quinn Canyon Range in Nevada. Several populations of GRSG in California (Pine Nut, Mono Lake, South Mono Lake, and White Mountains) are part of the Bi-State distinct population segment (DPS) of GRSG; this DPS is not discussed further, as the Bi-State DPS is being addressed under a separate planning effort and is not included in this CEA.

The Nevada and Northeastern California Sub-region includes those populations above within Nevada, and portions of additional populations within adjacent MZs, including the Northern Great Basin population in MZ IV and the Warm Springs Valley, Klamath, and Western Great Basin populations in MZ V (Garton et al. 2011, p. 297).

MZ III is part of a stronghold for GRSG (that includes MZs III, IV, and V) due in part to large areas of sagebrush habitat in Nevada (USFWS 2013a, p. 70). MZs III, IV, and V contain the largest area of habitat range-wide with low similarity to extirpated portions of the range (Wisdom et al. 2011). Despite containing large expanses of sagebrush habitat, this MZ faces high risks due to wildfire (USFWS 2013a, p. 70), difficulty in restoring burned habitat (Pyke 2011), and the unpredictability of location, extent, and outcome of wildfire (USFWS 2013a).

Throughout MZ III, BLM-administered, National Forest System, and other federal lands account for over 11 million acres of GRSG habitat (nearly 80 percent of all GRSG habitat in the MZ), with state and private lands accounting for approximately 2.6 million acres of GRSG habitat (nearly 20 percent of habitat) (Manier et al. 2013, p. 118). The BLM also has some management authority over split-estate lands, with privately held surface and federal subsurface mineral rights. The higher percentage of GRSG habitat on BLM-administered and other federal land means BLM and Forest Service management could play a key role in alleviating threats to GRSG in MZ III.

Table 5-1 provides a breakdown of landownership and acres of GRSG habitat in MZ III, including portions of the BLM and Forest Service sub-regions within MZ III. As the table shows, of the approximately 10 million acres of priority habitat and nearly 4 million acres of general habitat in MZ III, approximately 63 percent of priority habitat and 81 percent of general habitat is on BLM-administered lands. Approximately 12 percent of priority habitat and approximately 9 percent of general habitat is on National Forest System Lands.

**Table 5-1
Management Jurisdiction in MZ III by Acres of Priority and General Habitats**

	Total Surface Area (Acres)	Priority Habitat (Acres)	General Habitat (Acres)	Non-habitat (Acres)
MZ III	78,429,300 (100%)	10,028,500 (13%)	3,970,100 (5%)	64,430,700 (82%)
BLM	45,097,500 (58%)	6,309,400 (63%)	3,199,800 (81%)	35,588,300 (55%)
Forest Service	12,377,600 (16%)	1,236,200 (12%)	356,200 (9%)	10,785,200 (17%)
Tribal and Other Federal	5,282,700 (7%)	260,800 (3%)	29,100 (<1%)	4,992,800 (8%)
Private	12,251,400 (16%)	1,836,200 (18%)	384,800 (10%)	10,030,400 (16%)
State	3,101,900 (4%)	385,900 (4%)	200 (<1%)	2,715,800 (4%)

Source: Manier et al. 2013, p. 118

Sub-Region Habitat Conditions

Sagebrush cover is limited and patchy across much of the Nevada and Northeastern California Sub-region, as dictated by the “basin and range” topography characteristic of large portions of the sub-region. This condition is evident in the lack of connectivity among subpopulations in this region (Knick and Hanser 2011). Lower elevation valley bottoms often are dominated by non-GRSG habitat, including playas and salt desert shrub vegetation, but transition to sagebrush-dominated benches as elevation rises. These sagebrush-dominated benches often comprise breeding and winter habitat (USFWS 2013a, p. 73). Moving up in elevation, pinyon and juniper woodlands dominate mid-elevation areas; these woodlands then give way to little sagebrush, mountain big sagebrush, and mountain shrub communities used by GRSG as nesting and brood-rearing habitat in the higher elevations (USFWS 2013a, p. 74).

Large areas of GRSG habitat in the sub-region have been substantially altered from their natural condition as a result of altered fire regimes and spread of invasive annual grasses like cheatgrass (*Bromus tectorum*), native conifers like juniper (*Juniperus* spp.), and in some cases pinyon pine (*Pinus monophylla*). The amount of GRSG habitat affected by fire in the region is approximately ten times greater than is typical in the Wyoming Basin (MZ II) to the east (Manier et al. 2013, p. 132). Wildfire is closely linked with invasion and dominance of annual grasses, especially cheatgrass, due to fire’s effect on fuel composition and fire-return intervals. Cheatgrass invasion has been widespread in this region for decades, and some former (historic) habitats are likely “unrecoverable” without unreasonable expenditures of cost and time (Manier et al. 2013, p. 132).

Additionally, past and ongoing human activities have further fragmented or reduced GRSG habitat in MZ III. Common human disturbances in the MZ include mining and associated infrastructure, roads, transmission lines, and other

rights-of-way (ROWs), renewable energy development and associated infrastructure, grazing development including fences, and to a lesser extent recreation, agriculture, and urban conversion.

Habitat degradation is a complicated interaction among many factors, including drought, unmanaged or improperly managed livestock grazing, changes in natural fire regimes, conifer encroachment, and invasive plant species; changes in land use and land development are also causes of habitat loss (Fischer et al. 1996; Pyle and Crawford 1996; Beck and Mitchell 2000; Nelle et al. 2000).

Nevada and Northeastern California GRSG LUPA/EIS Alternatives

The Nevada and Northeastern California GRSG LUPA/EIS evaluated the following seven alternatives:

- Alternative A, current management (the No Action Alternative)
- Alternative B, which uses GRSG conservation measures in A Report on National Greater Sage-Grouse Conservation Measures (NTT 2011) to form BLM and Forest Service management direction
- Alternative C, which uses individual and conservation group-submitted management recommendations for GRSG and GRSG habitat to form BLM and Forest Service management direction
- Alternative D, the BLM and Forest Service agency-preferred alternative, which emphasizes balancing resources and resource use among competing human interests, land use, and conservation of natural and cultural resource values, while sustaining and enhancing ecological integrity
- Alternative E, which is based on the State of Nevada's Conservation Plan for GRSG in Nevada (Sagebrush Ecosystem Technical Team [SETT] 2014a)
- Alternative F, which also uses individual and conservation group-submitted management recommendations for GRSG and GRSG habitat; this alternative differs from Alternative C on issues related to grazing, wild horse and burro management, lands and realty, and minerals
- The Proposed Plan, which is based on modifications made to the draft agency-preferred alternative (Alternative D), is based on public comments received on the Draft LUPA/EIS, internal BLM and Forest Service review, new information, and best available science. The Proposed Plan incorporates adaptive management, monitoring, and mitigation for GRSG and its habitat, as well as incorporation of RDFs (consistent with applicable law) to further reduce project impacts on GRSG habitat

Utah GRSG LUPA/EIS Alternatives

The Utah GRSG LUPA/EIS evaluated the following seven alternatives:

- Alternative A, current management (the No Action Alternative)
- Alternative B, which uses GRSG conservation measures in A Report on National Greater Sage-Grouse Conservation Measures (NTT 2011) to form BLM and Forest Service management direction
- Alternative C, which uses individual and conservation group-submitted management recommendations for GRSG and GRSG habitat to form BLM and Forest Service management direction
- Alternative D, which is the Utah Sub-region's alternative (the agency-preferred alternative). This alternative was developed by the Utah BLM in cooperation with the Forest Service Intermountain Region and local USFWS. This alternative includes modifications to the conservation measures identified in the NTT report and is designed to address local ecological site variability. This alternative also emphasizes balancing resources and resource uses among competing human interests, land uses, and the conservation of GRSG habitat.
- Alternative E is divided into two alternatives, Alternative E1 and Alternative E2. Alternative E1 is based on the *State of Utah's Conservation Plan for Greater Sage Grouse in Utah* (Utah Greater Sage-Grouse Working Group 2013) and would apply to all BLM-administered and National Forest System lands in Utah. Alternative E2 is based on the State of Wyoming's Governor's Executive Orders 2011-05 and 2013-3 with adjustments by the BLM interdisciplinary team, which includes members of the Wyoming Governor's Office. The management actions being considered under Alternative E2 would only apply to National Forest System lands in Wyoming.
- The Proposed Plan, which is based on modifications made to the draft agency-preferred alternative (Alternative D), is based on public comments received on the Draft LUPA/EIS, internal BLM and Forest Service review, new information, and best available science. The Proposed Plan incorporates adaptive management, monitoring, and mitigation for GRSG, as well as incorporation of RDFs (consistent with applicable law) to further reduce project impacts on GRSG habitat.

Population Trends in Management Zone III

Populations within MZ III are described under *GRSG Habitat and Populations*, above. Trends for these populations are summarized below.

MZ III contains the most GRSG populations (along with MZ IV) of MZs range-wide; however, these populations are also some of the most isolated and exhibit lower densities of strutting male GRSG at leks (Manier et al. 2013, p. 11). MZ III is one of two major MZs (along with MZ IV) declining the slowest from 2007 to 2013, with a population decline of approximately one-third (Garton et al. 2015, p. 24). Predicted population trends indicate that overall, populations in MZ III have a 0 percent chance of falling below 200 males by 2037 and an 8 percent chance of falling below 200 males by 2107 (USFWS 2013a, page 70).

The Nevada portion of the Southern Great Basin population contains the largest number of GRSG within MZ III (USFWS 2013a, p. 70). Garton et al. (2011) determined that this population has declined by 19 percent between 1965 and 2007, and by 33 percent between 2007 and 2013 (Garton et al. 2015, p. 15). In addition, Garton et al. (2011) determined that this population has a 2 percent chance of declining below 200 males within the next 30 years and a 78 percent chance of declining below 200 males within 100 years (by 2107). However, these scenarios may be drastically influenced by unforeseen stochastic events or novel environmental conditions.

For the Northeast Interior Utah population, Garton et al. (2011, p. 330) reported that the population declined by 26 percent from 1970 to 2007, and declined by 42 percent from 2007 to 2013 (Garton et al. 2015, p. 14). While the Emery population declined by 30 percent from 1970 to 2007 (Garton et al. 2011, p. 332), this population doubled between 2007 and 2013 based on counts at two leks (Garton et al. 2015, p. 14). While the South Central Utah population remained relatively stable over the 1970 to 2007 period (Garton et al. 2011, p. 332), this population declined by approximately 51 percent between 2007 and 2013 (Garton et al. 2015, p. 15).

While population estimates and trends for the sub-region are not available, GRSG populations are described in **Section 3.2**.

5.1.4 Regional Efforts to Manage Threats to GRSG

Regional efforts include past, present, and reasonably foreseeable actions conducted by the BLM, Forest Service, and other federal agencies, including actions performed in cooperation with non-federal agencies, organizations, landowners, or other groups in MZ III. These efforts would be applicable on state and private lands, which contain approximately 2.6 million acres (32 percent) of GRSG habitat (Manier et al. 2013, p. 118). The boundaries of MZ III encompass portions of the states of Nevada, California, and Utah. Regional efforts occurring in these states are also discussed below.

Other BLM and Forest Service Planning Efforts

As part of the GRSG Range-wide Planning Effort, other BLM and Forest Service sub-regions, as explained in Chapter 1, are undergoing LUPA/EIS processes similar to this one for the Nevada and Northeastern California Sub-region. The

Final EIS associated with each of these efforts has identified a Proposed Plan that meets the purpose and need of conserving, enhancing, and/or restoring GRSG habitat by reducing, eliminating, or minimizing threats. The management actions from the various Proposed Plans will cumulatively decrease the threat of GRSG habitat loss and will limit fragmentation throughout the range. Key actions present in many of the Proposed Plans include changes in land use allocations, a mitigation framework, an adaptive management strategy, monitoring plan, mitigation requirements, anthropogenic disturbance cap, and lek buffers.

Additionally, California BLM field offices have included the Population Management Unit (PMU) conservation strategies for GRSG within their current RMPs.

The BLM and Forest Service have incorporated management of Sagebrush Focal Areas (SFAs) into their proposed management actions for GRSG and its habitat. SFAs are a subset of PHMA and represent recognized “strongholds” for the species that have been noted and identified by USFWS as having the highest densities of the species and other criteria important for the persistence of the species. Those portions of SFAs on BLM-administered or National Forest System lands would be recommended for withdrawal from mineral entry, subject to a NSO stipulation with no exceptions, modifications, or waivers, and are prioritized for management and conservation actions, including, but not limited to, review of livestock grazing permits/leases. Management of SFAs would enhance protection of GRSG and its habitat in these areas, providing a net conservation gain to GRSG habitats in light of other past, present, and reasonably foreseeable future actions considered in this CEA. There are no SFAs in MZ III; however SFAs do exist in MZs IV and V, as discussed in **Section 5.1.8** and **Section 5.1.12**.

Nevada/California State Efforts

Nevada State Plan. The State of Nevada submitted a state alternative for inclusion in the Nevada and Northeastern California Sub-Regional GRSG Draft LUPA/EIS. The *Nevada Greater Sage-Grouse Conservation Plan* (SETT 2014a) includes regulatory mechanisms to avoid, minimize (with the use of design features), and/or mitigate impacts through the Conservation Credit System (described in additional detail below) to protect and restore GRSG habitat. The plan defines a Sage-Grouse Management Area (SGMA), and aims to reach a conservation goal of a net conservation gain of GRSG habitat due to new anthropogenic disturbances. The state plan identifies GRSG core, priority, and general habitat within the SGMA.

Under the plan, project proponents must seek to avoid GRSG habitat disturbance. If a project proponent wishes to demonstrate that avoidance cannot be reasonably accomplished, minimization and mitigation would be applied through SETT consultation. The project proponent must demonstrate that specific criteria are met; criteria are summarized in Table 3-1 of the plan.

Criteria are more stringent in core habitat and less stringent in general habitat. If a project cannot avoid adverse effects (direct or indirect) to GRSG habitat, the project proponent will be required to implement design features that minimize the project's adverse effects on GRSG habitat to the extent practicable. Mitigation would be required for all anthropogenic disturbances to GRSG habitat, including those that have minimized disturbances through the process above. Mitigation requirements will be determined by the Conservation Credit System, a market-based mechanism that quantifies conservation outcomes (credits) and impacts from new anthropogenic disturbances (debits), defines standards for market transactions, and tracks conservation action implementation progress in the state.

GRSG habitat is determined based on the Nevada Habitat Suitability Map (described below) for GRSG habitat prepared by the state and USGS. The habitat map incorporates GRSG telemetry data along with environmental data at multiple scales, such as land cover, vegetation communities, physiographic indices, and anthropogenic attributes. The habitat suitability model will be used to inform management decisions on protecting GRSG habitat and to provide strategic decision tools to identify where conservation activities will have the greatest beneficial impact on GRSG and its habitat.

The Nevada state plan only applies to lands within Nevada; it does not apply to portions of the Nevada and Northeastern California Sub-region within California.

The Greater Sage-Grouse Conservation Plan for Nevada and Eastern California. The plan (Sage-Grouse Conservation Team 2004) is a collaboration between the Nevada Governor's Sage-Grouse Conservation Team, Nevada Department of Wildlife, and the California Department of Fish and Game (now California Department of Fish and Wildlife). The plan provides an assessment of GRSG populations in Nevada and Eastern California, the risk factors facing GRSG populations, strategies and actions to reduce or eliminate those risk factors, and implementation and monitoring strategies. The risk factors identified as affecting Nevada and California GRSG populations the most include habitat quantity, quality, and wildfire. The plan provides recommended management actions to improve or mitigate these risk factors, including conifer removal, wildfire prevention, vegetation treatments, sagebrush and perennial grass restoration techniques, evaluating and altering livestock grazing, and cheatgrass management.

Nevada State Regulations/Programs. Nevada has several state regulations and programs pertaining to GRSG. Assembly Bill 461 formally created and gave regulatory authorization for the Sagebrush Ecosystem Program. Governor Sandoval signed the bill into law in July 2013. Nevada also has a pesticide registration fee; portions of the revenue from the fee will provide funding to the state noxious weed program and GRSG habitat conservation (NDA 2013). The state also has a Nevada Cheatgrass Action Team, a voluntary multi-disciplinary

group of individuals to assist the SETT with planning and managing projects to address cheatgrass and other invasive plants that impact GRSG habitat.

Nevada and Northeastern California GRSG Habitat Mapping. GRSG habitat for the sub-region was derived from a quantitative approach using “A *Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California: A Decision Support Tool for Management*” (Coates et al. 2014a). GRSG telemetry location data were compiled from multiple areas across Nevada and northeastern California. Telemetry data were then linked spatially with corresponding environmental covariates to enable calculations of population-level resource selection functions (Manly et al. 2002). Locations of active leks were used as an additional dataset for map validation. The map reflects both the presence of GRSG and the presence of habitat features associated with GRSG occupancy and can be used to prioritize areas for different management scenarios. The strength of the map is to account for characteristics that describe the quality of the environment for GRSG, as well as an index of population abundance (Coates et al. 2014a; See *Chapter 3, Section 3.2.3-Management Zones*). The three management categories derived from this mapping process for the Nevada and Northeastern California Sub-region include “Priority,” “General,” and “Other” Habitat Management Areas.

Additional regional efforts specific to the Bi-State DPS of GRSG exist; however, these efforts are not discussed here, as the Bi-State DPS is not included in this CEA.

Utah State Efforts

The UDWR developed a *Conservation Plan for Greater Sage-Grouse in Utah* (Utah Greater Sage-Grouse Working Group 2013). The conservation plan identifies 11 population areas in Utah that are the focus of GRSG conservation efforts and helps coordinate the efforts of ten local working groups in the state. The goal of the *Conservation Plan for Greater Sage-Grouse in Utah* is to protect, maintain, improve, and enhance GRSG populations and habitats on public and private lands within established SGMAs (population areas). It includes conservation strategies and measurable objectives regarding populations and habitat, including a 5 percent permanent disturbance limit (as of April 2013), and through Utah Executive Order EO/2015/002 (see below), provides a regulatory mechanism to preserve GRSG through specific restrictions on public or private land use.

On February 25, 2015, Utah Governor Gary Herbert signed Utah Executive Order EO/2015/002. The Executive Order directs state agencies whose actions may affect GRSG to implement Utah’s *Conservation Plan for Greater Sage-Grouse in Utah* (Utah Greater Sage-Grouse Working Group 2013) in GRSG population areas identified in the 2013 Conservation Plan.

Earlier efforts in Utah included formation of Utah’s Sage-Grouse Plan Committee, comprised of members from public and private entities, which

prioritized threats to the species across the state in Utah's Greater Sage-Grouse Management Plan (UDWR 2009). The plan sought to protect and maintain occupied habitat, while restoring 175,000 acres of habitat by 2014. The plan provided an overall strategy for local working groups to use in implementing conservation actions, while providing annual updates detailing those actions taken for specific strategies identified in each plan. One recent report for the Strawberry Valley Adaptive Resource Management Area reported that 10,223 acres had been purchased within the management area by the Utah Reclamation and Mitigation Commission (Strawberry Valley Adaptive Resource Management Local Working Group 2006).

Natural Resources Conservation Service Sage-Grouse Initiative

The Natural Resources Conservation Service's (NRCS) Sage-Grouse Initiative (SGI) is working with private landowners in 11 western states to improve habitat for GRSG (Manier et al. 2013). With approximately 31 percent of all sagebrush habitats across the range in private ownership (Stiver 2011, p. 39), including approximately 2.2 million acres (16 percent) in MZ III (Manier et al. 2013, p. 118), a unique opportunity exists for the NRCS to benefit GRSG and to ensure the persistence of large and intact rangelands through long-term contracts and conservation easements. Although most SGI funds are invested on private lands, funds are also used to implement conservation measures on BLM-administered and other public lands.

Participation in the SGI program is voluntary, but willing participants enter into binding contracts to ensure that conservation practices that enhance GRSG habitat, such as fence marking, protecting riparian areas, and maintaining vegetation in nesting areas, are implemented. Participating landowners are bound by a contract (usually 3 to 5 years) to implement, in consultation with NRCS staff, conservation practices if they wish to receive the financial incentives offered by the SGI. These financial incentives generally take the form of payments to offset costs of implementing conservation practices and easements or rental payments for long-term conservation.

While potentially effective at conserving GRSG populations and habitat on private lands, incentive-based conservation programs that fund the SGI generally require reauthorization from Congress under subsequent farm bills, meaning future funding is not guaranteed.

As of 2015, SGI has secured conservation easements on over 455,000 acres across the GRSG range (NRCS 2015), with the largest percentage of easements occurring in Wyoming (approximately 200,000 acres). In MZ III, SGI has thus far secured conservation easements on 11,191 acres that maintain intact sagebrush-grassland habitat. It has also accomplished the following within MZ III:

- Established over 37,000 acres where grazing management promotes GRSG habitat and sustainable ranching

- Removed conifers encroaching on nearly 19,000 acres of GRSG habitat
- Seeded over 5,500 acres with native plants
- Marked 10 miles of fences in GRSG habitat

Other Regional Efforts

In addition, tribes, counties, and local working groups are playing a critical role in promoting GRSG conservation at the local level. Individual conservation plans have been prepared by most local working groups (USGS 2014) to develop and implement strategies to improve or maintain GRSG habitat and reduce or mitigate threats on the local level. The proposed conservation actions and recommendations in these plans are voluntary actions for private landowners. Local working group projects have included monitoring, research, and mapping habitat areas, as well as public outreach efforts such as landowner education and collaboration with federal, state, and other local entities. These efforts provide a net conservation gain to GRSG through increased monitoring and public awareness.

Elko County, in northeast Nevada, has developed a GRSG Management and Conservation Strategy Plan (County of Elko 2012). The plan is based primarily on wildfire, fuels, and predator reduction.

Several counties in Utah have adopted resolutions for GRSG management modeled on the statewide 2013 Conservation Plan for Greater Sage-grouse in Utah, with provisions specific to their county and the use of incentives and cooperative conservation programs.

The local working groups in the Utah Sub-region within MZ III (Castle Country, Color Country, Morgan-Summit, Parker Mountain, Rich County, Southwest Desert, Strawberry Valley, West Desert, and portions of Uinta Basin Adaptive Resource Management Local Working Groups) (USGS 2014) operate under plans providing an adaptive framework for voluntary and collaborative GRSG and GRSG habitat conservation at the local level, using state and federal agency-recommended strategies to address threats to GRSG in their local areas.

Similarly, there are seven local working groups in the Nevada and Northeastern California Sub-region within MZ III (portions of the Washoe/Modoc, North Central Nevada, Northeastern Nevada Stewardship Group, White Pine, Lincoln, and South Central Nevada working groups) (USGS 2014). Local working group boundaries generally contain several Population Management Unit (PMU) working groups, for example the Buffalo-Skedaddle working group in the Washoe/Modoc local working group).

5.1.5 Relevant Cumulative Actions

This cumulative effects analysis considers the incremental impact of the Nevada and Northeastern California GRSG LUPA and alternatives in combination with

other past, present, and reasonably foreseeable future federal and non-federal actions on lands in MZ III (see **Table 5-37**). Where these actions occur within GRSG habitat, they would cumulatively add to the impacts of BLM- and Forest Service-authorized activities set forth in the Nevada and Northeastern California LUPA. In addition to the conservation efforts described above, relevant reasonably foreseeable future cumulative actions occurring on federal, state, private, or mixed land ownership in MZ III are described in the Proposed RMPAs/LUPAs for Nevada and Northeastern California and Utah, which are incorporated by reference.

The following list includes past, present, and reasonably foreseeable future actions in MZ III that, when added to the Proposed Plan and alternatives for the Nevada and Northeastern California Sub-region, could cumulatively affect GRSG:

- TransWest Express, Energy Gateway South, and Zephyr transmission line projects, throughout Utah and a portion of Nevada
- Southern Nevada Water Authority ROWs, Nevada
- South Unit Oil and Gas Development, Duchesne County, Utah
- Greens Hollow Coal Extraction, Emery County, Utah
- Alton Coal Tract SITLA, Kane County, Utah
- West Tavaputs Plateau Natural Gas Full Field Development Plan, Carbon County, Utah
- Gasco Energy Inc. Uinta Basin Natural Gas Development Project, Uintah and Duchesne Counties, Utah
- Long Canyon Mine, Elko County, Nevada
- Luning and Enel Salt Wells Solar Energy Projects, Mineral and Churchill Counties, Nevada
- Salt Wells Geothermal Utilization Project, Churchill County, Nevada
- Conifer removal, fuels reductions, and vegetation projects throughout Utah and Nevada
- Grand Staircase-Escalante National Monument Livestock Grazing Plan Amendment, Kane and Garfield counties, Utah
- Eleven pending prospecting permits totaling over 22,000 acres in the sub-region in priority habitat and/or general habitat; ten are in the Battle Mountain District office and one is in the Winnemucca District Office (**Section 3.13**)

5.1.6 Threats to GRSG in Management Zone III

In its COT report, the USFWS identifies wildfire, spread of invasive plants, conifer encroachment, infrastructure development, livestock grazing and free-roaming equids, conversion to agriculture, energy development, mining, and recreation as the present and widespread threats facing GRSG in MZ III (USFWS 2013a). These threats impact GRSG mainly by fragmenting and degrading their habitat. The loss of sagebrush steppe across the West approaches or exceeds 50 percent in some areas. It is a primary factor in long-term declines in GRSG abundance across its historical range (USFWS 2010a).

Habitat fragmentation reduces connectivity of populations, increases predation pressure, and increases the likelihood of extirpation from random events such as drought or outbreak of West Nile virus. Furthermore, climate change is likely to affect habitat availability to some degree by decreasing summer flows and limiting growth of grasses and forbs, thereby limiting water and food supply. Climate change is also increasing certain threats, as increasing atmospheric CO₂ concentrations and warming temperatures favor cheatgrass and encroaching conifers (Knapp et al. 2001; Ziska et al. 2005; Blank et al. 2006) and warming temperatures and changing precipitation seasonality increases stress on sagebrush and increases the frequency of extreme burning conditions. Sensitive species such as GRSG, which are already stressed by declining habitat, increased development, and other factors, could experience additional pressures as a result of climate change.

Each COT report threat considered present and widespread in at least one population in MZ III is discussed below. For more detail on the nature and type of effects and the direct and indirect impacts on GRSG in the sub-region, see **Chapter 4** of the Nevada and Northeastern California GRSG LUPA/EIS. The quantitative impact analysis focuses on impacts in MZ III.

For those threats below that are analyzed quantitatively (infrastructure, livestock grazing, conversion to agriculture, energy development and mining, and recreation), acres presented in the analyses tables represent acres of land allocations from each of the Nevada and Northeastern California Sub-region LUPA/EIS alternatives in the Nevada and Northeastern California Sub-region portion of MZ III, combined with acres of land allocations from the Proposed Plans of additional BLM and Forest Service sub-regions in the non-Nevada and Northeastern California Sub-region portion of MZ III. Utah is the only other sub-region within MZ III, so the acres presented in the analyses tables are the Nevada and Northeastern California Proposed Plan allocations combined with allocations from each of the Utah alternatives. The percentages in the tables represent the relative contribution of each Nevada and Northeastern California Sub-region alternative to the total allocation in the MZ.

Wildfire

Nature and Type of Effects. Big sagebrush and low sagebrush burned by wildfire often require many years to recover, especially after large wildfires. Mountain sagebrush, however, can recover from soil-stored seed. Contiguous old-growth sagebrush sites are at high wildfire risk, as are large blocks of contiguous dead sagebrush and sagebrush sites with a substantial cheatgrass understory. Before recovering, these sites are of limited use to GRSG, except along the edges and in unburned islands.

Because of its widespread impact on habitat, wildfire has been identified as a primary factor associated with GRSG habitat loss and subsequent population declines. Depending on the species of sagebrush and the size of a burn, a return to a full pre-burn community cover can take from 25 to 120 years (Baker 2011; Miller et al. 2011). While wildfire may have variable effects on long- and short-term post-fire invertebrate food source availability for GRSG (Nelle et al. 2000, Fischer et al. 1996; Rickard 1970), any increase in invertebrate abundance may be of little value to GRSG as the reduction in vegetation cover post-wildfire would likely lead to increased predation vulnerability (Nelle et al. 2000).

While most sagebrush subspecies are killed by wildfire and are relatively slow to reestablish, cheatgrass recovers and reestablishes quickly after a wildfire from residual seed in the soil and increased seed production in the first two to three years after burning. Further, the longer that cheatgrass has been dominant on a site, the more it alters soil characteristics to favor reestablishment of itself after a fire and disfavor native species. This rapid recovery and site alteration can lead to a reoccurring wildfire cycle that often prevents sagebrush reestablishment (USFWS 2010a, p. 22).

BLM and Forest Service management to prevent or control wildfires can also affect GRSG and its habitat. Increased human activity and noise associated with wildfire suppression, fuels treatments, and prescribed fire in areas occupied by GRSG could affect breeding and foraging behavior. Important habitats could be altered over the long term from use of heavy equipment or temporarily from noise arising from small engines, such as chainsaws and pumps, and from low-level flights by fixed- and rotary-wing aircraft.

In addition, the reduced role of wildfire (i.e., wildfire suppression) can contribute to higher rates of conifer encroachment in some areas (Miller et al. 2011, p. 10). In the initial stages of encroachment, fuel loadings remain consistent with the sagebrush understory. As conifer encroachment advances, fire return intervals are altered by decreasing understory abundance. The depleted understory causes the stands to become resistant to low-intensity wildfires; over years, the accumulating conifer loads contribute to larger-scale wildfires and confound control efforts due to extreme fire behavior.

Conditions in the sub-region and MZ III. Wildfire has been a primary threat to GRSG habitats and populations occurring across MZ III; the number and size of areas affected annually by wildfire in MZ III are approximately ten times greater than is typical in the Wyoming Basin (MZ II) to the east (Manier et al. 2013, p. 132). Challenges related to wildfire and fuels management have become pronounced or extreme in MZ III where cheatgrass has invaded, increased wildfire intensity, and reduced wildfire return intervals (Manier et al. 2013, p. 81). In MZ III, 62 percent of priority habitat and general habitat have high risk for wildfire, including within most GRSG populations in MZ III (Manier et al. 2013, p. 85-87). Since 2000, approximately 404,000 acres (3 percent) of GRSG habitat has burned in this MZ, with an average of 13,500 acres of GRSG habitat burned annually and a maximum observed burned area of 55,000 acres (Manier et al. 2013, p. 132). Wildfires on BLM-administered lands contribute 60 percent of average acres burned in this MZ annually (Manier et al. 2013, p. 82).

The Northwest Interior Nevada population has been heavily impacted by past wildfire. Several sub-populations in this area (e.g., Eugene Mountains, East Range, Humboldt Range, Majuba Mountain, and Trinity Ranges) have been extirpated from their range due to severe wildfire and inability of the habitat to recover (USFWS 2013a, p. 73).

Impact Analysis. Management actions in the Nevada and Northeastern California Sub-region that emphasize wildfire suppression in GRSG habitat would benefit the species by limiting habitat loss in the event of wildfire. Under current management (Alternative A), prescribed burning may be used to achieve habitat objectives; most existing LUPs support objectives of reintroducing fire into fire-dependent ecosystems, prioritizing response to wildfires, and determining where fire can be used for resource benefit. Alternatives B through F and the Proposed Plan provide for similar protection and maintenance of sagebrush habitat in implementing prescribed burning. The action alternatives all prioritize sagebrush protection in fuels treatment programs and would provide protection for sagebrush in fuels treatment and wildfire suppression. The Proposed Plan would further reduce impacts from wildfire. The Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer Expansion Assessment (Fire and Invasive Assessment Tool [FIAT]) prioritizes landscapes for wildfire prevention and suppression, fuels management, and habitat restoration and rehabilitation within GRSG habitats based on resistance and resilience concepts in Chambers et al. (2014). Additionally, the Proposed Plan would provide additional protection of GRSG habitat in high-risk or fire-prone landscapes, including winter range, by addressing the COT report objectives during the NEPA analysis for the burn plan when prescribed fire is proposed in GRSG habitat. This is in accordance with the COT report objective to retain and restore healthy native sagebrush plant communities within the range of GRSG.

Recognition of the importance of sagebrush habitat during interagency wildfire response would benefit GRSG in the event of a wildfire. The State of Nevada is

implementing the Nevada Division of Forestry's Wildland Fire Protection Program, which will improve delivery of financial, technical, and equipment/human resources to Nevada counties in fuels reduction planning and implementation, wildfire management and suppression, and restoration of burned areas (SETT 2014a, p. 48). The Nevada state plan emphasizes pre-suppression, fire suppression, and post-fire restoration/rehabilitation activities in core GRSG habitat (SETT 2014a, p. 50-55). Similarly, the 2015 Utah executive order and conservation plan for GRSG (Utah Greater Sage-Grouse Working Group 2013) emphasizes prevention, suppression, and rehabilitation/restoration within GRSG management areas throughout the state. These programs would benefit GRSG during wildfire planning and response throughout MZ III, particularly on lands not administered by the BLM or Forest Service.

The Interagency Standards for Fire and Fire Aviation Operations "Red Book" includes BMPs for GRSG habitat conservation for wildlife and fuels management (BLM 2013n). This document is a supplemental policy or guidance for the BLM, the Forest Service, and the USFWS. These BMPs could benefit GRSG and its habitat during interagency wildland fire operations by using spatial habitat data and predictive services to prioritize and preposition firefighting resources in GRSG habitat. However, since several years have elapsed since GRSG BMPs were incorporated, benefits would likely now be apparent, and it is unclear if this is currently the case. In January 2015, Secretarial Order 3336 "Rangeland Fire Prevention, Management and Restoration" was signed by the Secretary of the Interior. The order sets forth enhanced policies and strategies for preventing and suppressing rangeland wildfire and for restoring sagebrush landscapes impacted by wildfire across the West for the DOI. The order will improve coordination with local, state, tribal, and regional efforts to address rangeland wildfire at a landscape level.

Coordination with rural fire districts to manage wildfires in GRSG habitat will further reduce this threat across land ownership types and improve the quality and quantity of habitat.

Reasonably foreseeable wildland fire management efforts are projected to increase (**Section 5.1.16**), especially through increased coordination of federal, state, and local fire prevention actions and the implementation of the Utah Sub-region BLM and Forest Service LUPA, the only other BLM and Forest Service LUPA that will be implemented in MZ III. When the impacts of the Nevada and Northeastern California Sub-region LUPA are added to these actions, this would result in a net conservation gain to GRSG habitats and populations in MZ III.

However, in those years where wildfires that threaten the wildland-urban interface are widespread, firefighting resources would be shifted to those areas and away from GRSG habitat. Years with extensive involvement of wildland-

urban interface in wildfires may not see the expected benefits of policies and direction intended to increase wildfire response in GRSG habitat.

Spread of Invasive Plants

Nature and Type of Effects. As discussed in **Chapter 4**, invasive plants alter plant community structure and composition, productivity, nutrient cycling, and hydrology. Invasive plants also may cause declines in native plant populations, including sagebrush habitat, through such factors as competitive exclusion and niche displacement. Invasive plants reduce and may eliminate vegetation that GRSG use for food and cover. Invasive plants fragment existing GRSG habitat, which favors nest predators such as ravens (Howe et al. 2014), and reduce habitat quality by competitively excluding vegetation essential to GRSG. Invasive plants can also create long-term changes in ecosystem processes such as wildfire cycles and other disturbance regimes that persist even after an invasive plant infestation is removed (Connelly et al. 2004). In big sagebrush in the Great Basin, encroachment by invasive annual grasses has resulted in dramatic increases in the number of wildfires, wildfire return frequency, and widespread detrimental effects on GRSG habitat (Young and Evans 1978; West and Young 2000; West and Yorks 2002; Connelly et al. 2004 in Manier et al. 2013). Big sagebrush communities invaded by cheatgrass have estimated mean fire-return intervals of less than 10 years in many areas (Connelly et al. 2004), whereas a return to a full pre-burn community cover can take from 25 to 120 years depending on the species of sagebrush and the size of a burn (Baker 2011; Miller et al. 2011).

Roads and recreational activities can promote the spread of invasive plants through vehicular traffic. Invasive plants can further exacerbate the fragmenting effects of roadways. Improperly managed grazing in sagebrush habitats can lead to the demise of the most common perennial grasses in this system and an abundance of invasive annual grasses such as cheatgrass or medusahead (Reisner et al. 2013).

Conditions in the Sub-region and MZ III. Via seeds carried by wind, humans, machinery, and animals, invasive plants have invaded and will likely continue to invade many locations in MZ III, including in the sub-region. Some species, including cheatgrass, have become so ubiquitous throughout the sub-region that it is considered economically infeasible to attempt to eradicate them. Modeling has suggested that approximately 4.9 million acres (35 percent of priority habitat and general habitat) of GRSG habitat in MZ III are considered to be at a moderate to high risk for cheatgrass occurrence (Manier et al. 2013, p. 90).

The BLM and Forest Service currently manage invasive plant infestations through integrated weed management, including biological, chemical, mechanical, manual, and educational methods. The BLM is guided by the 1991 and 2007 Records of Decision (RODs) for Vegetation Treatment on BLM Lands in Thirteen Western States (BLM 1991a) and by the 2007 Programmatic

Environmental Report (BLM 2007a). The Humboldt-Toiyabe National Forest is guided by the *Humboldt and Toiyabe National Forest-wide Noxious Weed Treatment Environmental Assessment*. The BLM and Forest Service also participate in the National Early Warning and Rapid Response System for Invasive Species. The goal of this system is to minimize the establishment and spread of new invasive species through a coordinated framework of public and private processes (FICMNEW 2003). Invasive plants are managed in cooperation with county governments and represent a landscape-level approach across management jurisdictions.

Impact Analysis. Management actions in the Nevada and Northeastern California Sub-region that minimize ground disturbance in GRSG habitat would benefit the species by limiting potential for establishment and spread of invasive plants. Increased activity, such as surface disturbance, motorized transportation, and animal and human activity, would increase the chance for the establishment and spread of invasive plants.

Management under Alternative A would allow for the most acres of surface disturbance within GRSG habitat; therefore, the potential for invasive plants to spread and establish would be greatest under this alternative, and effects on GRSG habitat (e.g., reduction in quality of habitat) would be more pronounced. All of the action alternatives would reduce surface disturbance within GRSG habitat and would include invasive plant-prevention measures to some degree. Under all alternatives, BLM and Forest Service would work closely with local and state agencies to manage and treat invasive plants on public lands. The BLM and Forest Service would participate in exotic plant pest councils, state vegetation and noxious weed management committees, state invasive species councils, county weed districts, and weed management associations. Under Alternative E, state measures to minimize project disturbance in GRSG core GRSG habitat would include invasive plant treatment as part of comprehensive vegetation management.

Of all alternatives, the Proposed Plan would likely have the lowest potential for invasive plant spread and establishment, given the 3 percent anthropogenic disturbance threshold, which would limit surface disturbance; extensive mitigation and monitoring plans; FIAT assessments based on resistance and resilience concepts and subsequent prioritization; application of RDFs (consistent with applicable law); and incorporation of GRSG habitat objectives. The COT report objective for invasive species is to maintain and restore healthy native sagebrush plant communities; of all the alternatives, the Proposed Plan would best meet this objective.

Relevant cumulative actions that result in surface-disturbing activities, such as ROWs and energy and mining projects, would increase the potential for the spread of invasive plants on both federal and non-federal lands. Projects requiring state agency review and/or approval would be subject to conditions in

both the Nevada and Utah state plans, including control of invasive plant species and use of native seed mixes during reclamation, and the Utah disturbance cap, which would limit anthropogenic disturbances in GRSG management areas. The Nevada and Utah state plans also address invasive plant species in fire management. These stipulations would benefit GRSG habitat by limiting the spread or establishment of invasive plants, particularly on lands that lack BLM and Forest Service protective regulatory mechanisms.

Reasonably foreseeable invasive plant management efforts are projected to increase (**Section 5.1.16**), including other state and county noxious weed regulations and the implementation of the Utah BLM and Forest Service LUPA in MZ III. When the impacts of the Nevada and Northeastern California LUPA are added to these actions, this would result in a net conservation gain to GRSG habitats and populations in MZ III. The Proposed Plan may result in the greatest net conservation gain due to its 3 percent anthropogenic disturbance cap, which should reduce potential for the spread of weeds during the 20-year analysis period.

Conifer Encroachment

Nature and Type of Effects. Conifer woodlands, especially juniper (*Juniperus* spp.) and in some regions pinyon pine (*Pinus edulis*), may expand into sagebrush habitat and reduce availability of habitat for GRSG. Conifer expansion may be encouraged by human activities, including fire suppression and grazing (Miller et al. 2011). Trees offer perch sites for raptors; thus, woodland expansion may also increase the threat of predation, as would power lines (Manier et al. 2013, p. 91; Howe et al. 2014). Locations within approximately 1,000 yards of current pinyon and/or juniper woodlands are at highest risk of expansion (Bradley 2010). Studies have shown that GRSG incur population-level impacts at very low levels of conifer encroachment (Baruch-Mordo et al. 2013). In the Great Basin (best documented in MZs III, IV, and V), conifer encroachment reduces habitat quality in important seasonal GRSG ranges when woodland development is sufficient to restrict shrub and herbaceous production (Connelly et al. 2004 in Manier et al. 2013, p. 91).

Conditions in the Sub-region and in MZ III. Conifer encroachment risk is high on approximately 1.8 million acres (13 percent of priority habitat and general habitat combined) of GRSG habitat in MZ III, and approximately 58 percent of conifer encroachment risk in priority habitat (and 76 percent in general habitat) occur on BLM-administered lands within MZ III (Manier et al. 2013, p. 93). In comparison, 17 percent of conifer encroachment risk in priority habitat (and 6 percent in general habitat) occur on private lands and 19 percent in priority habitat occur on National Forest System lands (17 percent in general habitat). Therefore, BLM actions are likely to have the greatest potential to ameliorate the effects of conifer encroachment on GRSG habitat, in both priority habitat and general habitat, than any other single land management entity.

Impact Analysis. The COT objective is to remove conifer woodlands from areas of sagebrush that are most likely to support GRSG (post-removal) at a rate that is at least equal to the rate of encroachment (USFWS 2013a, p. 47). Management under Alternatives D, E, and the Proposed Plan would target conifers in GRSG habitat for removal. Treatment acres under the Proposed Plan are presented in **Table 2-3**; conifer removal would target Phase I and II encroachment near leks using the FIAT assessments to identify treatment locations. The Vegetation Dynamics Development Tool identifies the acres of treatment required per decade. The Proposed Plan would also incorporate GRSG habitat objectives to guide conifer encroachment treatments as outlined in **Table 2-2**. Under Alternative A, existing California BLM field office RMPs incorporate the Sage Steppe Ecosystem Restoration Strategy (BLM 2008f), which includes conifer removal projects. Alternatives B, C, and F are largely silent on conifer removal and thus would not serve to reduce this threat on BLM-administered and National Forest System lands in the sub-region, though the cumulative impact of other past, present, and reasonably foreseeable future actions in the sub-region and larger MZ would help reduce the threat across the MZ III.

Relevant cumulative actions on federal, private, and state lands within the MZ include several large conifer removal projects (see **Table 5-37**). Further, the NRCS carries out conservation measures to remove encroaching conifers near leks and other seasonal habitats while minimizing disturbance to GRSG (NRCS 2012, p. 13). SGI has helped reduce the threat of early succession conifer encroachment through mechanical removal on 18,885 acres of private lands within MZ III; SGI has also contributed funds for conifer removal projects on federal lands. The majority of these efforts were located inside PACs (NRCS 2015), helping to preserve historic fire return intervals and important GRSG habitat.

Reasonably foreseeable conifer encroachment management efforts are projected to increase (**Section 5.1.16**), including efforts on private land and implementation of the Utah BLM and Forest Service LUPA in MZ III. When the impacts of the Nevada and Northeastern California LUPA are added to these actions, this would result in a net conservation gain to GRSG habitats and populations in MZ III. The Proposed Plan would have the greatest reduction in the threat from conifer encroachment and provide a net conservation gain to GRSG. Alternatives D and E would also reduce the threat, though to a lesser degree than the Proposed Plan because they do not specify acres for treatment or habitat objectives.

Infrastructure

Rights-of-Way

Nature and Type of Effects. As discussed in **Chapter 4**, transmission lines can directly affect GRSG by posing a collision and electrocution hazard. They also

can indirectly decrease lek attendance and recruitment by providing perches and nesting habitat for potential avian predators such as golden eagles and ravens (Connelly et al. 2004, Coates et al. 2014b). In addition, power lines and pipelines often extend for many miles and fragment GRSG habitat. The ground disturbance associated with construction, as well as vehicle and human presence on maintenance roads, may introduce or spread invasive species over large areas, degrading habitat. Impacts from roads may include direct habitat loss from road construction and direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or seasonal habitats, facilitate predator movements, spread invasive plants, and increase human disturbance from noise and traffic (Forman and Alexander 1998).

Conditions in the Sub-region and in MZ III. Infrastructure, such as ROWs and associated facilities and urbanization, is widespread throughout MZ III. In some locations, infrastructure development has affected GRSG habitat. Development of roads, fences, and utility corridors has also contributed to habitat loss and fragmentation in portions of MZ III. The best available estimates suggest about 17 percent of MZ III is within approximately 4 miles of urban development (Knick et al. 2011, p. 214). Impacts of infrastructure development in MZ III are primarily related to highways, roads, power lines, and communication towers, with 90 percent of MZ III within 4 miles of a road, 14 percent within 4 miles of a power line, and 5 percent within 4 miles of a communication tower (Knick et al. 2011, pp. 215-216).

Although not representative of all infrastructure ROWs, transmission lines greater than 115 kilovolts indirectly influence 33 percent of priority habitat and 25 percent of general habitat across MZ III. Indirect effects are assumed to occur to a radius of 4 miles (Manier et al. 2013, p. 41). Approximately 53 percent of transmission lines in priority habitat and 80 percent in general habitat are on BLM-administered lands across GRSG habitats in MZ III (Manier et al. 2013, p. 41). In contrast, private and National Forest System lands contain 32 percent and 6 percent of transmission lines in priority habitat, respectively, and 15 percent and 5 percent in general habitat, respectively. Therefore, BLM actions are likely to have the greatest potential to affect transmission line ROWs in GRSG habitat than any other land management entity. Designating ROW exclusion and avoidance areas in PHMA and GHMA on BLM-administered and National Forest System lands could reduce the threat on these lands. However, in areas with scattered federal landownership, infrastructure may be routed around federal lands, often increasing its length and potential impact. ROW avoidance and exclusion areas on BLM-administered and National Forest System lands could increase this tendency.

Impact Analysis. **Table 5-2** lists the areas of ROW avoidance and exclusion in GRSG habitat by alternative. **Table 5-3** lists acres of PHMA and GHMA in existing utility corridors.

**Table 5-2
Acres of Rights-of-Way Designations in GRSG Habitat in MZ III**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ III	Percent Within Sub-Region	MZ III	Percent Within Sub-Region
Open to Rights-of-Way				
Alternative A	371,500	99%	4,343,000	95%
Alternative B	24,000	0%	209,000	0%
Alternative C	25,000	0%	209,000	0%
Alternative D	24,000	0%	209,000	0%
Alternative E	24,000	0%	209,000	0%
Alternative F	24,000	0%	209,000	0%
Proposed Plan	53,000	55%	286,000	27%
Right-of-Way Exclusion				
Alternative A	118,000	93%	271,000	94%
Alternative B	3,808,000	>99%	271,000	94%
Alternative C	8,198,000	>99%	15,000	0%
Alternative D	368,000	>99%	21,000	29%
Alternative E	118,000	93%	271,000	94%
Alternative F	3,808,000	>99%	4,404,000	>99%
Proposed Plan	118,000	93%	270,000	95%
Right-of-Way Avoidance				
Alternative A	1,734,000	0%	20,000	0%
Alternative B	1,734,000	0%	4,153,000	>99%
Alternative C	1,734,000	0%	20,000	0%
Alternative D	5,412,000	68%	4,165,000	>99%
Alternative E	5,424,000	68%	4,153,000	>99%
Alternative F	1,734,000	0%	20,000	0%
Proposed Plan	5,395,000	68%	4,077,000	>99%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within ROW designations in MZ III; it also displays the percentage of those acres that are found within the sub-region.

**Table 5-3
Acres of Existing Utility Corridors in GRSG Habitat in MZ III**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ III	Percent Within Sub-Region	MZ III	Percent Within Sub-Region
Alternative A	325,000	92%	427,000	96%
Alternative B	325,000	92%	427,000	96%
Alternative C	120,000	79%	0	0%
Alternative D	329,000	92%	423,000	96%
Alternative E	325,000	92%	427,000	96%
Alternative F	325,000	92%	427,000	96%
Proposed Plan	61,000	59%	77,000	77%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within existing utility corridors in MZ III; it also displays the percentage of those acres that are found within the sub-region.

In general, the three ROW designations discussed below – exclusion, avoidance, and open – will provide differing levels of protection to GRSG and its habitat. Exclusion will provide the highest level of habitat protection, while avoidance may provide less protection, and open has the least amount of protection. See the *Glossary* for full definitions of exclusion, avoidance, and open.

Across MZ III, Alternative A (current management) leaves the most acres of GRSG habitat open to ROW/SUAs. Alternatives C and F would both reduce acres open to ROWs and contribute the most acres of ROW exclusion of all the action alternatives, making them the most protective of GRSG and its habitat. Alternative B also contributes substantially to ROW exclusion within PHMA, though not as much as Alternatives C and F. Alternative E and the Proposed Plan would not contribute as many acres of ROW exclusion as the alternatives above. For Alternative E, all proposed ROWs within the SGMA would trigger SETT consultation, and the associated avoid, minimize, and mitigate strategy. Measures in the Proposed Plan, including applying disturbance screening criteria, RDFs (consistent with applicable law), buffers, mitigation, and the disturbance cap, would reduce impacts on GRSG relative to Alternative A.

Alternatives D and E and the Proposed Plan would contribute the most acres of ROW avoidance within MZ III. These alternatives would increase protection to GRSG and its habitat compared to Alternative A, but to a lesser extent than Alternative F, which manages all GRSG habitat as ROW exclusion, and Alternative C, which manages all PHMA and ACECs as ROW exclusion.

Because Alternatives C and F would manage the most GRSG habitat as exclusion, these alternatives would likely provide the highest level of protection

to GRSG and its habitat and would be most likely to meet the COT report objective, which is to avoid development of infrastructure in GRSG priority areas for conservation.

The numbers of ROW authorizations are anticipated to grow in the sub-region. Increasing populations, continued energy development, and new communication sites drive the need for new ROWs on both federal and non-federal lands. For instance, the TransWest Express project would impact GRSG habitat in MZ III. While this project would be exempted from the conservation measures in this plan, conservation measures for GRSG will be incorporated via the project's site-specific NEPA process. Additionally, this project will be in compliance with BLM Instruction Memorandum 2012-043, Greater Sage-Grouse Interim Management Policies and Procedures, which requires that GRSG habitat is maintained or enhanced through avoidance, minimization, and applying compensatory mitigation. Actual impacts and contribution to cumulative effects from these projects are unknown at this time.

ROW impacts on GRSG habitat on state or private land could be greater due to less restrictive management on those lands. However, it is likely that impacts would be reduced, since new ROW authorizations that require state agency review or approval would be subject to the permitting process and stipulations for development in the SGMA under both the Nevada and Utah state conservation plans for GRSG. These stipulations would benefit the GRSG and its habitat by ensuring that projects avoid, minimize, and mitigate impacts on GRSG habitat from ROWs developments.

The effect of the alternatives and other conservation actions in the MZ (most notably the Nevada state plan and Utah executive order) could be synergistic. By implementing restrictions on infrastructure in PHMA and on state and private lands together, the cumulative beneficial effect on GRSG would be greater than the sum of their individual effects because protections would be applied more consistently across the landscape. This is especially important in areas of mixed land ownership patterns where complementary protections can benefit leks, early brood-rearing habitat, or other important seasonal habitats that do not follow geopolitical boundaries.

Reasonably foreseeable ROW development in MZ III is expected to increase over the 20-year analysis period (**Section 5.1.16**), though state and private GRSG conservation efforts as well as the Utah BLM and Forest Service LUPA in MZ III would reduce the threat by restricting the type and location of developments. When restrictions in the Nevada and Northeastern California LUPA are added to these conservation actions, the impacts of future ROW developments would be further reduced. Alternatives C and F would provide the greatest net conservation gain to GRSG habitats and populations in MZ III by providing the greatest amount of ROW exclusion in GRSG habitat. The

Proposed Plan would also reduce the threat to a lesser degree by providing the flexibility to site ROWs with the least impact on GRSG habitat.

Renewable Energy: Wind and Solar

Nature and Type of Effects. Impacts on GRSG from renewable energy development, such as that for wind and solar power, are similar to those from nonrenewable energy development. Additional concerns associated with wind energy developments are rotor blade noise, structure avoidance, and mortality caused by collisions with rotating blades (Connelly et al. 2004).

Conditions in the Sub-region and in MZ III. Wind energy development is an increasing threat to some populations across the GRSG range. Currently, nine ROW applications for wind testing or development are under NEPA review within the sub-region and/or MZ III (see **Table 5-1**). One utility-scale wind farm in the sub-region was in the planning stage but is currently temporarily deferred pending the release of the Nevada and Northeastern California GRSG LUPA/EIS; however, the proposed location is in MZ IV, within the Northern Great Basin GRSG population. No commercial-scale wind developments have been authorized or constructed in MZ III.

No current solar energy facilities measurably affect GRSG within its range (Manier et al. 2013, p. 66). The southern portion of GRSG range, including within MZ III, has higher solar energy generation potential than the rest of the GRSG range, indicating that given potential technological developments within the lifespan of this analysis, solar potential across the southern range of GRSG, including within MZ III, may become attractive to solar development projects (Manier et al. 2013, p. 66). There are currently two utility-scale solar projects in NEPA review in MZ III.

Geothermal energy development is discussed under *Energy Development and Mining*, below.

Impact Analysis. **Table 5-4** lists areas of wind energy ROW by alternative.

The Nevada and Northeastern California Sub-region alternatives would all reduce acres of GRSG habitat open to wind ROWs relative to Alternative A. Acres of GRSG habitat managed as wind exclusion would be the greatest under Alternatives C, D, and F, reducing potential impacts on GRSG and its habitat the most under these Alternatives.

The No Action Alternative would leave the most GRSG habitat open to wind ROWs, and would thereby have the greatest potential impact on GRSG and its habitat. Alternative E would not exclude these projects from GRSG habitat, but they would trigger SETT consultation and be subject to the avoid, minimize, and mitigate strategy in the Nevada state plan. Under the Proposed Plan, PHMA would be managed as exclusion for commercial wind facilities. GHMA would be

**Table 5-4
Acres of Wind Energy Management Designations in GRSG Habitat in MZ III**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ III	Percent Within Sub-Region	MZ III	Percent Within Sub-Region
Open to Wind Rights-of-Way				
Alternative A	3,693,000	>99%	4,327,000	96%
Alternative B	3,000	0%	193,000	0%
Alternative C	3,000	0%	193,000	0%
Alternative D	3,000	0%	193,000	0%
Alternative E	3,000	0%	193,000	0%
Alternative F	3,000	0%	193,000	0%
Proposed Plan	3,000	0%	193,000	0%
Wind Right-of-Way Exclusion				
Alternative A	1,873,000	6%	273,000	94%
Alternative B	5,564,000	68%	273,000	94%
Alternative C	9,953,000	82%	17,000	0%
Alternative D	5,802,000	70%	4,169,000	>99%
Alternative E	1,873,000	6%	273,000	94%
Alternative F	5,564,000	68%	4,407,000	>99%
Proposed Plan	5,564,000	68%	273,000	94%
Wind Right-of-Way Avoidance				
Alternative A	0	0%	0	0%
Alternative B	0	0%	4,134,000	100%
Alternative C	0	0%	0	0%
Alternative D	0	0%	0	0%
Alternative E	3,690,000	100%	4,134,000	100%
Alternative F	0	0%	0	0%
Proposed Plan	0	0%	4,134,000	100%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within wind energy management designations in MZ III; it also displays the percentage of those acres that are found within the sub-region.

ROW avoidance for wind facilities. Wind developments would also be subject to the anthropogenic disturbance criteria, a 3 percent disturbance cap, RDFs (consistent with applicable law), buffers, and a mitigation requirement. The Proposed Plan would reduce potential impacts on GRSG relative to the No Action Alternative but not to the extent of other alternatives, including Alternatives C, D, and F, which would manage the most GRSG habitat as wind ROW exclusion.

New ROW authorizations that require state agency review or approval would be subject to stipulations for development in the SGMA under the Nevada and Utah state conservation plan as discussed under *Rights-of-Way*, above.

The effect of the alternatives and other conservation actions in the MZ (most notably the Nevada state plan and Utah executive order) could be synergistic. By implementing restrictions on infrastructure in PHMA and on state and private lands together, the cumulative beneficial effect on GRSG would be greater than the sum of their individual effects because protections would be applied more consistently across the landscape. This is especially important in areas of mixed land ownership patterns where complementary protections can benefit leks, early brood-rearing habitat, or other seasonal habitats that do not follow geopolitical boundaries.

Reasonably foreseeable energy development in MZ III is expected to increase over the 20-year analysis period (**Section 5.1.16**), though state and private GRSG conservation efforts as well as wind energy restrictions in the Utah BLM and Forest Service LUPA in MZ III would reduce the threat by restricting the type and location of developments. When restrictions in the Nevada and Northeastern California LUPA are added to these conservation actions, the impacts of future energy developments would be further reduced. Alternatives C, D, and F would provide the greatest net conservation gain to GRSG habitats and populations in MZ III by providing the greatest amount of wind exclusion in GRSG habitat. The Proposed Plan would also reduce the threat to a lesser degree by providing the flexibility to site energy developments with the least impact on GRSG habitat.

Livestock Grazing and Free Roaming Equids

Nature and Type of Effects. 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 that alter species abundances and composition in GRSG insect prey. Changes in plant composition could occur in varying degrees and could change vegetative structure, affecting cover for nesting birds. Grazing could also alter fire regimes (Davies et al. 2010).

If not managed properly, cattle and sheep grazing can compact soil, remove biological soil crusts, enrich soil with nutrients, reduce vegetation cover and diversity, and trample nests, directly disturbing GRSG and negatively affecting

GRSG recruitment. Cattle and sheep may reduce invertebrate prey for GRSG or increase GRSG exposure to predators (Beck and Mitchell 2000, pp. 998-1,000; Knick 2011; Coates 2007, pp. 28-33). Grazing in riparian areas can destabilize stream flows and streambanks, cause the loss of riparian shade, and increase sediment and nutrient loads in the aquatic ecosystem (George et al. 2011). Stock watering tanks and troughs can contribute to stream and aquifer dewatering and may concentrate livestock movement and congregation in sensitive areas (Vance and Stagliano 2007); they also may contribute to the increased occurrence of West Nile virus (Walker and Naugle 2011). Stock watering tanks and troughs can cause GRSG mortality if not equipped with escape ramps or covers.

Even periodic improperly managed grazing can damage range resources over the long term. Grazing often exacerbates drought effects when stocking levels are not quickly reduced to match the limited forage production. The degree to which grazing affects habitat depends on several factors, such as the number of animals grazing in an area, the time of grazing, and the grazing system used.

However, targeted grazing can reduce seed production and populations of cheatgrass, if applied annually. The timing of the livestock grazing is critical, however, or else the livestock will consume the remnant native species along with the invasive annual grasses (BLM 2002c). Targeted livestock grazing also can be used to reduce fuel load (Davies et al. 2011; Davies et al. 2010; Connelly et al. 2004, pp. 7, 28-30), which can influence the behavior and effects of fire in sagebrush steppe and semi-desert systems under moderate or better weather conditions (Davies et al. 2010; Strand et al. 2014). As fire weather conditions become extreme, the potential role of grazing on fire behavior decreases.

Light to moderate grazing does not appear to affect perennial grasses, which are important to nesting cover (Strand and Launchbaugh 2013; BLM 1997d). However, excessive grazing can eliminate perennial grasses and lead to expansion of invasive species such as cheatgrass or medusahead (Reisner et al. 2013).

A well-developed understory of native grass, forbs, and sagebrush is critical for GRSG and other wildlife. Impacts on habitat vary with livestock densities and distribution; the more evenly livestock is distributed across the landscape, the lower its impact on any given area (Gillen et al. 1984). However, cattle show a strong preference for certain areas, leading to high use in some areas and little to no use in others. Livestock grazing is generally limited by slopes of greater than 30 percent, dense forests and vegetation, poor or little upland forage, and lack of water.

Since the passage of the 1934 Taylor Grazing Act, range conditions on BLM-administered lands have improved due to improved grazing management practices and decreased livestock numbers and annual duration of grazing. On

National Forest Systems lands, livestock grazing is administered in accordance to a number of laws and regulations, including the Multiple Use and Sustained Yield Act of 1960, Granger-Thye Act of 1950, and Organic Administration Act of 1897. As with BLM-administered lands, the Forest Service issues livestock grazing permits for a period of up to 10 years that are generally renewable if it is determined that the terms and conditions of the permit are being met and the ecological condition of the rangelands are meeting the fundamentals of rangeland health.

Although livestock grazing is the most widespread land use across the sagebrush biome, it exerts a different extent and influence on soils and vegetation than land uses that remove or fragment habitat (e.g., mineral extraction or infrastructure development). Livestock grazing influences vegetation by applying ongoing selective pressure, affecting perennial plant condition, competition, and composition (Connelly et al. 2004). Moreover, shifts in plant communities (i.e., exotic annual grass invasion and western juniper encroachment), caused in large part from historical improper (unmanaged) grazing, and cannot be easily reversed through changes to grazing systems or long-term rest from grazing (Strand et al. 2014). Thus, simply reducing AUMs or acres open to grazing would not necessarily restore high-quality GRSG habitat. However, if inappropriate grazing is occurring, restoring properly managed grazing practices, including potentially reducing AUMs, could result in higher quality GRSG habitat.

Reducing grass height caused by livestock grazing in GRSG nesting and brood-rearing habitat has been shown to negatively impact nesting success. Livestock grazing could reduce the suitability of breeding and brood-rearing habitat, which would impact GRSG populations (USFWS 2010a).

For BLM-administered lands, Standards for Rangeland Health require the BLM to ensure that the environment contains all of the necessary components to support viable populations of sensitive, threatened, and endangered species in a given area relative to site potential. Where livestock grazing results in a level of forage use (utilization levels) determined to have detrimental effects on GRSG habitat quality, changes in grazing management that will improve or restore habitat quality will be made as soon as practical but no later than the start of the next grazing year pursuant to 43 CFR 4180.2(c). Examples of changes in management that should be considered include temporary livestock exclusion (rest); permanent livestock exclusion; change in the season, duration, or intensity of use; fencing; and changes in salting and/or watering locations.

Barbed-wire fences contribute to direct mortality of GRSG through fence collisions (Stevens et al. 2011) and may contribute to predation by acting as perches for raptors (Braun 1998). Additional habitat modifications associated with grazing management are mechanical and chemical treatments to increase grass production, often by removing sagebrush (Knick et al. 2011). Standards for Rangeland Health protect habitat from elements detrimental to GRSG, but as

discussed above, not all rangelands in MZ III are in compliance with these standards.

Invertebrate numbers have been positively correlated with quality of herbaceous understory in sagebrush habitat (Hull et al. 1996; Jamison et al. 2002), suggesting that managing grazing through either stocking rates (Van Poolen and Lacey 1979) or seasonal pasture rests (Mueggler 1950; Laycock 1978; Owens and Norton 1990) to increase herbage production could benefit nesting GRSG and chick survival during early brood rearing by maintaining or increasing invertebrate food sources for GRSG chicks.

Grazing infrastructure, including spring developments, water tanks and troughs, can attract livestock to previously undisturbed habitat areas. Water developments have increased the amount of sagebrush habitat available to livestock grazing by the virtue of transporting and providing water in areas where it was previously unavailable (Connelly et al. 2004). This may expand livestock grazing impacts on greater areas of sagebrush habitat, particularly uplands important for GRSG nesting, early brood rearing, and wintering (Manier et al. 2013, p. 101). High stocking rates in water-poor areas and the associated congregation of cattle around water developments are particularly detrimental to vegetation immediately surrounding the water source (Hall and Bryant 1995; Dobkin et al. 1998), potentially reducing the available summer food source for GRSG. GRSG likely do not regularly use livestock water developments in summer range, but instead obtain required moisture from succulent vegetation (Connelly et al. 2004). Water developments designed to provide water to adjacent succulent vegetation may benefit GRSG by providing additional summer food sources; however, these types of water developments also provide additional breeding grounds for mosquitos that carry West Nile virus (see additional discussion below), which can breed in water-filled hoof prints (Walker and Naugle 2011). Congregating cattle may also increase local impacts on GRSG, including nest trampling and desertion (Beck and Mitchell 2000).

Riparian areas and wet meadows used for brood rearing are especially sensitive to grazing by livestock (Beck and Mitchell 2000, Hockett 2002). Summer grazing in wet meadows and riparian areas can lead to reduced low-vegetative forb growth that comprise essential GRSG summer diets (Manier et al. 2013, p. 99), compromised hydrology, reduction of suitable summer habitat for GRSG, and GRSG avoidance of these areas (Beck and Mitchell 2000).

Water developments may contribute to the increased occurrence of West Nile virus by providing suitable breeding areas for mosquitos that carry the virus (Walker and Naugle 2011). GRSG are highly susceptible to West Nile virus and suffer high rates of mortality (Clark et al. 2006; McLean 2006); the disease has been implicated in several GRSG die-offs in the Oregon Sub-region (**Section 4.2**). The primary vector of West Nile virus in sagebrush ecosystems is the mosquito *Culex tarsalis* (Naugle et al. 2004; Naugle et al. 2005; Walker and

Naugle 2011). The species is dependent on the availability of warm pools of water for larval development. Artificial water sources may facilitate the spread of West Nile virus within GRSG habitats because these water developments support abundant populations of *C. tarsalis* and provide suitable breeding habitat for longer temporal periods than natural, ephemeral water sources (Walker and Naugle 2011).

Because water developments attract other animals besides livestock, they may serve as predator “sinks” for GRSG; Connelly and Doughty (1989) observed that female GRSG with broods tended to avoid water developments more than males, potentially to reduce exposure and vulnerability to predation.

As discussed, fences increase collision risk for GRSG (Stevens et al. 2011) and provide perches for predators, making them a potential cause of direct mortality to GRSG (Braun 1998). Fences also contribute to habitat fragmentation (USFWS 2010a). Thus, fencing associated with livestock water developments, if present, may contribute to additional negative impacts on GRSG.

Impacts from wild horse and burro grazing can be similar to those from unmanaged livestock grazing, and can include impacts on riparian areas, water quality, soil and streambank erosion, and GRSG nest trampling and abandonment. Wild horses and burros also have impacts on vegetation; because of physiological differences, a horse consumes 20 to 65 percent more forage than a cow of equivalent body mass (Connelly et al. 2004). Comparison of sagebrush sites both occupied and unoccupied by wild horses has shown several notable differences, including overall reduced vegetative cover and shifted species composition (Beever and Aldridge 2011), reduced sagebrush canopy cover, increased fragmentation of shrub canopy, reduced total number of plant species (species richness), and increased soil compaction (Bartmann et al. 1987). At higher elevations only, forb cover may be higher in areas grazed by horses (Beever 1999; Beever et al. 2003). Where wild horses and burros co-occur with cattle, the total amount of habitat that remains ungrazed by nonnative grazers will be diminished as the free-roaming equids will separate themselves spatially from cattle, using steeper slopes and higher elevations (Connelly et al. 2004).

Horses also represent a unique grazing disturbance in sagebrush ecosystems comparable to neither cattle nor native ungulates (Beever 2003) because of their non-uniform use of the landscape, as well as their management status (horses are not hunted, fenced, or seasonally rotated between pastures). Further, horses are one of the least selective grazers in the GRSG range (Hanley and Hanley 1982), meaning that fewer plant species may remain ungrazed in occupied areas (Beever 2003). Due to physiological differences, horses trim vegetation more closely to the ground and can delay recovery of plants (Menard et al. 2002). Further, effects of wild horse grazing may be magnified in dry years (Beever and Brussard 2000) or during periods of drought or vegetation stress

(NTT 2011). Effects will be further exacerbated by wild horse and burro populations that exceed AML.

Water must also be available year-round for wild horse and burro use in HMAs and wild horse territories (Wild and Free-Roaming Horses and Burros Act of 1971). This can result in riparian areas receiving yearlong use by wild horses and burros, which contributes to degradation of these systems. Management to protect riparian areas with additional water developments and fencing can lead to detrimental impacts on GRSG as described above.

Conditions in the Sub-region and in MZ III. Livestock grazing is present and widespread on many land types, such as federal and private, across MZ III. Rangeland health assessments have found that approximately 17 percent of BLM-administered grazing allotments in GRSG habitat in MZ III are not meeting wildlife standards with grazing as a causal factor (Manier et al. 2013, p. 97).

Perhaps the most pervasive change associated with grazing management in GRSG habitats throughout MZ III is the construction of fencing and water developments (Knick et al. 2011, p. 224).

Approximately 4 million acres of GRSG habitat within MZ III is federally managed wild horse and burro range (Manier et al. 2013, p. 102). Within MZ III, nearly 25 percent of priority habitat and 41 percent of general habitat is negatively influenced by free-roaming equids (Manier et al. 2013, p. 102). The BLM manages 61 Herd Management Areas (HMAs) and the Forest Service manages 12 active Wild Horse and Burro Territories (WHBTs) in the sub-region (**Section 3.6**). Wild horse and burro populations in HMAs and WHBTs are managed to achieve and maintain established AMLs and corresponding forage allocations (AUMs).

Impact Analysis. On all lands in the sub-region, the BLM manages livestock grazing on 21.4 million acres, encompassing approximately 725 grazing allotments. The Forest Service manages an additional 225 grazing allotments (**Section 3.8**). **Table 5-5** lists the acres of PHMA and GHMA available and unavailable for grazing in MZ III by alternative.

Acres available to livestock grazing in PHMA are similar to Alternative A across most alternatives, with the exception of Alternatives C and F. Alternative C would manage PHMA as closed to grazing. Alternative F would reduce AUMs and acres available to grazing by 25 percent. The Nevada and Northeastern California Sub-region contains most of the acres of GRSG habitat available to grazing within MZ III. Acres unavailable to livestock grazing would be greatest under Alternative C, which closes all PHMA to grazing. Such a closure would benefit GRSG by maintaining nesting cover for protection and forage; however, the increased need for fencing to exclude grazing animals could also harm nesting GRSG by increasing the likelihood of predation and fence collision.

**Table 5-5
Acres Available and Unavailable to Livestock Grazing in GRSG Habitat in MZ III**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ III	Percent Within Sub-Region	MZ III	Percent Within Sub-Region
Available to Livestock Grazing				
Alternative A	5,526,000	69%	4,618,000	95%
Alternative B	5,526,000	69%	4,618,000	95%
Alternative C	1,728,000	0%	241,000	0%
Alternative D	5,763,000	70%	4,381,000	94%
Alternative E	5,526,000	69%	4,618,000	95%
Alternative F	5,526,000	69%	4,618,000	95%
Proposed Plan	5,526,000	69%	4,618,000	95%
Unavailable to Livestock Grazing				
Alternative A	0	0%	0	0%
Alternative B	0	0%	0	0%
Alternative C	8,175,000	100%	0	0%
Alternative D	0	0%	0	0%
Alternative E	0	0%	0	0%
Alternative F	0	0%	0	0%
Proposed Plan	0	0%	0	0%

Source: BLM 2015

This table displays the acres of PHMA and GHMA available and unavailable to livestock grazing in MZ III; it also displays the percentage of those acres that are found within the sub-region.

However, as discussed, light to moderate grazing is compatible with GRSG habitat; thus, simply closing acres to grazing may not itself benefit or harm GRSG. Possibly equally or more beneficial is restricting range improvements in GRSG habitat, providing seasonal rests from grazing pressure, limiting fencing, and effectively implementing range health standards on grazing allotments in GRSG habitat. Alternatives B through F and the Proposed Plan include grazing restrictions (to varying degrees), which would help protect GRSG from potential impacts such as habitat changes due to herbivory and collisions with fencing. In terms of impacts on BLM-administered and National Forest System lands, Alternative A would have the least GRSG-specific protective grazing restrictions, and would therefore have the greatest impacts on the species. Alternative C would have no areas available for livestock within with PHMA, and would therefore have the fewest direct impacts on the species. However, as a result of restricting grazing in GRSG habitat under Alternative C, increased fencing to exclude cattle may occur. This could result in higher cumulative effects through mortality from fencing collisions. Alternatively, removal of

livestock fencing on BLM-administered and National Forest System lands may lead to increased grazing-related impacts on riparian areas from free-roaming equids (discussed below).

Additionally, the lack of grazing within GRSG habitat could lead to fuel buildup in native bunchgrass habitats, leading to higher probability of bunchgrass mortality during wildfire and lower resistance to invasion or dominance by annual grasses post-fire (Balch et al. 2012). The loss of permittee/lessee invasive plant control partnerships under Alternative C could further contribute to an increase in the spread of invasive annual grasses. Reduced grazing under Alternative F would have similar, but fewer impacts, compared to Alternative C.

Under the Proposed Plan, livestock grazing management would be improved by managing for GRSG habitat objectives (**Table 2.2**), adaptive management, and range improvements to benefit GRSG. Processing of grazing permits/leases and land health assessments would be prioritized in PHMA, which would lead to improved grazing management and reduced impacts on GRSG in the highest-quality habitat for the species.

The COT report objectives for livestock grazing are to manage grazing in a manner consistent with local ecological conditions. This management would maintain or restore healthy sagebrush shrub and native perennial grass and forb communities and conserve essential habitat components for GRSG. Restoration to meet these standards and adequate monitoring would be required. The COT report also states that land managers should avoid or reduce the impact of range management structures on GRSG habitat.

If BLM-administered and National Forest System lands were made unavailable or if livestock grazing were reduced, as under Alternatives C and F, this could increase grazing pressure on adjacent private lands, especially where land ownership patterns are mixed. Loss of federal grazing permits would pose a threat of indirect adverse effects, including potential conversion of private grazing lands to agriculture, if the loss of federal grazing rights made ranching less economically viable.

Since 2010, the NRCS SGI has enhanced rangeland health through rotational grazing systems, revegetating former rangeland with sagebrush and perennial grasses and control of invasive weeds. On privately owned lands, SGI has developed a prescribed grazing approach that balances forage availability with livestock demand. This system allows for adjustments to timing, frequency, and duration of grazing, ensuring rangelands are managed sustainably to provide continued ecological function of sagebrush-steppe. A primary focus of the prescribed grazing approach is maintenance of key plant species, such as deep-rooted perennial grasses that have been shown to be essential for ecological resistance to invasive annual grasses (Reisner et al. 2013, pp. 1047-1048). These actions help to alleviate the adverse impacts associated with improper grazing

practices outlined above under *Nature and Type of Effects*. Within MZ III, SGI has implemented 37,557 acres of prescribed grazing systems and marked 10 miles of fences within MZ III. This program is likely the largest and most impactful program on private lands within MZ III. Because of its focus on priority areas for conservation, which often overlap PHMA, the SGI's past, present, and reasonably foreseeable work has had and likely will continue to have a cumulative beneficial impact on GRSG when considered alongside protective BLM and Forest Service management actions in PHMA.

Reasonably foreseeable livestock grazing management efforts in MZ III are expected to increase over the analysis period (**Section 5.1.16**), through increased NRCS conservation actions under the Sage-Grouse Initiative (e.g., fence marking and conservation easements), state efforts to maintain rangeland, and the implementation of the Utah BLM and Forest Service LUPA in MZ III. When grazing management within the Nevada and Northeastern California LUPA is added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ III.

Under all alternatives the BLM has the authority to adjust wild horse and burros AMLs if resource damage occurs; however, only Alternatives B through F and the Proposed Plan provide management guidelines specific to GRSG habitat (e.g., prioritizing gathers in GRSG habitat under Alternatives B and D, or reducing AMLs by 25 percent in GRSG habitat under Alternative F), which would benefit the species more than Alternative A. Under most action alternatives, range improvements for wild horses and burros would follow management action for livestock range improvements and be aligned with GRSG habitat objectives. Wild horse and burro management, including fencing riparian areas, round ups, and sterilization to manage populations at AMLs, could have indirect impacts on GRSG and its habitat as described above.

Reasonably foreseeable wild horse management efforts are projected to increase over the analysis period (**Section 5.1.16**) with implementation of the Utah BLM and Forest Service LUPA in MZ III. When wild horse management within the Nevada and Northeastern California LUPA is added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ III. Impacts may be reduced to the greatest extent under the Proposed Plan, where AMLs would be evaluated with consideration of GRSG habitat objectives for BLM-administered lands.

Conversion to Agriculture

Nature and Type of Effects. Converting sagebrush habitat to agricultural use causes direct loss of habitat available for GRSG. Habitat loss also decreases the connectivity between seasonal habitats, increasing population isolation and fragmentation. Fragmentation then increases the probability for decline of the population, reduced genetic diversity, and extirpation from stochastic events (Knick and Hanser 2011).

In addition to reducing the land area available to support GRSG, habitat loss and fragmentation also increase the likelihood of other disturbances, such as human activity, wildfire, predators, and invasive plant spread.

Conversion to cropland has generally eliminated or fragmented sagebrush on private lands in areas with deep fertile soils or irrigation potential. Sagebrush remaining in these areas has been limited to the agricultural edge or to relatively unproductive environments.

Conditions in the Sub-region and in MZ III. Regional assessments estimate that while less than 1 percent of priority habitat and general habitat in MZ III are directly influenced by agricultural development, 81 and 71 percent of priority habitat and general habitat, respectively, are within approximately 4 miles of agricultural land and are therefore negatively indirectly affected (Manier et al. 2013, p. 27).

Impact Analysis. The BLM and Forest Service do not convert public lands to tilled agriculture. As such, the only direct authority these agencies have over conversion to agriculture is by retaining or disposing of lands via the lands and realty program. Lands retained under BLM and Forest Service management will not be converted to agriculture, and disposing of lands could increase the likelihood they will be converted to tilled agriculture, depending on their location and new management authority. The COT report objectives for converting land to agriculture are to avoid further loss of sagebrush habitat for agricultural activities and to prioritize restoration.

As shown below in **Table 5-6**, acres of GRSG habitat identified for retention across MZ III are similar across all action alternatives with the exception of Alternative C, which would contribute to approximately twice the amount of PHMA retained as the other alternatives. All action alternatives with the exception of Alternative E would identify zero acres of PHMA for disposal (i.e., would retain all PHMA); Alternative E would have no change in disposal of PHMA from the No Action Alternative. For GHMA, all alternatives would identify similar amounts for disposal; however, no GHMA would be identified for disposal under Alternative D. Under the action alternatives, the BLM and Forest Service would generally retain GRSG habitat, thereby eliminating the possibility that GRSG habitat would be converted to agriculture use. Current land tenure retention guidance include retaining lands supporting threatened and endangered species and species of high interest, and existing California BLM field office RMPs and PMU conservation strategies specify retention of GRSG habitat, which would mean that GRSG habitat would be retained under the No Action Alternative on California lands and under Alternative D for the sub-region. Alternatives B, C and F and the Proposed Plan specifically consider GRSG habitat in land tenure retention, which would meet the COT objective for agricultural conversion. Beneficial impacts on GRSG would likely be greatest

**Table 5-6
Acres Identified for Retention and Disposal in GRSG Habitat in MZ III**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ III	Percent Within Sub-Region	MZ III	Percent Within Sub-Region
Acres Identified for Retention				
Alternative A	5,486,000	68%	4,401,000	95%
Alternative B	5,566,000	68%	4,401,000	95%
Alternative C	9,956,000	82%	0	0%
Alternative D	5,804,000	70%	4,395,000	95%
Alternative E	5,486,000	68%	4,401,000	95%
Alternative F	5,566,000	68%	4,401,000	95%
Proposed Plan	5,566,000	68%	4,401,000	95%
Acres Identified for Disposal				
Alternative A	80,000	100%	235,000	100%
Alternative B	0	0%	231,000	100%
Alternative C	0	0%	0	0%
Alternative D	0	0%	0	0%
Alternative E	80,000	100%	231,000	100%
Alternative F	0	0%	231,000	100%
Proposed Plan	0	0%	231,000	100%

Source: BLM 2015

This table displays the acres of PHMA and GHMA identified for retention and disposal in MZ III; it also displays the percentage of those acres that are found within the sub-region.

under the Proposed Plan, which would retain GRSG habitat unless there is a net conservation gain or no adverse impacts from disposal. Furthermore, under the Proposed Plan, GRSG habitat on private lands would be actively located and targeted for acquisition, and if acquired, managed as either PHMA or GHMA.

Land tenure adjustments require site-specific NEPA analysis, and land sales must meet the disposal criteria under applicable law. BLM and Forest Service land tenure adjustments are not anticipated to be a significant contributing element to the threat of agricultural conversion.

The NRCS SGI program focuses on maintaining rangeland that provides habitat for GRSG. This voluntary program provides private landowners with monetary incentives to protect GRSG habitat, often through conservation easements. As a result, private land containing GRSG habitat is protected from conversion to agriculture or other development for the life of the conservation agreement. The conservation easements and other conservation incentives such as

restoration of water features and fence marking can enhance the ability of private ranchlands to support GRSG. As of 2014, SGI has secured conservation easements on 11,191 acres within MZ III and marked or removed 10 miles of fence (NRCS 2015). This has preserved habitat and reduced the risk of direct mortality on these lands.

Additional actions within the sub-region include agricultural restoration or modification for benefit of GRSG, including establishing upland brood-rearing habitat, or “brood strips.” Upland brood strips are areas established to maximize insect and forb production for young gallinaceous birds, including GRSG.

Over the analysis period, conversion to agriculture is expected to increase (**Section 5.1.16**), though state and private conservation efforts as well as the Utah BLM and Forest Service LUPA in MZ III would reduce the threat. When land tenure decisions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in net conservation gain to GRSG habitats and populations in MZ III.

Energy Development and Mining

The COT report states that energy development should be designed to ensure that it will not impinge on stable or increasing GRSG population trends. For mining, the COT report objective is to maintain stable to increasing GRSG populations and no net loss of GRSG habitats in areas affected by mining (USFWS 2013a, p. 49).

There are approximately 1,580,100 acres of GRSG habitat in MZ III where energy and mineral development (including oil, gas, geothermal, coal, mineral materials, and nonenergy leasable minerals) is presently occurring. There are 7,028,600 acres indirectly influenced by energy development (including oil, gas, coal, and mineral materials; indirect effects were not quantified for geothermal and nonenergy leasable mineral developments) (Manier et al. 2013, pp. 52-71).

Oil and Gas

Nature and Type of Effects. As discussed in **Section 4.2**, oil and gas development impacts GRSG and sagebrush habitats through direct disturbance and habitat loss from well pads, access construction, seismic surveys, roads, power lines, and pipeline corridors. Indirect disturbances result from noise, vehicle traffic, gaseous emissions, changes in water availability and quality, and human presence. These factors could cumulatively or individually lead to habitat fragmentation in the long term (Connelly et al. 2004; Holloran 2005) or influence habitat quality, predator communities, and disease dynamics (Naugle et al. 2011).

Conditions in the Sub-region and in MZ III. There is relatively little oil and gas development within MZ III. Approximately 2,000 acres of PHMA are directly impacted throughout the MZ (Manier et al. 2013, p. 52), and approximately

571,000 acres (4 percent) of GRSG habitat are leased but undeveloped (Manier et al. 2013, p. 55). There are two oil-producing basins in the sub-region and in MZ III: Railroad Valley in Elko County, Nevada and Pine Valley in Eureka County, Nevada (**Section 3.13**).

Oil development-related wells on BLM-administered lands indirectly influence 38 percent of priority habitat and 80 percent of general habitat across MZ III, occurring to a distance of 12 miles from the development. Private surface lands account for 40 percent of indirect effects in priority habitat and 17 percent in general habitat in MZ III (Manier et al. 2013, p. 52). The Forest Service does not have any direct or indirect effects within this MZ. Thus, actions on BLM-administered lands within MZ III have a somewhat greater potential to ameliorate effects from oil and gas development than do similar conservation actions on private lands.

Although oil and gas activities have a disproportionately greater effect on private lands due to lack of BLM or Forest Service regulatory oversight, regulatory mechanisms on both federal surface and split-estate lands in MZ III would be influential should fluid mineral development occur. Split-estate lands with federal subsurface minerals may provide mitigation for impacts on GRSG habitat on private surface lands that would not otherwise be required on lands with both privately held surface and subsurface.

According to the Reasonably Foreseeable Development scenario (**Appendix P**), permanent disturbance associated with oil and gas development is projected to occur on 1,246 acres within the sub-region over the next 20 years (though only 128 acres of permanent disturbance will remain after reclamation is applied to temporarily disturbed areas), representing less than 1 percent of GRSG habitat within either the sub-region or MZ III. The potential for impacts would be reduced where areas are closed to fluid mineral leasing and where NSO and CSU/TL stipulations are applied. Given the small acreage and implementation of RDFs consistent with applicable law (**Appendix D**), the likelihood for impacts on GRSG habitat on BLM-administered and National Forest System lands is anticipated to be small and localized under all alternatives.

Impact Analysis. **Table 5-7** and **Table 5-8** provide a quantitative summary of fluid mineral leasing conditions on BLM-administered and National Forest System lands across MZ III, followed by an analysis of the Nevada and Northeastern California Sub-region alternatives.

As shown in **Tables 5-7** and **5-8**, fluid mineral closures and stipulations within the Nevada and Northeastern California Sub-region exert a fairly large influence on closures or stipulations within MZ III as a whole. Alternatives C and F would close the greatest amount of GRSG habitat to new fluid mineral leasing and would be the most protective of GRSG and its habitat. As such, reasonably

**Table 5-7
Acres Open and Closed to Fluid Mineral Leasing in GRSG Habitat in MZ III**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ III	Percent Within Sub-Region	MZ III	Percent Within Sub-Region
Open ¹ to Fluid Mineral Leasing				
Alternative A	3,690,000	100%	4,264,000	97%
Alternative B	0	0%	4,264,000	97%
Alternative C	0	0%	129,000	0%
Alternative D	0	0%	129,000	0%
Alternative E	0	0%	129,000	0%
Alternative F	0	0%	129,000	0%
Proposed Plan	0	0%	129,000	0%
Closed to Fluid Mineral Leasing				
Alternative A	164,000	67%	274,000	93%
Alternative B	3,854,000	99%	274,000	93%
Alternative C	8,244,000	99%	18,000	0%
Alternative D	414,000	87%	24,000	25%
Alternative E	164,000	67%	274,000	93%
Alternative F	3,854,000	99%	4,407,000	>99%
Proposed Plan	164,000	67%	274,000	93%

Source: BLM 2015

¹Open with standard stipulations. This table displays the acres of PHMA and GHMA open and closed to fluid mineral leasing in MZ III; it also displays the percentage of those acres that are found within the sub-region.

**Table 5-8
Acres with NSO and CSU/TL Stipulations in GRSG Habitat in MZ III**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ III	Percent Within Sub-Region	MZ III	Percent Within Sub-Region
NSO Stipulations				
Alternative A	2,001,000	0%	33,000	0%
Alternative B	2,001,000	0%	33,000	0%
Alternative C	2,001,000	0%	33,000	0%
Alternative D	5,680,000	65%	4,179,000	99%
Alternative E	2,001,000	0%	33,000	0%
Alternative F	2,001,000	0%	33,000	0%

**Table 5-8
Acres with NSO and CSU/TL Stipulations in GRSG Habitat in MZ III**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ III	Percent Within Sub-Region	MZ III	Percent Within Sub-Region
Proposed Plan	5,692,000	65%	33,000	0%
CSU/TL Stipulations				
Alternative A	0	0%	71,000	0%
Alternative B	0	0%	71,000	0%
Alternative C	0	0%	71,000	0%
Alternative D	0	0%	71,000	0%
Alternative E	3,690,000	100%	4,205,000	98%
Alternative F	0	0%	71,000	0%
Proposed Plan	0	0%	4,205,000	98%

Source: BLM 2015

This table displays the acres of PHMA and GHMA with NSO Stipulations and CSU/TL Stipulations in MZ III; it also displays the percentage of those acres that are found within the sub-region.

foreseeable future leasing projects would be less likely to impact GRSG populations on federal lands. Alternative D and the Proposed Plan would stipulate NSO within PHMA. This would reduce well density and impacts associated with construction and operation. The Proposed Plan would impose major constraints on the greatest amount of PHMA, and minor constraints on the greatest amount of GHMA. The Proposed Plan would provide additional protections to GRSG from fluid mineral development by requiring anthropogenic disturbance criteria, a 3 percent disturbance cap, buffers, mitigation requirements, and RDFs consistent with applicable law. Though Alternative E would not close GRSG habitat to new fluid mineral leasing, all new leases within the SGMA would be subject to SETT consultation for application of the avoid, minimize, and mitigate process under the Nevada state plan.

All BLM and Forest Service Proposed Plans within MZ III include RDFs (consistent with applicable law) to minimize impacts on GRSG from oil and gas development on federal lands. In areas where mineral estate is currently unleased, these tools can be applied to future leases; in areas that are already leased, RDFs consistent with applicable law can be applied as conditions of approval for development of existing leases. Examples include locating new compressor stations outside of PHMA to reduce noise disturbance; clustering operations and facilities as closely as possible; placing infrastructure in already disturbed locations where the habitat has not been fully restored; and restoring disturbed areas at final reclamation to the pre-disturbance landforms and desired plant communities. State plans contain similar measures to reduce impacts. Together, these measures would help protect unfragmented habitats,

minimize habitat loss and fragmentation, and maintain conditions that meet GRSG life history needs. Recent research indicates that restored habitats lack many of the features sought by GRSG in their habitat areas and may not support GRSG for long periods following restoration activities. In order to conserve GRSG populations on the landscape, protecting existing habitat through minimizing development would provide the chance for GRSG persistence (Arkle et al. 2014).

Reasonably foreseeable oil and gas development is limited in the MZ. When the impacts of the Nevada and Northeastern California LUPA are added to these actions, the impact would be a net conservation gain due in large part to implementation of NSO stipulations, anthropogenic disturbance caps, and adaptive management that would minimize future disturbances to GRSG populations and habitats.

New leasing authorizations that require state agency review or approval would be subject to stipulations for development in the SGMA under the Nevada and Utah state plans. These stipulations would benefit GRSG and its habitat by ensuring that projects avoid, minimize, and mitigate impacts on GRSG habitat from fluid mineral developments.

The effect of the Nevada and Northeastern California LUPA alternatives and other past, present, and reasonably foreseeable future management actions in the MZ (most notably the Nevada and Utah executive orders) could be synergistic, meaning that the effects of the actions together is greater than the sum of their individual effects. For example, applying buffers in PHMA and on state and private land would effectively conserve larger blocks of land than if these actions occurred individually. This would provide a landscape-scale net conservation gain, especially in areas where little development has occurred to date.

Reasonably foreseeable oil and gas development in MZ III is expected to increase over the 20-year analysis period (**Section 5.1.16**). State and private GRSG conservation efforts as well as actions in the Utah BLM and Forest Service Proposed Plan in MZ III would reduce the threat by restricting the location of developments and requiring mitigation. When restrictions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ III. Alternatives C and F would provide the greatest net conservation gain to GRSG habitats and populations in MZ III by providing the greatest amount of GRSG habitat closed to leasing. The Proposed Plan would also reduce the threat to a lesser degree through designation of NSO stipulations and additional conservation measures.

Geothermal

Nature and Type of Effects. Impacts on GRSG from geothermal development are similar to oil and gas development, and direct impacts on habitats would occur from development of power plants, access roads, pipelines, and transmission lines. As a result, impacts of geothermal developments on GRSG from direct habitat loss, habitat fragmentation via roads and transmission lines, noise, and increased human presence (Connelly et al. 2004) may be similar to those discussed for nonrenewable energy development. Comparable effects on local GRSG populations are also anticipated (Manier et al. 2013, p. 70). Other concerns related to geothermal energy development include air and water pollution, disposal of hazardous waste, land subsidence, and release of toxic gases into the environment (Manier et al. 2013, p. 70).

Conditions in the Sub-region and MZ III. Geothermal energy development potential is particularly high throughout MZ III; approximately 7,984,500 acres of BLM-administered GRSG habitat in the sub-region is open to geothermal leasing (**Section 3.13**). However, existing geothermal leases directly affect only 125,600 acres (less than 1 percent) of GRSG habitat in the MZ (Manier et al. 2013, p. 71).

The Required Foreseeable Development scenario for the Nevada and Northeastern California Sub-region (**Appendix P**) predicts up to 12 new geothermal power plants and estimates between 53 and 367 acres of disturbance would be required for each plant. Therefore, between 636 and 4,404 acres of temporary and permanent disturbance associated with geothermal development over the next 20 years is expected under the No Action Alternative throughout the sub-region on both BLM-administered and National Forest System lands. The conservative assumption that all 4,404 acres of disturbance would be located within MZ III, on PHMA, would mean that less than 1 percent of PHMA within MZ III would be directly affected under this scenario. It is reasonable to assume that not all 4,404 acres of disturbance would occur within GRSG habitat; however, indirect impacts from such development would affect a considerably larger area than the direct footprint of development, as discussed for several threats above. Typical geothermal development includes roads, transmission lines, and associated linear features in addition to power plant development, and as discussed above, these features may contribute to spread of invasive plants, habitat fragmentation, and increased predation on GRSG. Some of this acreage would be reclaimed after operations are ceased or wells are abandoned.

Impact Analysis. Under the RFD scenario for the action alternatives, estimated disturbance would generally decrease between 0 and 70 percent, relative to the No Action Alternative, above. The potential for impacts would be reduced where areas are closed to fluid mineral leasing and where NSO and CSU/TL stipulations are applied. Given the small acreage and implementation of RDFs consistent with applicable law (**Appendix D**), the likelihood for impacts on

GRSG habitat is anticipated to be small and localized under all alternatives, including the No Action Alternative.

The quantitative analysis of effects from geothermal leasing would be the same as described for oil and gas because allocations and past, present, and reasonably foreseeable future actions would be the same.

Coal

Nature and Type of Effects. Coal mining and the use of coal to produce electricity has environmental impacts. These include soil erosion, dust, noise, water pollution, acid-mine drainage, and air emissions, in addition to impacts on wildlife in the area. Burning coal releases toxic fumes and particulate matter into the atmosphere and contributes to climate change (Manier et al. 2013, pp. 69-71). Development of surface mines and associated infrastructure (such as roads and power lines), noise, and human activity may negatively impact GRSG numbers (Braun 1998).

Besides oil and natural gas development, past, present, and reasonably foreseeable future coal extraction has been and continues to be a major mining activity within GRSG habitats range-wide (Braun 1998). Coal potential is high in eastern areas (Utah) of MZ III (Manier et al. 2013, p. 132), indicating that development of coal resources could affect already isolated GRSG populations in Utah.

Conditions in MZ III. While coal potential and development within the GRSG range is generally high and widespread within MZs I, II, and VII, potential for coal within the Great Basin region is generally lower. However, coal potential is high in eastern areas (Utah) of MZ III (Manier et al. 2013, p. 132), especially within the Carbon and Emery GRSG population areas. All mining in these two population areas is currently underground, and no potential for surface mining exists within these population areas. The Alton Coal Tract project is an existing surface coal mine within the Panguitch population in Utah that may put the Alton-Sink Valley population of GRSG at risk of displacement or extirpation (USFWS 2012b); proposed expansion of this project would also be underground. Approximately 36 percent of BLM-administered priority habitat in MZ III and I percent of priority habitat on National Forest System lands are influenced by coal mining (Manier et al. 2013, p. 74). Coal mining does not directly or indirectly affect general habitat in MZ III. There are no leasable coal deposits in the Nevada and Northeastern California Sub-region (**Section 3.13**).

Impact Analysis. Because there are no leasable coal deposits in the Nevada and Northeastern California Sub-region, coal leasing decisions were not carried forward in the alternatives (Chapter 2). Therefore, none of the alternatives would have a cumulative influence on GRSG populations or habitat within MZ III portions of the Nevada and Northeastern California Sub-region. Coal

operations in Utah would continue to have a minor cumulative influence on GRSG populations within other portions of MZ III.

Reasonably foreseeable coal development in MZ III is expected to increase over the 20-year analysis period (**Section 5.1.16**), though state and private GRSG conservation efforts and the Utah BLM and Forest Service Proposed Plan in MZ III would reduce the threat by restricting the location of developments and requiring mitigation. Though the Nevada and Northeastern California LUPA does not contain coal leasing decisions, implementation of other BLM and Forest Service Proposed Plans in MZ III would result in a net conservation gain to GRSG habitats and populations.

Mineral Materials

Nature and Type of Effects. Development of surface mines (for sand, gravel, and other common mineral materials found in MZ III) may negatively impact GRSG numbers and disrupt the habitat and life-cycle of the species, similar to other types of mining activities (Braun 1998; Manier et al. 2013, pp. 70-71).

Conditions in the Sub-region and in MZ III. There are 1,140,200 acres of mining and mineral materials disposal sites (not including minerals mined as energy sources) on BLM-administered surface land on priority habitat and general habitat in MZ III; sites on BLM-administered lands contribute 77 percent of potential influence on priority habitat and 79 percent of potential influence on general habitat (Manier et al. 2013, p. 77). National Forest System lands contribute 8 and 9 percent of potential influence on priority habitat and general habitat, respectively, while private lands contribute 13 and 11 percent of influence on priority habitat and general habitat, respectively. Indirect effects are estimated to 1.5 miles out from the direct effects area (Manier et al. 2013, p. 77).

The mineral materials currently being developed for commercial purposes in the sub-region include sand and gravel, crushed stone, dimension stone, and common clays. Occurrence potential for these resources and other mineral materials spans the states of California and Nevada, with heavier concentrations on the northern half of Nevada (**Section 3.13**).

Across MZ III, priority habitat and general habitat are most affected by mining and mineral materials disposal sites on BLM-administered lands. GRSG may be directly impacted, being in the path of development; however, indirect impacts on habitat affect a much larger area than direct impacts. In total, 40 percent of priority habitat and 40 percent of general habitat influenced by the indirect impact of mining and mineral materials disposal sites in MZ III are on BLM-administered land (Manier et al. 2013, p. 77), suggesting that management of mining and material disposal sites on BLM-administered land would have the greatest impact on GRSG habitat conditions relative to actions on private and/or state lands should mineral development occur.

Impact Analysis. **Table 5-9** provides a quantitative summary of acreages of BLM-administered and National Forest System lands open and closed to mineral material disposal across MZ III.

**Table 5-9
Acres Open and Closed to Mineral Material Disposal in GRSG Habitat in MZ III**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ III	Percent Within Sub-Region	MZ III	Percent Within Sub-Region
Open to Mineral Material Disposal				
Alternative A	3,691,000	>99%	4,415,000	94%
Alternative B	1,000	0%	4,415,000	94%
Alternative C	1,000	0%	281,000	0%
Alternative D	1,000	0%	281,000	0%
Alternative E	3,691,000	>99%	4,415,000	94%
Alternative F	1,000	0%	4,415,000	94%
Proposed Plan	1,000	0%	4,415,000	94%
Closed to Mineral Material Disposal				
Alternative A	2,167,000	5%	280,000	91%
Alternative B	5,857,000	65%	280,000	91%
Alternative C	10,247,000	80%	23,000	0%
Alternative D	6,095,000	65%	4,175,000	99%
Alternative E	2,167,000	5%	280,000	91%
Alternative F	5,857,000	65%	280,000	91%
Proposed Plan	5,857,000	65%	280,000	91%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open and closed to mineral material disposal in MZ III; it also displays the percentage of those acres that are found within the sub-region.

Under Alternative A, most public lands within the sub-region are open to mineral material disposal. Specific closures of areas to mineral materials such as ACECs or crucial or essential wildlife habitat exist throughout the sub-region; however, this alternative provides the least protection to GRSG populations or habitat. Under Alternatives B, C, D, and F and the Proposed Plan, PHMA would generally be managed as closed to mineral material disposal. Under Alternative D, GHMA would also be closed to mineral material disposal; Alternative D may provide the greatest protection to GRSG and its habitat by closing PHMA and GHMA to mineral materials disposal. Under Alternative E, GRSG habitat would not be closed to mineral materials disposal; rather, the net conservation gain of GRSG habitat due to anthropogenic disturbances goal of the Nevada state plan

would apply, along with the associated “avoid, minimize, mitigate” process. Acres closed in GHMA would be similar across most alternatives, though Alternative D would have the greatest acres of GHMA closed.

The Proposed Plan would close PHMA to new mineral materials sales, though PHMA would remain open to expansion of existing pits. GHMA would remain open under the Proposed Plan. While the Proposed Plan would not contribute as many acres of GRSG habitat closed to mineral material disposal as Alternative D, the Proposed Plan would provide additional protections to GRSG habitat from mineral material development by requiring anthropogenic disturbance screening criteria, a 3 percent disturbance cap, RDFs consistent with applicable law, buffers, and mitigation. These closures and restrictions would reduce the effect on GRSG habitat from mineral material development on BLM-administered and National Forest System lands in MZ III for most action alternatives. However, these actions may shift development onto non-federal lands, with potentially greater impacts on GRSG and its habitat. This is because similar protective stipulations and permit requirements might not apply on those other lands.

New mineral material disposal authorizations that require state agency review or approval would be subject to the permitting process and stipulations for development in the SGMA under the Nevada and Utah state conservation plan. These stipulations would benefit the GRSG and its habitat by ensuring that projects avoid, minimize, and mitigate impacts on GRSG habitat from mineral material disposal. These stipulations would be of particular benefit on privately owned surface and subsurface lands, where BLM and Forest Service protective regulatory mechanisms do not apply.

Reasonably foreseeable mineral materials development in MZ III is expected to increase over the 20-year analysis period (**Section 5.1.16**), though state and private GRSG conservation efforts and the Utah BLM and Forest Service Proposed Plan in MZ III would reduce the threat by restricting the location of developments and requiring mitigation. When restrictions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ III.

Locatable Minerals

Nature and Type of Effects. Locatable minerals include gold, silver, uranium, and bentonite. Activities associated with locatable mineral development, such as stockpiling topsoil and extracting and transporting material, would cause mortality and nest disruption. These actions also would reduce the functionality of the surrounding habitat with noise and light disturbance, resulting in lost and degraded GRSG habitat.

As with fluid mineral development, reclamation practices may help to reduce long-term impacts on GRSG and its habitat. Although disturbed areas have not been restored to near pre-disturbance conditions in the past, more recent efforts since 1980 have been directed toward restoring functional habitat. Future reclamation would be focused on restoring habitats capable of supporting viable GRSG populations. Even with effective restoration, however, restored areas may not support GRSG populations at the same level as prior to disturbance.

Conditions in the Sub-region and in MZ III. The primary locatable minerals in commercially viable quantities in the Nevada and Northeastern California Sub-region are gold, silver, and copper. Uranium deposits are also found in eastern MZ III (Finch 1996), though none are currently developed. Manier et al. (2013) did not separate the analysis of existing conditions in the MZ for locatable minerals and mineral materials; therefore, the existing conditions for locatable minerals is included in the discussion for *Mineral Materials*, above.

Impact Analysis. **Table 5-10** provides a quantitative summary of acreages of BLM-administered and National Forest System lands open and recommended for withdrawal from mineral entry across MZ III.

Table 5-10
Acres Open and Recommended for Withdrawal from Locatable Mineral Entry in GRSG Habitat in MZ III

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ III	Percent Within Sub-Region	MZ III	Percent Within Sub-Region
Open to Locatable Mineral Entry				
Alternative A	5,772,000	65%	4,448,000	95%
Alternative B	2,007,000	0%	4,448,000	95%
Alternative C	2,007,000	0%	229,500	0%
Alternative D	5,844,000	66%	4,376,000	95%
Alternative E	5,772,000	65%	4,448,000	95%
Alternative F	2,007,000	0%	4,448,000	95%
Proposed Plan	5,766,000	65%	4,445,000	95%
Recommended for Withdrawal from Locatable Mineral Entry				
Alternative A	4,000	0%	0	0%
Alternative B	3,768,000	>99%	0	0%
Alternative C	7,986,000	>99%	0	0%
Alternative D	4,000	0%	0	0%
Alternative E	4,000	0%	0	0%

**Table 5-10
Acres Open and Recommended for Withdrawal from Locatable Mineral Entry
in GRSG Habitat in MZ III**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ III	Percent Within Sub-Region	MZ III	Percent Within Sub-Region
Alternative F	3,768,000	>99%	0	0%
Proposed Plan	4,000	0%	0	0%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open to mineral entry and recommended for withdrawal from locatable mineral entry in MZ III; it also displays the percentage of those acres that are found within the sub-region.

Under Alternative A, all lands are generally open to mineral location, and while there are specific locatable mineral withdrawals for particular ROWs, designated wilderness areas, ACECs and other administrative needs, there are no locatable mineral withdrawals specific to protecting GRSG habitat. Impacts on GRSG populations and habitat would be greatest under Alternative A. Mitigation of effects on GRSG and its habitat are identified through the NEPA process to approve plans of operation. Impacts under Alternative D would be the same as Alternative A; therefore, Alternative D would not provide any net conservation gain to GRSG compared to Alternative A.

Under Alternatives B, C, and F, PHMA would be recommended for withdrawal. These alternatives would increase restrictions and limitations for locatable minerals management in GRSG habitat and would thus provide conservation gains to GRSG relative to Alternative A, particularly Alternative C. Under Alternative E, all lands would generally remain open to locatable minerals as under Alternative A; however, a net conservation gain of GRSG habitat due to anthropogenic disturbances goal of the Nevada state plan would apply to locatable minerals management, along with the associated “avoid, minimize, mitigate” permitting process.

Subject to valid existing rights and applicable law, the Proposed Plan would provide additional protections to GRSG from locatable mineral development by applying 43 CFR 3809 standards and requiring anthropogenic disturbance criteria, RDFs, buffers, and mitigation. Under the Proposed Plan, abandoned mine sites in GRSG habitat would be restored by eliminating physical structures that could provide nesting and/or perching sites for predators. These closures and restrictions would reduce the effect on GRSG from mineral material development on BLM-administered and National Forest System lands in MZ III for most action alternatives. However, these actions may shift development onto non-federal lands, with potentially greater impact on GRSG. This is because similar protective stipulations and permit requirements might not apply on those other lands.

New locatable mineral authorizations that require state agency review or approval would be subject to the State permitting process and stipulations for development in the SGMA under both the Nevada and Utah state conservation plans for GRSG. These stipulations would benefit GRSG and its habitat by ensuring that projects avoid, minimize, and mitigate impacts on GRSG habitat from locatable mineral management. These stipulations would be of particular benefit on privately owned surface and subsurface lands, where BLM and Forest Service protective regulatory mechanisms do not apply.

Reasonably foreseeable locatable mineral development in MZ III is expected to increase over the 20-year analysis period (**Section 5.1.16**), though state and private GRSG conservation efforts as well as the Utah BLM and Forest Service Proposed Plan in MZ III would reduce the threat by applying RDFs as Conditions of Approval. The disturbance caps in the Proposed Plans would not be applied to block locatable mineral entry projects subject to valid existing rights and applicable law, but any locatable mineral entry would be considered as disturbance under the cap. When restrictions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ III.

Nonenergy Leasable Minerals

Nonenergy leasable minerals are materials such as sulfates, silicates, and trona (sodium carbonate). Impacts on GRSG are similar to those from other types of mining.

Conditions in the Sub-region and in MZ III. Existing leases for nonenergy leasable minerals represent a relatively small threat spatially, as 57,400 acres (less than 1 percent) of GRSG habitats in MZ III are directly affected by existing prospecting permits (Manier et al. 2013, p. 71). Identified solid leasable minerals in the Nevada and Northeastern California Sub-region include potassium and sodium. Within the sub-region there are 3,660 acres of approved nonenergy leasable leases and prospecting permits; however, none of these permits are located within priority or general habitat. There are currently eleven pending prospecting permits totaling over 22,000 acres in the sub-region on priority habitat or general habitat (**Section 3.13**).

Impact Analysis. **Table 5-11** provides a quantitative summary of acreages of BLM-administered and National Forest System lands open and closed to nonenergy leasable mineral leasing across MZ III.

Alternatives B, C, D, and F and the Proposed Plan would increase the acreage of PHMA closed to nonenergy leasing compared to current management (Alternative A) and Alternative E. The alternatives would provide fewer protections in GHMA, with the exception of Alternative D which would

Table 5-1 I
Acres Open and Closed to Nonenergy Leasable Mineral Leasing in GRSG Habitat in MZ III

	PHMA		GHMA	
	MZ III	Percent Within Sub-Region	MZ III	Percent Within Sub-Region
Open to Nonenergy Leasing				
Alternative A	3,690,000	100%	4,421,000	94%
Alternative B	0	0%	4,421,000	94%
Alternative C	0	0%	287,000	0%
Alternative D	0	0%	287,000	0%
Alternative E	3,690,000	100%	4,421,000	94%
Alternative F	0	0%	4,421,000	94%
Proposed Plan	0	0%	4,421,000	94%
Closed to Nonenergy Leasing				
Alternative A	2,175,000	5%	273,000	94%
Alternative B	5,865,000	65%	273,000	94%
Alternative C	10,255,000	80%	17,000	0%
Alternative D	6,103,000	66%	4,169,000	>99%
Alternative E	2,175,000	5%	273,000	94%
Alternative F	5,865,000	65%	273,000	94%
Proposed Plan	5,865,000	65%	273,000	94%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open and closed to nonenergy leasing in MZ III; it also displays the percentage of those acres that are found within the sub-region.

increase the acreage of GHMA closed to leasing. Because they would close the greatest amount of GRSG habitat to nonenergy mineral leasing, Alternatives C and D would be the most protective of GRSG and its habitat. The Proposed Plan would provide additional protections compared to the other action alternatives by requiring anthropogenic disturbance criteria, a 3 percent disturbance cap, buffers, RDFs consistent with applicable law, and mitigation.

Reasonably foreseeable nonenergy leasable mineral development in MZ III is expected to increase over the 20-year analysis period (**Section 5.1.16**). However, state and private GRSG conservation efforts as well as the Utah BLM and Forest Service Proposed Plan in MZ III would reduce the threat by providing additional protections such as disturbance caps, RDFs, and mitigation. When restrictions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ III.

Recreation

Nature and Type of Effects. Recreation such as camping, bicycling, wildlife viewing, horseback riding, fishing, and hunting can be dispersed; concentrated, such as OHV use and developed campsites; and permitted, such as via BLM Special Recreation Permit and Forest Service Recreation Special Use Authorization (RSUA). The BLM also manages Special Recreation Management Areas (SRMAs) where recreation is a primary resource management consideration.

Recreation on federally administered lands that use the extensive network of double-track and single-track routes have an impact on sagebrush and GRSG. Ecological impacts of roads and motorized trails are mortality due to collisions; behavior modifications due to noise, human activity, and habitat loss; alteration of the physical environment; nutrient leaching; erosion; invasive plants spread; increased use; and alteration by humans due to accessibility (Knick et al. 2011, p. 219). Generally, road-effect distances (the distance from a road at which a population density decrease is detected) are positively correlated with increased traffic density and speed (Foreman and Alexander 1998). Recreational activities can degrade GRSG habitat through direct impacts on vegetation and soils, introduction or spread of invasive species, and habitat fragmentation. This occurs in areas of concentrated use, trailheads, staging areas, and routes and trails. However, road access is critical to facilitate fire suppression response, thereby preserving intact vegetation and preventing further fragmentation.

Motorized activities, including OHV use, are expected to have a larger footprint on the landscape. They are anticipated to have the greatest level of impact due to noise levels, compared to nonmotorized uses, such as hiking or equestrian use. Cross-country motorized travel, which is permitted in designated areas on BLM-administered lands but not National Forest System lands, would increase the potential for soil compaction, perennial grasses and forbs loss, and reduction in sagebrush canopy cover. Losses in sagebrush canopy could be the result of repeated, high-frequency, cross-country OHV use over long periods. In addition, the chances of wildfire are increased during the summer, when fire dangers are high and recreation is at its highest.

Dispersed uses expand the human footprint. Closing areas to recreation and reclaiming unused, minimally used, or redundant roads in and around sagebrush habitats during seasonal use by GRSG may reduce the footprint and presumably impacts on wildlife. Restricting access to important habitat areas during seasonal GRSG use (lekking, nesting, brood-rearing, and wintering) may decrease the impacts associated with humans. However, access restriction will not eliminate other impacts, such as invasive plant spread, predator movements, cover loss, and erosion (Manier et al. 2013, p. 108).

Conditions in the Sub-region and in MZ III. Human populations have increased and expanded, primarily over the past century and in the western portion of the sagebrush distribution (Knick et al. 2011, p. 212). With these expanding

populations come greater human impacts (Leu et al. 2008). Uninhabited areas within the Great Basin ecoregion (MZs III and V) decreased 90 percent (from 22.2 million acres to less than 3 million acres) with expansion driven in part by economic and recreation opportunities in the region (Torregrosa and Devoe 2008, p. 10).

In the Nevada and Northeastern California Sub-region, travel management planning is complete for all National Forest System lands and lands managed by BLM California Field Offices (**Section 3.10**).

Impact Analysis. **Table 5-12** shows Acres of Travel Management Designations in GRSG Habitat in MZ III.

The COT report objectives for recreation are to maintain healthy native sagebrush communities, based on local ecological conditions, and to manage direct and indirect human disturbance (including noise) to avoid interruption of normal GRSG behavior (USFWS 2013a, p. 49). Limits on road use under the action alternatives and limits on OHVs would help meet these objectives.

Table 5-12
Acres of Travel Management Designations in GRSG Habitat in MZ III

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ III	Percent Within Sub-Region	MZ III	Percent Within Sub-Region
Open				
Alternative A	3,432,000	100%	3,571,000	100%
Alternative B	0	0%	3,571,000	100%
Alternative C	0	0%	0	0%
Alternative D	0	0%	0	0%
Alternative E	0	0%	0	0%
Alternative F	0	0%	0	0%
Proposed Plan	0	0%	0	0%
Limited				
Alternative A	2,094,000	16%	874,000	74%
Alternative B	5,526,000	68%	874,000	74%
Alternative C	9,744,000	82%	227,000	0%
Alternative D	5,598,000	69%	4,373,000	95%
Alternative E	5,526,000	68%	4,445,000	95%
Alternative F	5,526,000	68%	4,445,000	95%
Proposed Plan	5,527,000	68%	4,445,000	95%

**Table 5-12
Acres of Travel Management Designations in GRSG Habitat in MZ III**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ III	Percent Within Sub-Region	MZ III	Percent Within Sub-Region
		Closed		
Alternative A	42,000	86%	187,000	92%
Alternative B	42,000	86%	187,000	92%
Alternative C	214,000	97%	15,000	0%
Alternative D	209,000	97%	21,000	29%
Alternative E	42,000	86%	187,000	92%
Alternative F	42,000	86%	187,000	92%
Proposed Plan	42,000	86%	187,000	92%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within travel management designations of open, limited and closed in MZ III; it also displays the percentage of those acres that are found within the sub-region.

As shown in **Table 5-12**, there are slight variations among the action alternatives in acres closed and limited to motorized vehicles in both PHMA and GHMA; however, Alternatives C and D would close the most acres of PHMA, and Alternative C would designate the most acres of PHMA as limited. All action alternatives would close PHMA to cross-country motorized travel, and Alternatives D, E, F, and the Proposed Plan would similarly restrict acres of open GHMA. As a result of travel management planning, impacts on GRSG from recreational motorized vehicle use would be greatest under Alternative A; impacts would be reduced most under Alternatives C, D, and the Proposed Plan.

For recreation, Alternatives B and D and the Proposed Plan would aim to reduce impacts on GRSG with issuance of SRPs and RSUAs. Alternative F would take a similar approach, but with the addition of seasonal restrictions within 4 miles of active leks. Alternative E would require SETT consultation upon issuance of SRPs/RSUAs within GRSG habitat to avoid, minimize, and mitigate impacts on GRSG consistent with the Nevada state plan. These alternatives would have the greatest potential benefits to GRSG and its habitat by incorporating specific GRSG-related management. Alternatives A and C would not manage recreation to reduce impacts on GRSG, and may therefore have the greatest impact on GRSG and its habitat.

Reasonably foreseeable recreation in MZ III is expected to increase over the 20-year analysis period (**Section 5.1.16**). However, state and private GRSG conservation efforts as well as the Utah BLM and Forest Service Proposed Plan in MZ III would reduce the threat by providing additional protections such as disturbance caps and limitations on National Forest System lands. When

restrictions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ III.

5.1.7 Existing Conditions in WAFWA MZ IV

This section summarizes existing conditions and past and present actions for the Nevada and Northeastern California Sub-region (provided in more detail in **Chapter 3**) and for MZ IV as a whole. Reasonably foreseeable future actions are discussed in **Section 5.1.9**.

GRSG Habitat and Populations

MZ IV consists of nine GRSG populations: Baker, East-Central, Southwest Montana, Snake-Salmon-Beaverhead, Belt Mountains, Weiser, Northern Great Basin, Box Elder, and Sawtooth (Garton et al. 2011). The Nevada and Northeastern California Sub-region includes a portion of the Northern Great Basin population. This zone represents one of the largest areas of connected GRSG habitat, as demonstrated by Knick et al. (2011), and supports the largest population of GRSG outside of the Wyoming Basin (Garton et al. 2011). MZ IV includes GRSG populations in Oregon, Idaho, Nevada, Utah, and Montana.

In MZ IV, BLM-administered and other federal lands account for approximately 22,522,300 million acres of GRSG habitat (approximately 68 percent of habitat), with state and private lands accounting for over 10 million acres of GRSG habitat (approximately 31 percent of habitat) (Manier et al. 2013, p. 118). The BLM also has some management authority over split-estate lands, with BLM-administered federal mineral estate and privately held surface ownership. The higher percentage of GRSG habitat on BLM-administered and other federal land means BLM and Forest Service management could play a key role in alleviating threats to GRSG in MZ IV.

Table 5-13 provides a breakdown of land ownership and acres of GRSG habitat in MZ IV. As the table shows, approximately 52 percent of priority habitat and 19 percent of general habitat is on BLM-administered lands. Approximately 7 percent of priority habitat and 5 percent of general habitat is on National Forest System lands.

**Table 5-13
Management Jurisdiction in MZ IV by Acres of Priority and General Habitats**

	Total Surface Area (Acres)	Priority Habitat (Acres)	General Habitat (Acres)	Non-habitat (Acres)
MZ IV	78,259,200 (100%)	21,930,600 (28%)	10,958,500 (14%)	45,370,100 (58%)
BLM	26,220,300 (34%)	13,710,700 (63%)	4,928,200 (45%)	7,581,400 (17%)
Forest Service	22,291,600 (28%)	1,613,800 (7%)	1,113,500 (10%)	9,564,300 (21%)

**Table 5-13
Management Jurisdiction in MZ IV by Acres of Priority and General Habitats**

	Total Surface Area (Acres)	Priority Habitat (Acres)	General Habitat (Acres)	Non-habitat (Acres)
Tribal and other federal	2,431,000 (3%)	633,600 (3%)	522,500 (5%)	1,274,900 (3%)
Private	23,150,400 (30%)	4,890,200 (22%)	3,516,700 (32%)	14,743,500 (33%)
State	3,681,000 (5%)	1,019,400 (5%)	846,200 (8%)	1,815,400 (4%)
Other	484,800 (<1%)	62,900 (<1%)	31,400 (<1%)	390,500 (1%)

Source: Manier et al. 2013, p. 118

Population Trends in Management Zone IV

Historic disturbances to the sagebrush landscape, including conversion of habitat to agriculture, wildfire, invasive plants, and development, have resulted in a residual sagebrush landscape that is less intact and productive than those prior to European colonization. As a result, more known populations in the region are relatively small and/or separated from adjacent populations. Notable exceptions are the Snake-Salmon-Beaverhead and Northern Great Basin populations (Manier et al. 2013, p. 132). Garton et al. (2011) predicted a 10.5 percent chance this MZ will fall below 200 males by 2037, and a 39.7 percent chance it would fall below 200 males by 2107 (USFWS 2013a, p. 75).

The Snake-Salmon-Beaverhead and Northern Great Basin populations encompass the largest number of occupied leks in the sub-region. The Northern Great Basin population is especially important to long-term conservation of GRSG in MZ IV. This is because it comprises a substantial portion of the Great Basin core population (Connelly et al. 2004); located in the states of Idaho, Nevada, Utah, and Oregon, this is one of the two remaining major population strongholds in the range of the species. The Snake-Salmon-Beaverhead population provides additional and substantial population contributions within Idaho and known connectivity with the Southwest Montana population. Conversely, MZ IV also contains less resilient populations at higher risk of extirpation (USFWS 2013a). The Baker population is the smallest extant population in the state of Oregon and has little connectivity with other populations due to habitat and topography barriers.

In Montana, the GRSG population changes cyclically. For example, the GRSG population in Montana declined sharply from 1991 to 1996, before increasing through 2000 (Montana Sage-Grouse Working Group 2005). The population is thought to be down 33 percent from historic levels. Between 2004 and 2013, the average number of displaying males per lek in a given year in Montana ranged from 7 to 19 (Greater Sage-Grouse Habitat Conservation Advisory Council 2014).

5.1.8 Regional Efforts to Manage Threats to GRSG

Regional efforts include past, present, and reasonably foreseeable actions conducted by the BLM and by other federal and/or in cooperation with non-federal agencies, organizations, landowners, or other groups in MZ IV. These efforts may have a strong influence in alleviating threats to GRSG than BLM and Forest Service actions alone. This is because state and private lands account for approximately 10 million acres (approximately 31 percent) of GRSG habitat in MZ IV (Manier et al. 2013, p. 118). The boundaries of MZ IV encompass portions of the states of Idaho, Montana, Utah, Nevada, Oregon, and Wyoming. Regional efforts occurring in these states are also discussed below.

Other BLM and Forest Service Planning Efforts

The BLM and Forest Service have incorporated management of SFAs into their proposed management approach for GRSG, as described in **Section 5.1.4**. There are three SFAs comprising 7,886,000 acres in MZ IV as a whole. The North-Central Idaho SFA (2,629,400 acres) and the Southern Idaho/Northern Nevada SFA (4,198,900 acres) are entirely within MZ IV. The Southeast Oregon/North-Central Nevada SFA is mostly within MZ IV (1,057,700 acres) though a 683,200-acre portion is within MZ V.

Other BLM and Forest Service planning efforts are described in **Section 5.1.4**.

Idaho Statewide Efforts

Similar to efforts in nearby states, the governor of Idaho is expected to issue an executive order providing direction for GRSG conservation in Idaho on state lands. This executive order is expected to be largely consistent with BLM and Forest Service direction in the GRSG LUPs, though exact details are not known and are speculative as of the time this Final EIS was published.

Idaho Department of Lands prepared the Proposed Greater Sage-Grouse Conservation Plan (IDL 2015). Released in February 2015, and complementing Idaho Governor Otter's Proposed Plan (Alternative E of the Draft Idaho and Southwest Montana LUPA/EIS), the draft plan focuses on three primary threats to GRSG in Idaho: wildfire, infrastructure, and invasive species. The plan outlines enforceable stipulations in leases, permits, and easements on IDL lands. Conservation measures in the plan will be used as RDFs (consistent with applicable law) for activities supporting fire prevention, suppression, and rehabilitation, regulating oil and gas development, some mining activities, and abandoned mine reclamation. While the plan is composed of voluntary management guidelines, the guidelines may be used by state regulatory agencies for projects requiring agency review or approval.

The Idaho Sage-grouse Advisory Committee prepared their Conservation Plan for the Greater Sage-grouse in Idaho (Idaho Sage-grouse Advisory Committee 2006) to provide guidance, tools, and resources to GRSG Local Working Groups, and to facilitate and provide statewide consistency between Local

Working Group plans. The plan identifies 19 threats to GRSG and GRSG habitat and presents conservation measures to address each of those threats. Rural Fire Protection Districts have been established within the state to help suppress fires in GRSG habitat and to facilitate development of their local plans.

Montana Statewide Efforts

The Montana Department of Fish, Wildlife and Parks (MFWP) is tasked with implementing the range-wide WAFWA Sage-Grouse Strategy (Stiver et al. 2006) in Montana. The WAFWA Sage-Grouse Strategy monitors, researches, provides outreach, and funds conservation projects for GRSG. A basic premise of the WAFWA Sage-Grouse Strategy is that additional conservation capacity must be developed at all local, state, federal, and range-wide levels for both the short term (3 to 5 years) and for the long term (10 years or more) to ensure GRSG conservation.

In addition, the MFWP's Montana Management Plan and Conservation Strategy for Sage-Grouse was initiated in 2005 to protect, maintain, and restore GRSG habitat. The plan ranks threats to the species across the state and provides an overall strategy for public and private cooperation in conservation actions. In 2013, the governor established the Greater Sage-Grouse Habitat Conservation Advisory Council to provide recommendations on policies and actions for GRSG conservation and provide regulatory authority for conservation actions. The council provided these recommendations in January 2014. The governor subsequently issued an executive order on September 9, 2014 (State of Montana 2014), based on the council recommendations that provided the direction for future GRSG conservation in Montana.

Montana Executive Order. The Montana governor issued an executive order on September 9, 2014 (State of Montana 2014), based on the council recommendations that provided the direction for GRSG conservation in Montana. Stipulations for development in the executive order and Montana Management Plan and Conservation Strategy for Sage-Grouse include but are not limited to:

- A 0.6-mile NSO buffer around the perimeter of active leks for new activities
- Locating new overhead power lines and communication towers a minimum of 0.6 mile from the perimeter of active leks
- A minimum 2.0-mile buffer from active lek perimeters for main roads and a minimum 0.6-mile buffer for facility site access roads
- A 5 percent limit on anthropogenic surface disturbance within the Density and Disturbance Calculation Tool examination area (based upon suitable habitat)
- As authorized by permitting agency or agencies, activities (production, maintenance and emergency activity exempted), will

typically be prohibited from March 15 through July 15 outside of the NSO perimeter of an active lek and within 2 miles of that perimeter in Core Population Areas where breeding, nesting, and early brood-rearing habitat is present

Montana's plan will apply a disturbance cap in core habitat and will limit well density and apply timing limitations. The 0.6-mile buffer would protect males in the vicinity of leks during the breeding season; the density limits and disturbance cap would protect GRSG during nesting, brood-rearing, and winter concentration activities. The timing restrictions would reduce the potential for displacement or disruption during the breeding season.

Utah Statewide Efforts

Utah statewide efforts are described in **Section 5.1.4**, Regional Efforts to Manage Threats to GRSG in MZ III.

Oregon Statewide Efforts

The Oregon Department of Fish and Wildlife (ODFW). ODFW has developed a strategy to promote conservation of GRSG and intact, functioning GRSG habitats in Oregon. The *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat* (Oregon State Plan, Hagen 2011) describes the ODFW's proposed management of GRSG. It also provides guidance to public land management agencies and land managers for GRSG conservation. GRSG conservation guidelines in the State Plan are designed to maintain (at a minimum) or enhance the quality (the optimum) of current habitats. They will also assist resource managers in achieving the population and habitat objectives of the State Plan.

The Oregon State Plan provides biological recommendations for long-term conservation of GRSG in Oregon based on the best available science; however, implementing recommendations is the responsibility of the respective land manager. Thus, the intent of the Oregon State Plan is plan is to inform decision-makers regarding the biological consequences of various actions on GRSG, but not to dictate land management decisions. Similarly, GRSG conservation proposed in the plan is voluntary on private lands (Hagen 2011, p. viii).

The Oregon State Plan establishes "Core Areas" to help delineate landscape planning units by distinguishing areas of high biological value to GRSG. These areas are based on the locations of breeding areas and are intended to help balance GRSG habitat requirements with development, which would be subject to stipulations and regulations (Hagen 2011, p. 80). ODFW developed Core Areas necessary to conserve 90 percent of Oregon's GRSG population with emphasis on highest density and important use areas that provide for breeding, wintering, and connectivity corridors.

While the plan is composed of voluntary management guidelines, the guidelines may be used by state regulatory agencies, including the Energy Facility Siting

Council as conditions of approval on a case-by-case basis for certain energy projects. For example, the council has jurisdiction on wind energy projects greater than 105 MW (Dave Budeau, phone conversation with author, March 26, 2015).

Further, the Oregon Governor's natural resources department is currently in the process of developing regulations for GRSG conservation. The forthcoming Sage Grouse Conservation Action Plan will supplement the state plan and provide land use regulations and mitigations for Oregon core habitat areas (Dave Budeau, phone conversation with author, March 26, 2015).

Oregon Candidate Conservation Agreements (CCA) and Candidate Conservation Agreements with Assurances (CCAA). CCAs are voluntary agreements between the USFWS and one or more parties (including federal agencies) to address the conservation needs of species at risk of being listed under the ESA. CCAAs are similar, though these voluntary agreements are made between the USFWS and non-federal landowners. One CCA and several CCAAs are currently in place or will soon be implemented that will cover the entire GRSG range in the state of Oregon. Under these agreements and the associated Enhancement of Survival permit issued under the ESA, landowners would voluntarily undertake management activities on their properties to enhance, restore, or maintain habitat benefiting GRSG, in exchange for assurances that they would not be subject to increased land use restrictions should GRSG become listed under the ESA in the future. The agreements have a term of 30 years, and can be renewed upon expiration. Management activities would be guided by a Site Specific Plan (SSP), a unique management plan developed to address threats to GRSG on a particular allotment or property and that are approved by USFWS. As of April 2015, over 2.7 million acres of GRSG habitat in Oregon are either enrolled or pending enrollment under such agreements; the amount of GRSG habitat enrolled is expected to rise as the GRSG listing decision nears (Jeff Everett, Email to author, April 16, 2015).

GRSG Programmatic Candidate Conservation Agreement for Rangeland Management Practices on BLM Lands in Oregon. In cooperation with the BLM and USFWS, the Oregon Cattlemen's Association developed a Programmatic Candidate Conservation Agreement (Programmatic CCA) to reduce or eliminate negative impacts of rangeland management practices to GRSG and to maintain and support livestock grazing practices that are beneficial or neutral to GRSG on enrolled allotments administered by the BLM in Oregon. The Programmatic CCA covers approximately 10.2 million acres of GRSG habitat on BLM grazing allotments in southeast Oregon; however, not all these lands may eventually be enrolled in the programmatic CCA (USFWS 2013b). As of April 2015, BLM has received 65 written requests for development of an SSP and enrollment in the CCA. The written requests represent 121 allotments covering more than 1.9 million acres (Jeff Everett, Email to author, April 16, 2015).

Harney County Programmatic CCAA. After implementation of the Programmatic CCA described above, Oregon's Harney County Soil and Water Conservation District developed a programmatic CCAA for private lands in the county (USFWS 2013c). The covered area encompasses all GRSG habitat on non-federal lands in Harney County, Oregon and on some lands immediately adjacent to but outside of Harney County, including 346,965 acres of PPH and 825,395 acres of PGH. BLM-administered grazing allotments within Harney County are still eligible for inclusion under the Programmatic CCA. Because many grazers in Oregon use both private lands and BLM-administered allotments, the CCAA was structured after the Programmatic CCA in part to facilitate implementation of the agreements and encourage enrollment by such grazers (Jeff Everett, phone conversation with author, April 16, 2015). As of April 2015, 54 landowners have submitted letters of intent to enroll in the CCAA and have SSPs developed for their lands, which total approximately 320,000 acres of GRSG habitat (Jeff Everett, Email to author, April 16, 2015).

Oregon Multi-County Soil and Water Conservation District Programmatic CCAA. Following development of the Harney County Programmatic CCAA, USFWS and the Soil and Water Conservation Districts from Baker, Crook, Deschutes, Grant, Lake, Malheur, and southern Union Counties developed a programmatic CCAA for over 2.3 million acres of private rangelands within these counties, which represents the range of GRSG in Oregon. Again, BLM-administered grazing allotments within the counties are still eligible for inclusion under the Programmatic CCA, and again, the CCAA was structured after the Harney County CCAA in part to facilitate implementation of the agreements and encourage enrollment by grazers who use both private and BLM-administered allotments. As of April 2015, 55 landowners have submitted letters of intent to enroll in the CCAA and have SSPs developed for their lands, which total approximately 466,050 acres of GRSG habitat (Jeff Everett, Email to author, April 16, 2015).

The Oregon Department of State Lands (DSL) CCAA. DSL is working with the USFWS to develop a CCAA for State Common School Fund Rangelands in Oregon. These lands represent the final "gaps" in land ownership throughout GRSG range in Oregon not already covered by the CCA/CCAAs described above. The CCAA covers over 633,000 acres of DSL lands, including approximately 380,700 acres of low-density habitat and 153,100 acres of core area habitat (80 FR 9475). The required Environmental Assessment under NEPA is currently available for public comment and will be finalized in May 2015 (Jeff Everett, phone conversation with author, April 16, 2015).

Pacific Northwest Regional Infrastructure Team. In May 2013, Oregon Governor John Kitzhaber signed a Declaration of Cooperation with Secretary of the Interior Sally Jewell on the Pacific Northwest Regional Infrastructure Team. The Governor's offices of Washington and Idaho are also partners. This agreement recognized the need to, among other objectives, ensure

environmental and natural resource stewardship, including mitigating and protecting GRSG, while advancing infrastructure projects, further energy independence, and manage climate change risk.

Nevada/California Statewide Efforts

Nevada and California statewide efforts are described in **Section 5.1.4**, Regional Efforts to Manage Threats to GRSG in MZ V.

Wyoming Statewide Efforts

Though several statewide efforts to conserve GRSG exist in Wyoming, including the Wyoming Executive Order and the Wyoming Sage-Grouse Working Group, these efforts will not be discussed further in this CEA due to the very small amount of GRSG habitat in Wyoming that falls within MZ IV, and the correspondingly small or negligible effect Wyoming statewide efforts would play in GRSG conservation in MZs IV and V, respectively.

Natural Resources Conservation Service Sage Grouse Initiative

The Natural Resources Conservation Service's (NRCS) Sage Grouse Initiative (SGI) is described in **Section 5.1.4**, Regional Efforts to Manage Threats to GRSG in MZ III. SGI efforts in MZ IV are described here.

As of 2015, SGI has secured conservation easements on 98,167 acres within MZ IV (NRCS 2015). On these and additional private lands, SGI has completed other GRSG conservation actions within MZ IV, including implementation of grazing systems, conifer removal, vegetation seeding, and fence marking. These conservation actions are targeted at the critical threats in each MZ, consistent with those outlined in the COT report. SGI clusters implementation to achieve landscape benefits.

Other Regional Efforts

A programmatic EIS by the Western Area Power Administration (WAPA) and the USFWS for the entire upper Great Plains (including portions of MZ IV) will focus future wind energy developments in specific corridors outside of GRSG core habitat (Western Area Power Administration 2013). In accordance with Section 7 of the ESA, preparation of the programmatic EIS has involved consultation between cooperating entities and the USFWS and preparation of a programmatic Biological Assessment to ensure that the action will not jeopardize the continued existence of any federally listed species, including the federal candidate GRSG. At the time of this LUPA, specific conservation measures for protecting GRSG and its habitat under the programmatic EIS are not developed.

Tribes, counties, and local working groups are playing a critical role in promoting GRSG conservation at the local level. Individual conservation plans have been prepared by most local working groups to develop and implement strategies to improve or maintain GRSG habitat and reduce or mitigate threats

on the local level. The proposed conservation actions and recommendations in these plans are voluntary actions for private landowners.

The Elko County, Nevada GRS Management and Conservation Strategy Plan (County of Elko 2012) is described in **Section 5.1.4, Regional Efforts to Manage Threats to GRS in MZ III**, and would also apply to MZ IV.

Local working group projects have included monitoring, research, and mapping habitat areas, as well as public outreach efforts such as landowner education and collaboration with federal, state, and other local entities.

Some local working group conservation plans recommend restricting resource uses as well (USGS 2014). For example, the Big Desert Sage-Grouse Conservation Plan (Big Desert Sage-grouse Local Working Group 2010) limits recreational OHV use to existing designated roads and trails. Local working group GRS conservation plans in MZ IV include the following:

- North Magic Valley Conservation Plan (2011)
- West Central Conservation Plan (2010)
- East Idaho Uplands Conservation Plan (2011)
- Big Desert Conservation Plan (2010)
- Shoshone Basin Conservation Plan (2008)
- Jarbidge Conservation Plan (2007)
- Curlew Valley Conservation Plan (2004)
- Owyhee County Conservation Plan (2013)
- Upper Snake Conservation Plan (2009)
- Challis Conservation Plan (2010)
- Vale Conservation Plan (2005)
- Baker Conservation Plan (2005)
- Burns Conservation Plan (2005)
- Dillon Conservation Plan (2011)
- West Box Elder Conservation Plan (2006)
- Cache/East Box Elder (2006)
- North Central Nevada Conservation Plan (2004)
- Northeastern Nevada Conservation Plan (2004)

5.1.9 Relevant Cumulative Actions

This cumulative effects analysis considers the incremental impact of the Nevada and Northeastern California LUPA and alternatives in combination with other

past, present, and reasonably foreseeable future federal and non-federal actions on lands in MZ IV (see **Table 5-38**). Where these actions occur within GRSG habitat, they would cumulatively add to the impacts of BLM- and Forest Service-authorized activities set forth in the Nevada and Northeastern California LUPA. In addition to the conservation efforts described above, relevant reasonably foreseeable future cumulative actions occurring on federal, state, private, or mixed land ownership in MZ IV are described in the Proposed RMPAs/LUPAs for Idaho and Southwestern Montana, Oregon, Nevada and Northeastern California, and Utah, which are incorporated by reference.

The following list includes past, present, and reasonably foreseeable future actions in MZ IV that, when added to the Proposed Plan and alternatives for the Nevada and Northeastern California Sub-region, could cumulatively affect GRSG:

- Gateway West 230/500 Transmission Line Project, Wyoming and Idaho
- Boardman to Hemingway Transmission Line Project, Oregon and Idaho
- Fuels and vegetation treatments throughout the MZ
- Grazing permit renewals and allotment management plan updates throughout the MZ
- China Mountain Wind Project, Nevada and Idaho
- Small mining projects throughout the MZ

5.1.10 Threats to GRSG in Management Zone IV

In its COT report, the USFWS identifies fire, spread of weeds, conifer encroachment, infrastructure, grazing/free-roaming equids, conversion to agriculture, energy development, and recreation as the present and widespread threats facing GRSG in MZ IV (USFWS 2013a, pp. 22-24). Each threat is discussed below.

For those threats below that are analyzed quantitatively (infrastructure, livestock grazing, conversion to agriculture, energy development and mining, and recreation), acres presented in the analyses tables represent acres of land allocations from each of the Nevada and Northeastern California Sub-region LUPA/EIS alternatives in the Nevada and Northeastern California Sub-region portion of MZ IV, combined with acres of land allocations from the Proposed Plans of additional BLM and Forest Service sub-regions/planning areas in the non-Nevada and Northeastern California Sub-region portion of MZ IV.

Wildfire

Nature and Type of Effects. The impacts of wildfire on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ IV. Wildfire is a primary threat to GRSG habitats and populations across MZ IV, with 81 percent of priority habitat and general habitat being at high risk for wildfire, including the Snake-Salmon-Beaverhead and Northern Great Basin population areas (Manier et al. 2013, p. 133). Since 2000, more than 4.9 million acres (14 percent of priority habitat and 17 percent of general habitat) of GRSG habitat have burned in this MZ, with an average of more than 239,000 acres of priority habitat burned annually; more than 1 million acres burned in some years (Manier et al. 2013, p. 133). The Murphy Fire in Idaho and Nevada affected over 650,000 acres of habitat in this MZ in 2007 (USFWS 2013a, p. 78). In 2012, the Miller Homestead and Long Draw fires in southeastern Oregon burned 160,800 and 558,200 acres, respectively, mostly on BLM-administered lands with significant losses of GRSG habitat (BLM 2013i).

Impact Analysis. Management actions in the Nevada and Northeastern California Sub-region that emphasize wildfire suppression, pre-suppression, and fuels reduction in GRSG habitat would benefit the species by limiting habitat loss in the event of wildfire. As discussed in *Wildfire* in **Section 5.1.6**, the Proposed Plan would provide the greatest protections for GRSG populations and habitat of all alternatives from the threat of wildfire, and would be in accordance with the COT objective for this threat. As discussed above, BLM actions in the sub-region could be expected to measurably affect GRSG habitat in MZ IV due to the amount of GRSG habitat on BLM-administered lands in the sub-region relative to the wider MZ. Forest Service actions would likely have a smaller influence on the MZ scale.

Recognition of the importance of sagebrush habitat during interagency wildfire response would benefit GRSG in the event of wildfires. The State of Nevada and State of Utah GRSG conservation plans discussed in **Section 5.1.6** would benefit GRSG habitat in the MZ. The Montana executive order emphasizes fire suppression in core population areas, while recognizing other suppression priorities may take precedence. These programs would benefit GRSG during wildfire planning and response throughout MZ IV, particularly on lands not administered by the BLM or Forest Service.

On the local level, the Owyhee County Sage-Grouse Conservation Plan (2013) recommends reseeding burned areas with sagebrush and implementing sagebrush restoration projects in historical GRSG habitat where historical fires have removed sagebrush cover. However, the conservation plan does not identify a funding source for this action.

The Interagency Standards for Fire and Fire Aviation Operations “Red Book” includes BMPs for GRSG habitat conservation for wildlife and fuels management (BLM 2013n). This document is a supplemental policy or guidance for the BLM, the Forest Service, and the USFWS. These BMPs could benefit GRSG and its habitat during interagency wildland fire operations by using spatial habitat data

and predictive services to prioritize and preposition firefighting resources in critical habitat areas. However, since several years have elapsed since GRSG BMPs were incorporated, benefits would likely now be apparent, and it is unclear if this is currently the case. In January 2015, Secretarial Order 3336 “Rangeland Fire Prevention, Management and Restoration” was signed by the Secretary of the Interior. The order sets forth enhanced policies and strategies for preventing and suppressing rangeland wildfire and for restoring sagebrush landscapes impacted by wildfire across the West for the DOI. The order will improve coordination with local, state, tribal, and regional efforts to address rangeland wildfire at a landscape level.

Coordination with rural fire districts to manage wildfires in GRSG habitat will further reduce this threat across land ownership types and improve the quality and quantity of habitat.

Reasonably foreseeable wildland fire management efforts are projected to increase (**Section 5.1.16**), especially through increased coordination of federal, state, and local fire prevention actions and the implementation of other BLM and Forest Service RMPAs/LUPAs in MZ IV. When the impacts of the Nevada and Northeastern California Sub-region LUPA are added to these actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV.

However, in those years where wildfires that threaten wildland-urban interface are widespread, firefighting resources would be shifted to those areas and away from GRSG habitat. Years with extensive involvement of wildland-urban interface in wildfires may not see the expected benefits of policies and direction intended to increase wildfire response in GRSG habitat.

Spread of Invasive Plants

Nature and Type of Effects. The impacts of invasive plants on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ IV. Via seeds carried by wind, humans, machinery, and animals, invasive plants have invaded and will continue to invade many locations in MZ IV, including the sub-region. Some species, including cheatgrass, have become so ubiquitous throughout the sub-region that it is considered economically infeasible to attempt to eradicate them. Modeling has suggested that more than 18 million acres of GRSG habitat in MZ IV are considered to be at a moderate to high risk for cheatgrass occurrence (Manier et al. 2013, p.90).

The BLM and Forest Service currently manage invasive plant infestations through integrated weed management: biological, chemical, mechanical, manual, and educational methods. The BLM is guided by the 1991 and 2007 RODs for Vegetation Treatment on BLM Lands in Thirteen Western States (BLM 1991a) and by the 2007 Programmatic Environmental Report (BLM 2007a). The BLM

also participates in the National Early Warning and Rapid Response System for Invasive Species. The goal of this system is to minimize the establishment and spread of new invasive species through a coordinated framework of public and private processes (FICMNEW 2003). Invasive plants are managed in cooperation with county governments and represent a landscape-level approach across management jurisdictions.

Impact Analysis. Increased surface disturbance, motorized transportation, and animal and human activity, would increase the chance for the establishment and spread of invasive plants. As discussed in *Spread of Invasive Plants* in **Section 5.1.6**, the Proposed Plan would provide the greatest protections for GRSG populations and habitat of all alternatives from the threat of invasive plants, and would be in accordance with the COT objective for this threat. Other alternatives would also reduce the threat of invasive plant species relative to the No Action Alternative. As discussed above, BLM actions in the sub-region could be expected to measurably affect GRSG habitat in MZ IV due to the amount of GRSG habitat on BLM-administered lands in the sub-region relative to the wider MZ. Forest Service actions would likely have a smaller influence on the MZ scale.

Relevant cumulative actions that result in surface-disturbing activities would increase the potential for the spread of invasive plants on both federal and non-federal lands. Projects subject to the general stipulations outlined in the Montana executive order are required to control invasive plant species and to use native seed mixes during reclamation processes. Similarly, Utah's state plan directs land managers to aggressively respond to new infestations of invasive plants, and prioritize containment of infestations within sagebrush habitats. The Nevada state plan includes stipulations for including control of invasive plant species and use of native seed mixes during reclamation. The Nevada and Utah state plans also address invasive species in fire management. These stipulations would benefit GRSG habitat by limiting the spread or establishment of invasive species, particularly on lands that lack BLM and Forest Service protective regulatory mechanisms. Further, the *Greater Sage-Grouse Habitat Conservation Strategy for NRCS in Idaho* has identified GRSG conservation measures related to invasive plants, such as reducing the risk and rate of fire spread, restoration and rehabilitation, and invasive species control. A number of projects are ongoing or in the planning phase to treat invasive species in MZ IV (see **Table 5-38**).

Reasonably foreseeable invasive plant management efforts are projected to increase (**Section 5.1.16**), including other state and county noxious weed regulations and the implementation of other BLM and Forest Service RMPAs/LUPAs in MZ IV. When the impacts of the Nevada and Northeastern California LUPA are added to these actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV. The Proposed Plan may result in the greatest net conservation gain due to its 3 percent

anthropogenic disturbance cap that should reduce potential for the spread of weeds during the 20-year analysis period.

Conifer Encroachment

Nature and Type of Effects. The impacts of conifer encroachment on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ IV. Approximately 2.6 million acres of GRSG habitat within MZ IV is at high risk for conifer encroachment. Of this total, approximately 55 percent of priority habitat at high risk for conifer encroachment (and 34 percent of general habitat) occur on BLM-administered lands within MZ IV (Manier et al. 2013, p. 93). In comparison, 25 percent of priority habitat at risk for conifer encroachment (and 32 percent of general habitat) occur on private lands, and 15 percent of priority habitat at high risk occurs on National Forest System lands (25 percent on general habitat). Therefore, BLM actions are likely to have a greater potential to ameliorate the effects of conifer encroachment on GRSG habitat, particularly in priority habitat, than any other single land management entity.

Impact Analysis. The COT objective is to remove pinyon and/or juniper from areas of sagebrush that are most likely to support GRSG (post-removal) at a rate that is at least equal to the rate of pinyon and/or juniper incursion (USFWS 2013a, p. 47). As discussed in *Conifer Encroachment* in **Section 5.1.6**, the Proposed Plan would provide the greatest protections for GRSG populations and habitat of all alternatives from the threat of conifer encroachment. As discussed above, BLM actions in the sub-region could be expected to measurably affect GRSG habitat in MZ IV due to the amount of GRSG habitat on BLM-administered lands in the sub-region relative to the wider MZ. Forest Service actions would likely have a smaller influence on the MZ scale.

Relevant cumulative actions on federal, private, and state lands within the MZ include several large conifer removal projects (see **Table 5-38**). Further, the NRCS includes conservation measures to remove encroaching conifers near leks and other seasonal habitats while minimizing disturbance to GRSG (NRCS 2012, p. 13). SGI has helped reduce the threat of early succession conifer encroachment through mechanical removal on 206,099 acres of private lands within MZ IV. The majority of these efforts were located inside PACs (NRCS 2015), helping to preserve historic fire return intervals and important GRSG habitat. Utah's state plan directs land management agencies to remove encroaching conifers and conduct restoration of sagebrush habitats to expand GRSG habitat where possible.

Reasonably foreseeable conifer encroachment management efforts are projected to increase (**Section 5.1.16**), including efforts on private land and implementation of other BLM and Forest Service RMPAs/LUPAs in MZ IV. When the impacts of the Nevada and Northeastern California LUPA are added

to these actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV. The Proposed Plan would have the greatest reduction in the threat from conifer encroachment and provide a net conservation gain to GRSG. Alternatives D and E would also reduce the threat, though to a lesser degree than the Proposed Plan because they do not specify acres for treatment or habitat objectives.

Infrastructure

Rights-of-Way

Nature and Type of Effects. The impacts of ROWs on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ IV. Infrastructure, including ROWs and associated facilities and urbanization, is widespread throughout MZ IV and has affected GRSG habitat in many locations. Development of roads, fences, and utility corridors has also contributed to habitat loss and fragmentation in portions of MZ IV. The best available estimates suggest about 25 percent of the MZ IV is within approximately 4 miles of urban development (Knick et al. 2011, p. 214). Impacts of infrastructure development in MZ IV are primarily related to highways, roads, power lines, and communication towers, with 90 percent of MZ IV within 4 miles of a road, 30 percent within 4 miles of a power line, and 5 percent within 4 miles of a communication tower (Knick et al. 2011, pp. 215-216).

Although not representative of all infrastructure ROWs, transmission lines greater than 115 kilovolts indirectly influence 37 percent of priority habitat and 38 percent of general habitat across MZ IV. Indirect effects are assumed to occur to a radius of 4 miles (Manier et al. 2013, p. 41). Approximately 62 percent of transmission lines in priority habitat and 43 percent in general habitat are on BLM-administered lands across GRSG habitats in MZ IV (Manier et al. 2013, p. 41). In contrast, National Forest System lands contain 5 percent of transmission lines in priority habitat and 7 percent in general habitat. Therefore, BLM actions are likely to have a greater potential to affect transmission line ROWs in GRSG habitat than any other land management entity. Designating ROW exclusion and avoidance areas in PHMA and GHMA on BLM-administered and National Forest System lands could reduce the threat on these lands. However, in areas with scattered federal landownership, infrastructure may be routed around federal lands, often increasing its length and potential impact. ROW avoidance and exclusion areas on BLM-administered and National Forest System lands could increase this tendency.

Impact Analysis. As shown in **Table 5-14**, the largest impacts on GRSG would result from Alternatives B, C, and F, which would designate PHMA as ROW exclusion. Alternative F would also manage GHMA as ROW exclusion.

**Table 5-14
Acres of Rights-of-Way Designations in GRSG Habitat in MZ IV**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ IV	Percent Within Sub-Region	MZ IV	Percent Within Sub-Region
Open to Rights-of-Way				
Alternative A	3,340,000	98%	2,958,000	44%
Alternative B	68,000	0%	1,653,000	0%
Alternative C	68,000	0%	1,653,000	0%
Alternative D	68,000	0%	1,653,000	0%
Alternative E	68,000	0%	1,653,000	0%
Alternative F	68,000	0%	1,653,000	0%
Proposed Plan	98,000	31%	1,671,000	1%
Right-of-Way Exclusion				
Alternative A	720,000	22%	533,000	10%
Alternative B	3,991,000	86%	533,000	10%
Alternative C	5,349,000	89%	481,000	0%
Alternative D	764,000	26%	489,000	2%
Alternative E	720,000	22%	533,000	20%
Alternative F	3,991,000	86%	1,838,000	74%
Proposed Plan	787,000	28%	493,000	2%
Right-of-Way Avoidance				
Alternative A	7,219,000	0%	5,726,000	0%
Alternative B	7,219,000	0%	7,031,000	19%
Alternative C	7,219,000	0%	5,726,000	0%
Alternative D	10,481,000	31%	7,039,000	19%
Alternative E	10,490,000	31%	7,031,000	19%
Alternative F	7,219,000	0%	5,726,000	0%
Proposed Plan	11,092,000	35%	6,642,000	14%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within rights-of-way designations in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

Alternatives D and the Proposed Plan would designate PHMA as ROW avoidance, and though Alternative E would not designate PHMA, measures in the Nevada state plan for ROW permitting would be similar to ROW avoidance in PHMA.

The acres in **Table 5-15** depict existing utility corridors in GRSG habitat in MZ IV. As shown in **Table 5-15**, the largest impact from management in the Nevada and Northeastern California Sub-region would be from Alternatives A, B, D, E, and F. Under Alternative C, the contribution of acres of existing utility corridors in PHMA in MZ IV would be reduced relative to Alternative A, but not as much as under the Proposed Plan.

**Table 5-15
Acres of Existing Utility Corridors in GRSG Habitat in MZ IV**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ IV	Percent Within Sub-Region	MZ IV	Percent Within Sub-Region
Alternative A	365,000	84%	195,000	56%
Alternative B	365,000	84%	195,000	56%
Alternative C	150,000	61%	0	0%
Alternative D	364,000	84%	196,000	56%
Alternative E	365,000	84%	195,000	56%
Alternative F	365,000	84%	195,000	56%
Proposed Plan	118,000	52%	123,000	31%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within existing utility corridors in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

New ROW authorizations that require state agency review or approval would be subject to the permitting process and stipulations for development in GRSG Core areas under both the Montana executive order and the Nevada and Utah state conservation plans for GRSG. These stipulations would benefit the GRSG in Core Habitat (Montana) and the SGMA (Nevada and Utah) in MZ IV by ensuring that projects avoid, minimize, and mitigate impacts on GRSG habitat from ROWs developments.

Presidential Priority transmission projects that are proposed in MZ IV (i.e., Boardman to Hemingway and Gateway West) would not be subject to GRSG conservation requirements in BLM and Forest Service GRSG LUPAs/RMPAs but would be subject to requirements in applicable state plans as well as other state and federal laws and regulations. They would also develop their own suite of protective measures analyzed in project-specific NEPA documents. These projects will be in compliance with BLM Instruction Memorandum 2012-043, Greater Sage-Grouse Interim Management Policies and Procedures, which

requires that GRSG habitat is maintained or enhanced through avoidance, minimization, and application of compensatory mitigation. Whether or not these project-specific measures would adequately protect GRSG is unknown at this point in time because the measures have not been finalized.

Because they would manage the most GRSG habitat as exclusion, Alternatives C and F would provide the greatest conservation gain to GRSG and its habitat in the Nevada and Northeastern California Sub-region and be most likely to meet the COT report objective, which is to avoid development of infrastructure in GRSG priority areas for conservation.

The effect of the alternatives and other conservation actions in the MZ (most notably the Nevada state plan and the Montana and Utah executive orders) could be synergistic. By implementing restrictions on infrastructure in PHMA and on state and private lands together, the cumulative beneficial effect on GRSG would be greater than the sum of their individual effects because protections would be applied more consistently across the landscape. This is especially important in areas of mixed land ownership patterns where complementary protections can benefit leks, early brood-rearing habitat, or other seasonal habitats that do not follow geopolitical boundaries.

Reasonably foreseeable ROW development in MZ IV is expected to increase over the 20-year analysis period (**Section 5.1.16**), though state and private GRSG conservation efforts as well as other BLM and Forest Service Proposed Plans in MZ IV would reduce the threat by restricting the type and location of developments. When restrictions in the Nevada and Northeastern California LUPA are added to these conservation actions, the impacts of future ROW developments would be further reduced. Alternatives C and F would provide the greatest net conservation gain to GRSG habitats and populations in MZ IV by providing the greatest amount of ROW exclusion in GRSG habitat. The Proposed Plan would also reduce the threat to a lesser degree by providing the flexibility to site ROWs with the least impact on GRSG habitat.

Renewable Energy: Wind and Solar

Nature and Type of Effects. The impacts of renewable energy on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ IV. Wind energy development is an increasing threat to some populations in MZ IV. Over the last six years, the BLM has authorized and then relinquished one ROW for wind development and has two pending applications. Wind testing sites have been authorized on BLM-administered lands in the Idaho and Southwestern Montana Sub-region, though no commercial scale wind developments have been authorized and constructed (see **Chapter 5** of the Idaho and Southwestern Montana Sub-region LUPA/EIS).

Although not representative of all renewable energy development, wind turbines indirectly influence less than 1 percent of priority habitat and general

habitat combined across MZ IV. Private lands account for 82 percent of wind turbines affecting GRSG in priority habitat (and 62 percent in general habitat) within MZ IV. Therefore, conservation actions on private land are likely to have a greater potential to ameliorate the effects of wind energy development on GRSG habitat than any other single land management entity.

Solar energy potential is low in MZ IV, and the BLM has not received any applications for utility-scale solar production in the sub-region, nor are there solar resources comparable to the areas where utility-scale solar production projects are being proposed or built.

Impact Analysis. **Table 5-16** shows acres of wind energy management designations in GRSG habitat in MZ IV. As shown in the table, the Nevada and Northeastern California LUPA Alternatives C, D and F and the Proposed Plan would have the greatest contribution to acres of wind ROW exclusion in PHMA in MZ IV and would be the most protective of GRSG and its habitat in MZ IV. The No Action Alternative would leave the most GRSG habitat open to wind ROWs and would be least protective of GRSG and its habitat. Though Alternative E would not designate PHMA or GHMA, Core and Priority Habitats designated under this alternative would be equivalent to PHMA and GHMA, respectively, and additional stipulations and the Nevada state plan’s avoid, minimize, mitigate strategy would apply to wind ROW developments and would provide additional protections over Alternative A. Under the Proposed Plan, PHMA would be managed as exclusion for commercial wind facilities. GHMA would be ROW avoidance for wind facilities. Wind developments would also be subject to the anthropogenic disturbance criteria, a 3 percent disturbance cap, RDFs (consistent with applicable law), buffers, and a mitigation requirement.

Table 5-16
Acres of Wind Energy Management Designations in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ IV	Percent Within Sub-Region	MZ IV	Percent Within Sub-Region
	Open to Wind Rights-of-Way			
Alternative A	3,272,000	100%	2,805,000	47%
Alternative B	0	0%	1,500,000	0%
Alternative C	0	0%	1,500,000	0%
Alternative D	0	0%	1,500,000	0%
Alternative E	0	0%	1,500,000	0%
Alternative F	0	0%	1,500,000	0%
Proposed Plan	0	0%	1,500,000	0%

**Table 5-16
Acres of Wind Energy Management Designations in GRSG Habitat in MZ IV**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ IV	Percent Within Sub-Region	MZ IV	Percent Within Sub-Region
Wind Right-of-Way Exclusion				
Alternative A	6,619,000	2%	1,301,000	4%
Alternative B	9,890,000	35%	1,301,000	4%
Alternative C	11,248,000	43%	1,249,000	0%
Alternative D	9,926,000	35%	2,570,000	51%
Alternative E	6,619,000	2%	1,301,000	4%
Alternative F	9,890,000	35%	2,606,000	52%
Proposed Plan	10,587,000	39%	1,261,000	1%
Wind Right-of-Way Avoidance				
Alternative A	1,390,000	0%	5,112,000	0%
Alternative B	1,390,000	0%	6,145,000	17%
Alternative C	1,390,000	0%	5,112,000	0%
Alternative D	1,390,000	0%	5,112,000	0%
Alternative E	3,031,000	54%	6,145,000	17%
Alternative F	1,390,000	0%	5,112,000	0%
Proposed Plan	1,390,000	0%	6,046,000	15%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within wind energy management designations in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

Across MZ IV, most other sub-region LUPA Proposed Plans maintain exclusion areas in PHMA for wind energy, with the exception of Oregon, which allows for avoidance in PHMA in Lake, Harney, and Malheur Counties. The Proposed Plan in Idaho would allow wind energy development in GHMA, subject to a screening process, whereas Montana would manage GHMA as avoidance for wind. In the Nevada and Northeastern California Sub-region, wind and solar ROWs would be excluded in PHMA. GHMA would also be exclusion for wind ROW, while GHMA would be avoidance for solar ROWs.

Projects that require state agency review or approval would be subject to the Montana executive order permitting process. This would encourage wind energy development outside of core habitat areas. Similarly, in Nevada, wind energy developments would be located outside of core, priority, and general habitats, or would minimize and/or mitigate for impacts if avoidance is not

feasible. The Utah Executive Order directs state agencies to minimize disturbance within GRSG management areas and maintain consistency with conservation measures in the Utah state plan. In Oregon and Idaho, wind energy projects could voluntarily site development outside of GRSG habitat, but currently no regulatory mechanisms are in place to reduce impacts on GRSG habitat from projects requiring state agency review or approval.

The effect of the Proposed Plan and other conservation actions in the MZ (most notably the Nevada state plan and the Montana and Utah executive orders) could be synergistic. By implementing restrictions on infrastructure in PHMA and on state and private lands together, the cumulative beneficial effect on GRSG would be greater than the sum of their individual effects because protections would be applied more consistently across the landscape. This is especially important in areas of mixed land ownership patterns where complementary protections can benefit leks, early brood-rearing habitat, or other seasonal habitats that do not follow geopolitical boundaries.

Reasonably foreseeable energy development in MZ IV is expected to increase over the 20-year analysis period (**Section 5.1.16**), though state and private GRSG conservation efforts as well as wind energy restrictions in other BLM and Forest Service Proposed Plans in MZ IV would reduce the threat by restricting the type and location of developments. When restrictions in the Nevada and Northeastern California LUPA are added to these conservation actions, the impacts of future energy developments would be further reduced. Alternatives C, D, and F would provide the greatest net conservation gain to GRSG habitats and populations in MZ IV by providing the greatest amount of wind exclusion in GRSG habitat. The Proposed Plan would also reduce the threat to a lesser degree by providing the flexibility to site energy developments with the least impact on GRSG habitat.

Livestock Grazing and Free Roaming Equids

Nature and Type of Effects. The impacts of livestock grazing and free-roaming equids on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ IV. Livestock grazing is prevalent across MZ IV. Rangeland health assessments have found that over 19 percent of BLM-administered grazing allotments in GRSG habitat in MZs IV are not meeting wildlife standards with grazing as a causal factor (Manier et al. 2013, p. 97).

Nearly 2 million acres of GRSG habitat within MZ IV is federally managed wild horse and burro range (Manier et al. 2013, p. 102); 5.7 percent of priority habitat in MZ IV is negatively influenced by free-roaming equids (Manier et al. 2013, p. 102).

Impact Analysis. **Table 5-17** shows acres available and unavailable to livestock grazing in GRSG habitat in MZ IV. As shown in the table, with the exception of Alternative C, the Nevada and Northeastern California LUPA action alternatives would have a similar contribution to acres available to livestock grazing. Alternative C would exclude livestock grazing from PHMA. The Proposed Plan would reduce slightly the acres available to grazing in MZ IV.

Table 5-17
Acres Available and Unavailable to Livestock Grazing in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ IV	Percent Within Sub-Region	MZ IV	Percent Within Sub-Region
Available to Livestock Grazing				
Alternative A	11,057,000	31%	9,053,000	14%
Alternative B	11,057,000	31%	9,053,000	14%
Alternative C	7,636,000	0%	7,757,000	0%
Alternative D	11,076,000	31%	9,034,000	14%
Alternative E	11,057,000	31%	9,053,000	14%
Alternative F	11,057,000	31%	9,053,000	14%
Proposed Plan	11,687,000	35%	8,679,000	11%
Unavailable to Livestock Grazing				
Alternative A	211,000	6%	149,000	16%
Alternative B	211,000	6%	149,000	16%
Alternative C	4,953,000	96%	124,000	0%
Alternative D	227,000	12%	133,000	6%
Alternative E	211,000	6%	149,000	16%
Alternative F	211,000	6%	149,000	16%
Proposed Plan	262,000	24%	124,000	0%

Source: BLM 2015

This table displays the acres of PHMA and GHMA available and unavailable to livestock grazing in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

As discussed in *Livestock Grazing and Free Roaming Equids* in **Section 5.1.6**, the alternative which most reduces acres available for grazing would not necessarily have the greatest benefit on GRSG populations and habitat. Given these considerations, and because the Proposed Plan contains additional measures that would improve GRSG habitat as discussed in **Section 5.1.6**, the Proposed Plan would provide the greatest benefit to GRSG of all the alternatives.

Relevant cumulative actions that improve grazing management with respect to GRSG within MZ IV include rangeland health improvements through the NRCS

SGL. These improvements are described in *Livestock Grazing and Free Roaming Equids* in **Section 5.1.6**. Within MZ IV, SGL has implemented 314,930 acres of prescribed grazing systems. This program is likely the largest and most impactful program on private lands within MZ IV. Because of its focus on priority areas for conservation, which often overlap PHMA, the SGL's past, present, and reasonably foreseeable work has had and likely will continue to have a cumulative beneficial impact on GRSG when considered alongside protective BLM and Forest Service management actions in PHMA.

Reasonably foreseeable livestock grazing management efforts in MZ IV are expected to increase over the analysis period (**Section 5.1.16**), through increased NRCS conservation actions under the Sage-Grouse Initiative (e.g., fence marking and conservation easements), state efforts to maintain rangeland, and the implementation of other BLM and Forest Service LUPAs in MZ IV. When grazing management within the Nevada and Northeastern California LUPA is added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV.

Under all alternatives the BLM has the authority to adjust wild horse and burros AMLs if resource damage occurs; however, only Alternatives B through F and the Proposed Plan provide management guidelines specific to GRSG habitat, which would benefit the species more than Alternative A. Under most action alternatives, management actions and range improvements for wild horses and burros would follow management action for livestock range improvements and be aligned with GRSG habitat objectives, as described in **Section 5.1.6**.

Reasonably foreseeable wild horse management efforts are projected to increase over the analysis period (**Section 5.1.16**) with implementation of other BLM and Forest Service LUPAs in MZ IV. When wild horse management within the Nevada and Northeastern California LUPA is added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV. Impacts may be reduced to the greatest extent under the Proposed Plan, where AMLs would be evaluated with consideration of GRSG habitat objectives for BLM-administered lands.

Conversion to Agriculture

Nature and Type of Effects. The impacts of agricultural conversion on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ IV. Regional assessments estimate that while only 1 percent of priority habitat and general habitat in MZ IV are directly influenced by agricultural development, over 85 percent of GRSG habitat is within approximately 4 miles of agricultural land and indirectly influenced by it (Manier et al. 2013, p. 27).

Impact Analysis. The BLM and Forest Service do not convert public lands to agriculture. As such, the only direct authority these agencies have over

conversion to agriculture is by retaining or disposing of lands in the realty program. Lands retained under BLM and Forest Service management will not be converted to agriculture, and disposing of lands could increase the likelihood they will be converted to agriculture, depending on their location and new management authority.

Table 5-18 shows acres identified for retention and disposal in GRSG habitat in MZ IV. As shown in the table, the Nevada and Northeastern California LUPA action alternatives acres of PHMA identified for retention would not vary substantially across alternatives and would have a similar contribution to acres identified for retention across MZ IV. Alternative C would retain approximately twice the PHMA as the other alternatives in the sub-region, which would translate to additional retained acres of PHMA across MZ IV. Since Alternatives B, C, D, and F would retain all PHMA in public ownership, acres of PHMA identified for disposal under these alternatives would be zero. Under the Proposed Plan, PHMA would be retained unless there is a net conservation gain to GRSG by disposal of PHMA.

**Table 5-18
Acres Identified for Retention and Disposal in GRSG Habitat in MZ IV**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ IV	Percent Within Sub-Region	MZ IV	Percent Within Sub-Region
Acres Identified for Retention				
Alternative A	11,129,000	29%	9,034,000	13%
Alternative B	11,279,000	30%	9,034,000	13%
Alternative C	12,637,000	38%	7,859,000	0%
Alternative D	11,315,000	31%	9,181,000	14%
Alternative E	11,129,000	29%	9,034,000	13%
Alternative F	11,279,000	30%	9,034,000	13%
Proposed Plan	11,973,000	34%	8,627,000	9%
Acres Identified for Disposal				
Alternative A	151,000	100%	362,000	51%
Alternative B	4,000	0%	359,000	51%
Alternative C	4,000	0%	178,000	0%
Alternative D	4,000	0%	178,000	0%
Alternative E	151,000	100%	359,000	51%
Alternative F	4,000	0%	359,000	51%
Proposed Plan	4,000	0%	178,000	0%

Source: BLM 2015

This table displays the acres of PHMA and GHMA identified for retention and disposal in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

Cumulative impacts vary relatively little across alternatives because BLM and Forest Service management have little impact on alleviating this threat. Restrictions on grazing on federal land could increase agriculture pressure on adjacent private lands. If the loss of federal grazing rights makes ranching economically unviable, the potential conversion of private grazing lands to agriculture could increase. However, the Proposed Plan does not substantially increase acreage unavailable to grazing.

The COT report objectives for converting land to agriculture are to avoid further loss of sagebrush habitat for agricultural activities (both plant and animal production) and to prioritize restoration. In areas where taking agricultural lands out of production has benefited GRSG, the programs supporting these actions should be targeted and continued (USFWS 2013a, p. 48). In accordance with this objective, the NRCS's SGI program focuses on maintaining rangeland that provides habitat for GRSG, as described under *Conversion to Agriculture* in **Section 5.1.6**. As of 2014, SGI has secured conservation easements on 98,167 acres within MZ IV and marked or removed 95 miles of fence (NRCS 2015).

As discussed in **Section 5.1.6**, the Proposed Plan would provide the greatest protections for GRSG populations and habitat of all alternatives from the threat of agricultural conversion. Over the analysis period, conversion to agriculture is expected to increase (**Section 5.1.16**), though state and private conservation efforts as well as other BLM and Forest Service Proposed Plans in MZ IV would reduce the threat. When land tenure decisions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in net conservation gain to GRSG habitats and populations in MZ IV.

Energy Development and Mining

The COT report states that energy development should be designed to ensure that it will not impinge on stable or increasing GRSG population trends. For mining, the COT report objective is to maintain stable to increasing GRSG populations and no net loss of GRSG habitats in areas affected by mining (USFWS 2013a, p. 49).

There are approximately 1,137,700 acres of GRSG habitat in MZ IV where energy and mineral development (including geothermal, mineral materials, locatable and nonenergy leasable minerals) is presently occurring. There are 6,553,300 acres indirectly influenced by energy development (including oil and gas, and mineral materials; indirect effects were not quantified for geothermal and nonenergy leasable mineral developments) (Manier et al. 2013, pp. 52-71). No coal or oil and gas development is presently occurring in MZ IV. Wind energy development is discussed in *Renewable Energy*, above.

Oil and Gas

Nature and Type of Effects. The impacts of oil and gas development on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ IV. Currently, oil and gas development within MZ IV is limited to the extent that the area of direct impact on priority habitat and general habitat is smaller than the minimum reporting size of Manier et al. (2013, p. 52). However, because indirect influence was estimated to extend nearly 12 miles from oil and gas development, approximately 222,100 acres of priority habitat and 32,700 acres of general habitat are influenced by oil and gas development in MZ IV (Manier et al. 2013, p. 52). The area of indirect influence is split evenly between BLM-administered and private lands. Additionally, approximately 346,000 acres (1 percent) of GRSG habitat in MZ IV are leased but currently undeveloped (Manier et al. 2013, p. 55), representing additional potential impacts on GRSG and its habitat.

Although oil and gas activities have a disproportionately greater effect on private lands due to lack of BLM or Forest Service regulatory oversight, regulatory mechanisms on both federal surface and split-estate lands in MZ IV would be influential should fluid mineral development occur. Development on split-estate lands with BLM-administered federal mineral estate and other surface ownership would require mitigation for impacts on GRSG habitat on private surface lands that would not be required on lands with both privately held surface and mineral estates.

According to the RFD scenario (**Appendix P**), permanent disturbance associated with oil and gas development is projected to occur on 1,246 acres within the sub-region over the next 20 years (though only 128 acres of permanent disturbance will remain after reclamation is applied to temporarily disturbed areas), representing less than 1 percent of GRSG habitat within either the sub-region or MZ IV. The potential for impacts would be reduced where areas are closed to fluid mineral leasing and where NSO and CSU/TL stipulations are applied. Given the small acreage and implementation of RDFs consistent with applicable law (**Appendix D**), the likelihood for impacts on GRSG habitat on BLM-administered and National Forest System lands is anticipated to be small and localized under all alternatives.

Impact Analysis. **Tables 5-19** and **5-20** provide a quantitative summary of fluid mineral leasing conditions on BLM-administered and National Forest System lands across MZ IV.

As shown in **Tables 5-19** and **5-20**, fluid mineral closures and stipulations within the Nevada and Northeastern California Sub-region alternatives would contribute some level of influence within the wider MZ IV. For example, Alternatives C and F would contribute most of the acres closed to fluid mineral

Table 5-19
Acres Open and Closed to Fluid Mineral Leasing in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ IV	Percent Within Sub-Region	MZ IV	Percent Within Sub-Region
Open* to Fluid Mineral Leasing				
Alternative A	3,272,000	100%	1,306,000	100%
Alternative B	0	0%	1,306,000	100%
Alternative C	0	0%	0	0%
Alternative D	0	0%	0	0%
Alternative E	0	0%	0	0%
Alternative F	0	0%	0	0%
Proposed Plan	0	0%	0	0%
Closed to Fluid Mineral Leasing				
Alternative A	1,439,000	11%	1,347,000	4%
Alternative B	4,710,000	73%	1,347,000	4%
Alternative C	6,067,000	79%	1,295,000	0%
Alternative D	1,483,000	13%	1,303,000	1%
Alternative E	1,439,000	11%	1,347,000	4%
Alternative F	4,710,000	73%	2,652,000	51%
Proposed Plan	1,507,000	15%	1,308,000	1%

Source: BLM 2015

*Open with standard stipulations. This table displays the acres of PHMA and GHMA open and closed to fluid mineral leasing in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

Table 5-20
Acres with NSO and CSU/TL Stipulations in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ IV	Percent Within Sub-Region	MZ IV	Percent Within Sub-Region
NSO Stipulations				
Alternative A	7,454,000	0%	3,828,000	0%
Alternative B	7,454,000	0%	3,828,000	0%
Alternative C	7,454,000	0%	3,828,000	0%
Alternative D	10,716,000	30%	5,142,000	26%
Alternative E	7,454,000	0%	3,828,000	0%
Alternative F	7,454,000	0%	3,828,000	0%
Proposed Plan	11,354,000	34%	3,828,000	0%

**Table 5-20
Acres with NSO and CSU/TL Stipulations in GRSG Habitat in MZ IV**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ IV	Percent Within Sub-Region	MZ IV	Percent Within Sub-Region
	CSU/TL Stipulations			
Alternative A	0	0%	4,104,000	0%
Alternative B	0	0%	4,104,000	0%
Alternative C	0	0%	4,104,000	0%
Alternative D	0	0%	4,104,000	0%
Alternative E	3,271,000	100%	5,409,000	24%
Alternative F	0	0%	4,104,000	0%
Proposed Plan	0	0%	5,037,000	19%

Source: BLM 2015

This table displays the acres of PHMA and GHMA with NSO Stipulations and CSU/TL Stipulations in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

leasing within MZ IV in GRSG habitat, and these alternatives would be most protective of GRSG and its habitat. As such, reasonably foreseeable future leasing projects would be less likely to impact GRSG populations on federal lands. Alternative D and the Proposed Plan would impose major stipulations on PHMA and GHMA, contributing 44 and 26 percent of PHMA and GHMA in MZ IV with these stipulations, respectively. The Proposed Plan would provide additional protections to GRSG from fluid mineral development by requiring anthropogenic disturbance criteria, a 3 percent disturbance cap, buffers, mitigation requirements, RDFs consistent with applicable law, and by managing SFAs as NSO with no waivers, exceptions, and modifications. Alternative E would contribute all of the PHMA with minor constraints in MZ IV.

All BLM and Forest Service Proposed Plans within MZ IV include RDFs (consistent with applicable law) to minimize impacts on GRSG from oil and gas development on federal lands. In areas where mineral estate is currently unleased, these tools can be applied to future leases; in areas which are already leased, RDFs consistent with applicable law can be applied as conditions of approval for development of existing leases. Similarly, state plans contain similar measures to reduce impacts. Together, these measures would help protect unfragmented habitats, minimize habitat loss and fragmentation, and maintain conditions that meet GRSG life history needs. Recent research indicates that restored habitats lack many of the features sought by GRSG in their habitat areas and may not support GRSG for long periods following restoration activities. In order to conserve GRSG populations on the landscape, protection of existing habitat through minimizing development would provide the best hope for GRSG persistence (Arkle et al. 2014).

Reasonably foreseeable oil and gas development is limited in the MZ. When the impacts of the Nevada and Northeastern California LUPA are added to these actions, the impact would be a net conservation gain due in large part to implementation of NSO stipulations, anthropogenic disturbance caps, and adaptive management that would minimize future disturbances to GRSG populations and habitats.

Under the Montana Executive Order, authorizations of oil and gas development that require state agency review or approval would be subject to the GRSG permitting process. They also would be subject to stipulations for development in GRSG Core areas. Similarly, authorizations in Nevada would be subject to measures in the Nevada state plan, including avoidance, minimization, and mitigation of any unavoidable impacts on GRSG habitat. Oil and gas lease authorizations in Utah that require state agency review or approval would be subject to the Utah executive order, which directs the Utah division of Oil, Gas, and Mining to consult with UDWR on all actions within GRSG management areas, and incorporate conservation measures from the state's GRSG conservation plan.

The effect of the Nevada and Northeastern California LUPA alternatives and other past, present, and reasonably foreseeable future conservation actions in the MZ (most notably the Nevada state plan and Montana and Utah executive orders) could be synergistic, meaning that the effects of the actions together is greater than the sum of their individual effects. For example, applying buffers in PHMA and on state and private land would effectively conserve larger blocks of land than if these actions occurred individually. This would provide a landscape-scale net conservation benefit, especially in areas where little development has occurred to date.

Reasonably foreseeable oil and gas development in MZ IV is expected to increase over the 20-year analysis period (**Section 5.1.16**), though state and private GRSG conservation efforts as well as other BLM and Forest Service Proposed Plans in MZ IV would reduce the threat by restricting the location of developments and requiring mitigation. When restrictions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV. Alternatives C and F would provide the greatest net conservation gain to GRSG habitats and populations in MZ IV by providing the greatest amount of GRSG habitat closed to leasing. The Proposed Plan would also reduce the threat to a lesser degree through designation of NSO stipulations and additional conservation measures.

Geothermal

Nature and Type of Effects. The impacts of geothermal development on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and MZ IV. Geothermal energy development potential is particularly high throughout MZ IV, though geothermal leases directly affect 75,900 acres (less than 1 percent) of GRSG habitats in the MZ (Manier et al. 2013, p. 71). Geothermal leases in the sub-region cover 60,000 acres (**Section 3.12**).

The RFD scenario for the Nevada and Northeastern California Sub-region (**Appendix P**) predicts up to 12 new geothermal power plants and estimates between 53 and 367 acres of disturbance would be required for each plant. Therefore, between 636 and 4,404 acres of temporary and permanent disturbance associated with geothermal development over the next 20 years is expected under the No Action Alternative throughout the sub-region on both BLM-administered and National Forest System lands. The conservative assumption that all 4,404 acres of disturbance would be located within MZ IV, on PHMA, would mean that less than 1 percent of PHMA within MZ IV would be directly affected under this scenario. It is reasonable to assume that not all 4,404 acres of disturbance would occur within GRSG habitat; however, indirect impacts from such development would affect a considerably larger area than the direct footprint of development, as discussed for several threats above. Typical geothermal development includes roads, transmission lines, and associated linear features in addition to power plant development, and as discussed above these features may contribute to spread of invasive plants, habitat fragmentation, and increased predation on GRSG. Some of this acreage would be reclaimed after operations are ceased or wells abandoned.

Impact Analysis. Under the RFD scenario for the action alternatives, estimated disturbance would generally decrease between 0 and 70 percent, relative to the No Action Alternative. The potential for impacts would be reduced where areas are closed to fluid mineral leasing and where NSO and CSU/TL stipulations are applied. Given the small acreage and implementation of RDFs consistent with applicable law (**Appendix D**), the likelihood for impacts on GRSG habitat is anticipated to be small and localized under all alternatives, including the No Action Alternative.

The quantitative analysis of effects from geothermal leasing would be the same as described for oil and gas because allocations and past, present, and reasonably foreseeable future actions would be the same.

Coal

Coal potential is low throughout MZ IV (Manier et al. 2013, p. 133) and there are no direct or indirect effects from surface coal leases in the MZ (Manier et al. 2013, p. 74). There are no leasable coal deposits or coal development in the Nevada and Northeastern California Sub-region (**Section 3.13**). This threat will not be described further for this MZ in this document.

Mineral Materials

Nature and Type of Effects. The impacts of mineral materials on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ IV. There are 652,000 acres of mining and mineral materials disposal sites (not including minerals mined as energy sources) on BLM-administered surface land on priority habitat and general habitat in MZ IV. There are 1,049,600 acres across all landownership types, making BLM-administered land the largest contributor (62 percent) to direct effects from this threat. National Forest System lands contribute to direct effects on 170,200 acres (16 percent) of priority habitat and general habitat. Indirect effects are estimated to 1.5 miles out from the direct effects area (Manier et al. 2013, p. 77). The mineral materials currently being developed for commercial purposes in the MZ IV include stone, sand and gravel, limestone, soil, and pumice.

Across MZ IV, priority habitat and general habitat are most affected by mining and mineral materials disposal sites on BLM-administered lands. GRSG may be directly impacted, being in the path of development; however, indirect impacts on habitat affect a much wider population of birds. In total, 61 percent of priority habitat and 48 percent of general habitat influenced by the indirect impact of mining and mineral materials disposal sites are on BLM-administered land. This does not include minerals mined as energy sources. Mining and mineral materials disposal sites on private land, by comparison, indirectly affect 26 percent of priority habitat and 34 percent of general habitat. National Forest System lands indirectly affect 10 percent of priority habitat and 13 percent of general habitat (Manier et al. 2013, p. 77). As a result, management of mining and material disposal sites on BLM-administered land would have the greatest impact on GRSG habitat conditions should mineral development occur.

Impact Analysis. **Table 5-21** provides a quantitative summary of acreages of BLM-administered and National Forest System lands open and closed to mineral material disposal across MZ IV. As shown in the table, both Alternatives A and E would contribute all of the PHMA open to mineral material disposal in MZ IV; Alternative E would not close PHMA as in the other alternatives but instead mineral materials developments in PHMA would be subject to the Nevada state plan's avoid, minimize, and mitigate permitting strategy. Under Alternative A, most public lands within the sub-region are open to mineral material disposal. Specific closures of areas to mineral materials such as ACECs or crucial or essential wildlife habitat exist throughout the sub-region; however, this alternative provides the least protection to GRSG populations or habitat. Under Alternatives B, C, D, and F and the Proposed Plan, PHMA would generally be managed as closed to mineral material disposal. Under Alternative D, GHMA would also be closed to mineral material disposal; Alternative D may provide the greatest protection to GRSG and its habitat by closing PHMA and GHMA to mineral materials disposal.

**Table 5-21
Acres Open and Closed to Mineral Material Disposal in GRSG Habitat in MZ IV**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ IV	Percent Within Sub-Region	MZ IV	Percent Within Sub-Region
Open to Mineral Material Disposal				
Alternative A	3,277,000	>99%	8,981,000	15%
Alternative B	5,000	0%	8,981,000	15%
Alternative C	5,000	0%	7,676,000	0%
Alternative D	5,000	0%	7,676,000	0%
Alternative E	3,277,000	>99%	8,981,000	15%
Alternative F	5,000	0%	8,981,000	15%
Proposed Plan	5,000	0%	8,609,000	11%
Closed to Mineral Material Disposal				
Alternative A	8,882,000	2%	1,569,000	3%
Alternative B	12,153,000	28%	1,569,000	3%
Alternative C	13,510,000	35%	1,517,000	0%
Alternative D	12,189,000	28%	2,839,000	47%
Alternative E	8,882,000	2%	1,569,000	3%
Alternative F	12,153,000	28%	1,569,000	3%
Proposed Plan	12,850,000	32%	1,529,000	1%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open and closed to mineral material disposal in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

The Proposed Plan would close PHMA to new mineral materials sales, though PHMA would remain open to expansion of existing pits. The Proposed Plan would provide additional protections to GRSG from mineral material development by requiring anthropogenic disturbance criteria, a 3 percent disturbance cap, RDFs consistent with applicable law, buffers, and mitigation. These closures and restrictions would reduce the effect on GRSG from mineral material development on BLM-administered and National Forest System lands in MZ IV compared to most action alternatives. However, these actions may shift development onto non-federal lands, with potentially greater impact on GRSG. This is because similar protective stipulations and permit requirements might not apply on those other lands.

Under the Montana Executive Order, authorizations of new mineral material disposal sites that require state agency review or approval would be subject to

the GRSG permitting process. They also would be subject to stipulations for development in GRSG Core areas. Similarly, authorizations in Nevada would be subject to measures in the Nevada state plan, including avoidance, minimization, and mitigation of any unavoidable impacts on GRSG habitat, and authorization in GRSG management areas in Utah would be subject to consultation with UDWR and conservation measures. New authorizations that would occur in the majority of MZ IV within Idaho or Oregon that lack state plans containing regulatory mechanisms may incorporate GRSG habitat recommendations from these states' plans, though these would voluntary measures and not binding conditions. These stipulations would be of particular benefit on privately owned surface and on split-estate lands with BLM-administered federal mineral estate and other surface ownership, where BLM and Forest Service protective regulatory mechanisms do not apply.

Reasonably foreseeable mineral materials development in MZ IV is expected to increase over the 20-year analysis period (**Section 5.1.16**), though state and private GRSG conservation efforts as well as other BLM and Forest Service Proposed Plans in MZ IV would reduce the threat by restricting the location of developments and requiring mitigation. When restrictions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV.

Locatable Minerals

Nature and Type of Effects. The impacts of locatable minerals management on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ IV. The primary locatable minerals in commercially viable quantities in MZ IV include zeolite, bentonite, diatomaceous earth, limestone, perlite, sunstone, bentonite, gold, silver, and copper.

Impact Analysis. **Table 5-22** provides a quantitative summary of acreages of BLM-administered and National Forest System lands open to and recommended for withdrawal from mineral entry across MZ IV. As shown in the table, Alternatives A, D, and E would contribute nearly half of the PHMA open to locatable entry in MZ IV. Alternatives B, C, and F would recommend PHMA for withdrawal. While some acres of PHMA would still be available for locatable mineral entry under the Proposed Plan, SFAs would be recommended for withdrawal and additional protections under this alternative would provide the greatest benefit to GRSG populations and habitat compared to the other action alternatives as discussed in **Section 5.1.6**. However, implementation of this alternative could push development onto private lands with less restrictions, thereby increasing impacts on GRSG.

Table 5-22
Acres Open and Recommended for Withdrawal from Locatable Mineral Entry
in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ IV	Percent Within Sub-Region	MZ IV	Percent Within Sub-Region
Open to Locatable Mineral Entry				
Alternative A	7,772,000	44%	10,345,000	13%
Alternative B	4,367,000	0%	10,345,000	13%
Alternative C	4,367,000	0%	9,023,000	0%
Alternative D	7,780,000	44%	10,337,000	13%
Alternative E	7,772,000	44%	10,345,000	13%
Alternative F	4,367,000	0%	10,345,000	13%
Proposed Plan	6,108,000	29%	9,960,000	9%
Recommended for Withdrawal from Locatable Mineral Entry				
Alternative A	3,664,000	0%	9,000	0%
Alternative B	7,069,000	48%	9,000	0%
Alternative C	8,391,000	56%	9,000	0%
Alternative D	3,664,000	0%	9,000	0%
Alternative E	3,664,000	0%	9,000	0%
Alternative F	7,069,000	48%	9,000	0%
Proposed Plan	5,974,000	39%	9,000	0%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open to mineral entry and recommended for withdrawal from locatable mineral entry in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

Authorizations of new locatable mineral sites that require state agency review or approval would be subject to either the regulatory mechanisms of the Montana, Nevada, or Utah state plans. These measures would be of particular benefit on privately owned surface and on split-estate lands with BLM-administered federal mineral estate and other surface ownership, where BLM and Forest Service protective regulatory mechanisms do not apply.

Reasonably foreseeable locatable mineral development in MZ IV is expected to increase over the 20-year analysis period (**Section 5.1.16**), though state and private GRSG conservation efforts as well as other BLM and Forest Service Proposed Plans in MZ IV would reduce the threat by applying RDFs as Conditions of Approval. The disturbance caps in the Proposed Plans would not block locatable mineral entry projects, but any locatable mineral entry would be considered as disturbance under the cap. When restrictions within the Nevada

and Northeastern California LUPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV.

Nonenergy Leasable Minerals

Nature and Type of Effects. The impacts of nonenergy leasable minerals management on GRSG are described in **Section 4.2** and above in **Section 5.1.6.**

Conditions in the Sub-region and in MZ IV. Existing leases for nonenergy leasable minerals represent a relatively small threat spatially, as 12,000 acres (less than 1 percent) of GRSG habitats in MZ IV are directly affected by existing prospecting permits (Manier et al. 2013, p. 71). Phosphate development is prevalent in southeastern Idaho, though acres disturbed are not known.

Impact Analysis. **Table 5-23** provides a quantitative summary of acreages of BLM-administered and National Forest System lands open and closed to nonenergy mineral leasing across MZ IV. As shown in the table, both Alternatives A and E would contribute all of the PHMA open to nonenergy mineral leasing in MZ IV; Alternative E would not close PHMA as in the other alternatives but instead leasing in PHMA would be subject to the Nevada state plan avoid, minimize, and mitigate permitting strategy. Alternatives C and D would have the largest contribution of PHMA closed to nonenergy mineral leasing, followed by Alternatives B, D, F, and the Proposed Plan. Because they would close the greatest amount of GRSG habitat to nonenergy mineral leasing, Alternatives C and D would be the most protective of GRSG and its habitat.

Table 5-23
Acres Open and Closed to Nonenergy Leasable Mineral Leasing in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ IV	Percent Within Sub-Region	MZ IV	Percent Within Sub-Region
	Open to Nonenergy Leasing			
Alternative A	3,272,000	100%	8,763,000	15%
Alternative B	0	0%	8,763,000	15%
Alternative C	0	0%	7,458,000	0%
Alternative D	0	0%	7,458,000	0%
Alternative E	3,272,000	100%	8,763,000	15%
Alternative F	0	0%	8,763,000	15%
Proposed Plan	0	0%	8,391,000	11%

Table 5-23
Acres Open and Closed to Nonenergy Leasable Mineral Leasing in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ IV	Percent Within Sub-Region	MZ IV	Percent Within Sub-Region
	Closed to Nonenergy Leasing			
Alternative A	8,887,000	2%	1,787,000	3%
Alternative B	12,158,000	28%	1,787,111	3%
Alternative C	13,515,000	35%	1,735,000	0%
Alternative D	12,193,000	28%	3,056,000	43%
Alternative E	8,887,000	2%	1,787,000	3%
Alternative F	12,158,000	28%	1,787,000	3%
Proposed Plan	12,855,000	32%	1,747,000	1%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open and closed to nonenergy leasing in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

The Proposed Plan would close PHMA to new nonenergy mineral leases, though PHMA would remain open to expansion of existing pits. The Proposed Plan would provide additional protections to GRSG from nonenergy mineral leasing by requiring anthropogenic disturbance criteria, a 3 percent disturbance cap, RDFs consistent with applicable law, buffers, and mitigation. These closures and restrictions would reduce the effect on GRSG from leasing on BLM-administered and National Forest System lands in MZ IV compared to most action alternatives. However, these actions may shift development onto non-federal lands, with potentially greater impacts on GRSG. This is because similar protective stipulations and permit requirements might not apply on those other lands.

However, under the Montana Executive Order, authorizations of new nonenergy mineral leases that require state agency review or approval would be subject to the GRSG permitting process. They also would be subject to stipulations for development in GRSG Core areas. Similarly, authorizations in Nevada would be subject to measures in the Nevada state plan, including avoidance, minimization, and mitigation of any unavoidable impacts on GRSG habitat, and authorization in GRSG Management Areas in Utah would subject to consultation with UDWR and conservation measures. New authorizations that would occur in the majority of MZ IV within Idaho or Oregon that lack state plans containing regulatory mechanisms may incorporate GRSG habitat recommendations from these states' plans though these would voluntary measures and not binding conditions. These stipulations would be of particular benefit on privately-owned surface and on split-estate lands with BLM-

administered federal mineral estate and other surface ownership, where BLM and Forest Service protective regulatory mechanisms do not apply.

Reasonably foreseeable nonenergy leasable mineral development in MZ IV is expected to increase over the 20-year analysis period (**Section 5.1.16**). However, state and private GRSG conservation efforts as well as other BLM and Forest Service Proposed Plans in MZ IV would reduce the threat by providing additional protections such as disturbance caps, RDFs, and mitigation. When restrictions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV.

Recreation

Nature and Type of Effects. The impacts from recreation management on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ IV. Human populations have increased and expanded, primarily over the past century and in the western portion of the sagebrush distribution (Knick et al. 2011, p. 212). With these expanding populations come greater human impacts (Leu et al. 2008), including from recreational uses of BLM-administered and National Forest System lands. Uninhabited areas within the Great Basin ecoregion (portions of MZs III, IV, and V) decreased 90 percent (from 22.2 million acres to less than 3 million acres) with expansion driven in part by economic and recreation opportunities in the region (Torregrosa and Devoe 2008, p. 10).

The COT report objectives for recreation are to maintain healthy native sagebrush communities, based on local ecological conditions, and to manage direct and indirect human disturbance (including noise) to avoid interruption of normal GRSG behavior (USFWS 2013a, p. 49). Limits on road use under the action alternatives and limits on OHVs would help meet these objectives.

Impact Analysis. **Table 5-24** shows Acres of Travel Management Designations in GRSG Habitat in MZ IV.

As shown in **Table 5-24**, none of the action alternatives would contribute to the acres of GRSG habitat designated as open to cross-country motorized travel in MZ IV, with the exception of Alternative B, which would contribute all of the GHMA open in MZ IV. The Proposed Plan would contribute the greatest amount of PHMA designated as closed in MZ IV compared to other action alternatives but would not contribute as many acres of GHMA as closed as Alternatives A, B, E, or F. Acres of GRSG habitat in MZ IV with limited designations do not vary substantially across the action alternatives with the exception of Alternatives B and C, which contribute little or no limited GHMA.

**Table 5-24
Acres of Travel Management Designations in GRSG Habitat in MZ IV**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ IV	Percent Within Sub-Region	MZ IV	Percent Within Sub-Region
Open				
Alternative A	2,769,000	100%	1,125,000	>99%
Alternative B	0	0%	1,125,000	>99%
Alternative C	0	0%	1,000	0%
Alternative D	0	0%	1,000	0%
Alternative E	0	0%	1,000	0%
Alternative F	0	0%	1,000	0%
Proposed Plan	0	0%	1,000	0%
Limited				
Alternative A	7,485,000	9%	8,329,000	2%
Alternative B	10,253,000	33%	8,329,000	2%
Alternative C	11,575,000	41%	8,131,000	0%
Alternative D	10,261,000	33%	9,445,000	14%
Alternative E	10,253,000	33%	9,453,000	14%
Alternative F	10,253,000	33%	9,453,000	14%
Proposed Plan	10,897,000	37%	9,068,000	10%
Closed				
Alternative A	587,000	4%	204,000	17%
Alternative B	587,000	4%	204,000	17%
Alternative C	622,000	9%	168,000	0%
Alternative D	614,000	8%	176,000	5%
Alternative E	587,000	4%	204,000	17%
Alternative F	587,000	4%	204,000	17%
Proposed Plan	640,000	11%	177,000	5%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within travel management designations of open, limited and closed in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

For recreation, Alternatives B and D and the Proposed Plan would aim to reduce impacts on GRSG with issuance of SRPs and RSUAs. Alternative F would take a similar approach, but with the addition of seasonal restrictions within 4 miles of active leks. Alternative E would require SETT consultation upon issuance of SRPs/RSUAs within GRSG habitat to avoid, minimize, and mitigate impacts on GRSG consistent with the Nevada state plan. These alternatives

would have the greatest potential benefits to GRSG and its habitat by incorporating specific GRSG-related management. Alternatives A and C would not manage recreation to reduce impacts on GRSG and may therefore have the greatest impact on GRSG and its habitat.

Reasonably foreseeable recreation in MZ IV is expected to increase over the 20-year analysis period (**Section 5.1.16**). However, state and private GRSG conservation efforts as well as other BLM and Forest Service Proposed Plans in MZ IV would reduce the threat by providing additional protections such as disturbance caps and limitations on National Forest System lands. When restrictions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV.

5.1.11 Existing Conditions in WAFWA MZ V

This section summarizes existing conditions and past and present actions for the Nevada and Northeastern California Sub-region (provided in more detail in Chapter 3) and for MZ V as a whole. Reasonably foreseeable future actions are discussed in **Section 5.1.13**.

GRSG Habitat and Populations

MZ V consists of four GRSG populations: Central Oregon, Klamath, Warm Springs Valley, and Western Great Basin (USFWS 2013a, p. 25-26), and the Nevada and Northeastern California Sub-region contains three of these populations: portions of the Western Great Basin, the Warm Springs Valley, and Klamath populations. The entirety of the Klamath population occurs in the Nevada and Northeastern California Sub-region. MZ V represents the westernmost extent of the GRSG range and contains a mix of habitat issues that have had long-term effects on GRSG populations. GRSG leks in MZ V are relatively well connected (second in connectedness only to the Wyoming Basin; Knick and Hanser 2011); however, the COT Report identifies habitat loss and fragmentation due to wildfire and conifer encroachment as primary threats to GRSG in the MZ (USFWS 2013a).

In MZ V, state and private lands account for over 2 million acres of GRSG habitat (approximately 17 percent of habitat), with BLM-administered and other federal land accounting for over 10.3 million acres of habitat (approximately 80 percent of habitat) (Manier et al. 2013, p. 118). Additionally, BLM-administered federal mineral estate that may exist with other surface ownership, often referred to as split-estate lands, exists within MZ V. The higher percentage of GRSG habitat on BLM-administered and other federal land means BLM management could play a key role in alleviating threats to GRSG in MZ V.

Table 5-25 provides a breakdown of landownership and acres of GRSG habitat in MZ V. As the table shows, approximately 72 percent of priority habitat and

**Table 5-25
Management Jurisdiction in MZ V by Acres of Priority and General Habitats**

	Total Surface Area (Acres)	Priority Habitat (Acres)	General Habitat (Acres)	Non-habitat (Acres)
MZ V	36,447,900 (100%)	7,097,200 (19%)	5,808,000 (16%)	23,542,700 (65%)
BLM	14,179,800 (39%)	5,117,500 (72%)	4,196,700 (72%)	4,865,600 (21%)
Forest Service	10,136,000 (29%)	62,200 (<1%)	114,900 (2%)	9,958,900 (42%)
Tribal and other federal	1,964,700 (5%)	717,100 (10%)	101,800 (2%)	1,145,800 (5%)
Private	6,299,000 (17%)	798,000 (11%)	1,199,000 (21%)	4,302,000 (18%)
State	473,600 (1%)	64,900 (<1%)	115,800 (2%)	292,900 (1%)
Other	3,394,700 (9%)	337,500 (5%)	79,800 (1%)	2,977,400 (13%)

Source: Manier et al. 2013, p. 118

72 percent of general habitat is on BLM-administered lands. Only a small percentage of priority habitat and general habitat is located on National Forest System lands (less than 1 percent of priority habitat and 2 percent of general habitat in MZ V is on National Forest System lands). As a result, the contribution of National Forest System lands to cumulative effects in MZ V will not be discussed further.

The percentage of BLM-administered surface area in the MZ is high. This suggests that BLM actions in MZ V likely will have a greater impact on ameliorating major threats to GRSG than comparable actions on private and state lands.

Population Trends in Management Zone V

Of the seven management zones, MZ V is characterized as one of those supporting the highest densities of GRSG. MZ V consists of three GRSG populations, Western Great Basin, Warm Springs Valley, and Central Oregon, and a fourth, small and fragmented population, Klamath (Manier et al. p. 133). The Klamath population is entirely within the Nevada and Northeastern California Sub-region.

The range of GRSG in MZ V has continued to shrink in extent over the last three decades, while some populations within MZ V are relatively stable. When considered in its entirety, population change from 1965 to 2004 was statistically undetectable (Connelly et al. 2004), declining by 3.3 percent by some measures (Connelly et al. 2004), and by 2 percent by others (Garton et al. 2011). However, populations in MZ V as a whole declined 65 percent over the 2007 to 2013 period (Garton et al. 2015, p. 19). Garton et al. (2015, p. 19) predicted a 13.6 percent chance that populations within MZ V will fall below 200 males in the short term (by 2045), and a 92.3 percent chance that populations within MZ V will fall below 500 males in the long term (by 2115).

5.1.12 Regional Efforts to Manage Threats to GRSG

Regional efforts include past, present, and reasonably foreseeable actions conducted by the BLM and by other federal and/or in cooperation with non-federal agencies, organizations, landowners, or other groups in MZ V. These efforts would be applicable on state and private lands in the sub-region, which contain approximately 3.6 million acres (28 percent) of GRSG habitat (Manier et al. 2013, p. 118). The boundaries of MZ V encompass portions of the states of Oregon, Nevada, and California. Regional efforts occurring in these states are discussed below.

Other BLM and Forest Service Planning Efforts

The BLM has incorporated management of SFAs into its proposed management approach for GRSG, as described in **Section 5.1.4**. There are two SFAs comprising 2,593,700 acres in MZ V as a whole. The Sheldon-Hart Mountain NWR Complex Area (1,910,500 acres) in southeast Oregon and northwest Nevada is entirely within MZ V. The Southeast Oregon/North-Central Nevada SFA is mostly within MZ IV, though a 683,200-acre portion is within MZ V.

Other BLM and Forest Service planning efforts are described in **Section 5.1.4**.

Oregon Statewide Efforts

Oregon statewide efforts are described in **Section 5.1.8**, Regional Efforts to Manage Threats to GRSG in MZ IV.

Nevada/California State Efforts

Nevada and California statewide efforts are described in **Section 5.1.4**, Regional Efforts to Manage Threats to GRSG in MZ III.

Natural Resources Conservation Service Sage Grouse Initiative

The Natural Resources Conservation Service's (NRCS) Sage Grouse Initiative (SGI) is described in **Section 5.1.4**, Regional Efforts to Manage Threats to GRSG in MZ III. SGI efforts in MZ V are described here.

As of 2015, SGI has secured conservation easements on over 455,000 acres across the GRSG range (NRCS 2015), with the largest percentage of easements occurring in Wyoming (approximately 200,000 acres). In MZ V, SGI has thus far secured conservation easements on 28,871 acres that maintain intact sagebrush-grassland habitat. It has also accomplished the following:

- Established over 88,000 acres where grazing management promotes GRSG habitat and sustainable ranching
- Removed conifers encroaching on 175,595 acres of GRSG habitat
- Seeded over 1,000 acres with native plants
- Marked 80 miles of fences in GRSG territory

Other Regional Efforts

Tribes, counties, and local working groups are also playing a critical role in promoting GRSG conservation at the local level. Individual conservation plans have been prepared by some local working groups in MZ V to develop and implement strategies to improve or maintain GRSG habitat and reduce or mitigate threats on the local level. The proposed conservation actions and recommendations in these plans are voluntary actions for private landowners. Local working group projects have included monitoring, research, and mapping habitat areas, as well as public outreach efforts such as landowner education and collaboration with federal, state, and other local entities. These efforts provide a conservation gain to GRSG through increased monitoring and public awareness. Local working groups in MZ V include the Prineville, Lakeview, Burns, and Vale local working groups in Oregon (Portions of Burns and Vale are also within MZ IV, and an additional group in Oregon, Baker, is entirely within MZ IV), and the Washoe/Modoc and North Central Nevada local working groups in Nevada (the Washoe/Modoc group is also partially in California, and both groups are also within MZ III) (USGS 2014).

5.1.13 Relevant Cumulative Actions

This cumulative effects analysis considers the incremental impact of the Nevada and Northeastern California LUPA and alternatives in combination with other past, present, and reasonably foreseeable future federal and non-federal actions on lands in MZ V (see **Table 5-39**). Where these actions occur within GRSG habitat, they would cumulatively add to the impacts of BLM-authorized activities set forth in the Nevada and Northeastern California LUPA. In addition to the conservation efforts described above, relevant reasonably foreseeable future cumulative actions occurring on federal, state, private, or mixed land ownership in MZ V are described in the Proposed Oregon Sub-region RMPA, which is incorporated by reference.

The following list includes past, present, and reasonably foreseeable future actions in MZ V that, when added to the Proposed Plan and alternatives for the Nevada and Northeastern California Sub-region, could cumulatively affect threats to GRSG:

- Wagontire Wind Energy Development Project, Harney County, Oregon
- Buckskin Mountain Wind Energy Development Project, Harney County, Oregon
- Several ongoing locatable minerals mining operations in Harney and Lake Counties, Oregon
- North Steens 230-kV Transmission Line Project, Harney County, Oregon

- West Butte Wind Power ROW Project, Crook and Deschutes Counties, Oregon
- Vya PMU Programmatic Habitat Restoration and Fuels Reduction Project, northeast California and northwest Nevada
- Northeastern California Juniper Treatment Project, northeast California and northwest Nevada
- North Steens Ecosystem Restoration Project, Harney County, Oregon
- South Warner Sagebrush Sage-Grouse Habitat Restoration, Lake County, Oregon
- Five Creeks Rangeland Restoration Project, Harney County, Oregon
- Steens Mountain Comprehensive Recreation Plan, Harney County, Oregon
- Greater Sage-Grouse Programmatic Candidate Conservation Agreement for Rangeland Management Practices on BLM Lands, Oregon
- Integrated Invasive Plant Management Environmental Assessments for Burns, Lakeview, Prineville, and Vale Districts
- Wildhorse Gathers EAs

5.1.14 Threats to GRSG in Management Zone V

In its COT report, the USFWS identifies wildfire, spread of invasive plants, conifer encroachment, infrastructure development, livestock grazing and free-roaming equids, conversion to agriculture, energy development, and recreation as the present and widespread threats facing GRSG in MZ V (USFWS 2013a, pp. 25-26). Each threat is discussed in this section.

For those threats below that are analyzed quantitatively (infrastructure, livestock grazing, conversion to agriculture, energy development and mining, and recreation), acres presented in the analyses tables represent acres of land allocations from each of the Nevada and Northeastern California Sub-region LUPA/EIS alternatives in the Nevada and Northeastern California Sub-region portion of MZ V, combined with acres of land allocations from the Proposed Plans of additional BLM and Forest Service sub-regions in the non-Nevada and Northeastern California Sub-region portion of MZ V. The Oregon Sub-region is the only other sub-region within MZ V.

Wildfire

Nature and Type of Effects. The impacts of wildfire on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the sub-region and MZ V. Wildfire has been a primary threat to GRSG habitats and populations occurring across MZ V, with 67 percent of priority habitat and general habitat having high risk for wildfire, including the Western Great Basin and Central Oregon population areas (Manier et al. 2013, p. 133). Since 2000, approximately 1.6 million acres (17 percent of priority habitat and 6 percent of priority habitat) of GRSG habitats have burned in this MZ, with an average of more than 95,000 acres of priority habitats burned annually and a maximum yearly burn of nearly one million acres (Manier et al. 2013, p. 83). Wildfires on BLM-administered lands contribute 88 percent of average acres burned in this MZ annually (Manier et al. 2013, p. 82-83). In 2012, the Rush Fire burned more than 265,000 acres of PACs in California and more than 313,000 acres in Nevada, comprising portions of the Western Great Basin population; this wildfire also affected most of the largest leks in the region and may have isolated subpopulations through removal of connectivity habitat (USFWS 2013a, p. 83). Also in 2012, the Lone Willow portion of the Western Great Basin population was affected by the Holloway Fire, which burned approximately 221,000 acres in Oregon and 140,000 acres in Nevada of habitat considered important or essential for GRSG (USFWS 2013a, p. 84). In 2012, the Miller Homestead and Long Draw fires in southeastern Oregon burned 160,800 and 558,200 acres, respectively, mostly on BLM-administered lands with significant losses of GRSG habitat (BLM 2013i).

Impact Analysis. Management actions in the Nevada and Northeastern California Sub-region that emphasize wildfire suppression in GRSG habitat would benefit the species by limiting habitat loss in the event of wildfire. As discussed in *Wildfire* in **Section 5.1.6**, the Proposed Plan would provide the greatest protections for GRSG populations and habitat of all alternatives from the threat of wildfire and would be in accordance with the COT objective for this threat. As discussed above, BLM actions in the sub-region could be expected to considerably affect GRSG habitat in MZ V due to the amount of GRSG habitat on BLM-administered lands in the sub-region relative to the wider MZ.

Recognition of the importance of sagebrush habitat during interagency wildfire response would benefit GRSG in the event of an unplanned fire. The State of Nevada GRSG conservation plan discussed in **Section 5.1.6** would benefit GRSG habitat in the MZ. Voluntary conservation recommendations in the Oregon state plan, while not currently a regulatory mechanism in the state, would help reduce threats from wildfire if implemented on projects requiring state agency review or approval, or by private landowners. These programs would benefit GRSG during wildfire planning and response throughout MZ V, particularly on lands not administered by the BLM.

The Interagency Standards for Fire and Fire Aviation Operations “Red Book” includes BMPs for GRSG habitat conservation for wildlife and fuels management (BLM 2013n). This document is a supplemental policy or guidance for the BLM, the Forest Service, and the USFWS. These BMPs could benefit the GRSG during

interagency wildland fire operations by using spatial habitat data and predictive services to prioritize and preposition firefighting resources in critical habitat areas. However, since several years have elapsed since GRSG BMPs were incorporated, benefits would likely now be apparent, and it is unclear if this is currently the case. In January 2015, Secretarial Order 3336 “Rangeland Fire Prevention, Management and Restoration” was signed by the Secretary of the Interior. The order sets forth enhanced policies and strategies for preventing and suppressing rangeland wildfire and for restoring sagebrush landscapes impacted by wildfire across the West for the DOI. The order will improve coordination with local, state, tribal, and regional efforts to address rangeland wildfire at a landscape level.

Reasonably foreseeable wildland fire management efforts are projected to increase (**Section 5.1.16**), especially through increased coordination of federal, state, and local fire prevention actions and the implementation of the Oregon Sub-region BLM RMPA in MZ V. When the impacts of the Nevada and Northeastern California Sub-region LUPA are added to these actions, this would result in a net conservation gain to GRSG habitats and populations in MZ V.

However, in those years where wildfires that threaten wildland-urban interface are widespread, firefighting resources would be shifted to those areas and away from GRSG habitat. Years with extensive involvement of wildland-urban interface in wildfires may not see the expected benefits of policies and direction intended to increase wildfire response in GRSG habitat.

Spread of Invasive Plants

Nature and Type of Effects. The impacts of invasive plants on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and MZ V. Via seeds carried by wind, humans, machinery, and animals, invasive plants have invaded and will continue to invade many locations in MZ V. Some species, including cheatgrass, have become so ubiquitous that it is considered economically infeasible to attempt to eradicate them, such as those areas that have crossed a threshold that precludes their returning to traditional plant community composition through normal plant succession. Modeling has suggested that more than 5.6 million acres of GRSG habitat MZ V are considered to be at a moderate to high risk for cheatgrass occurrence (Manier et al. 2013, p. 90).

The BLM currently manages invasive plant infestations through integrated weed management, including biological, chemical, mechanical, manual, and educational methods. It is guided by the 1991 and 2007 RODs for Vegetation Treatment on BLM Lands in Thirteen Western States (BLM 1991a) and by the 2007 Programmatic Environmental Report (BLM 2007a). The BLM also participates in the National Early Warning and Rapid Response System for Invasive Species.

The goal of this system is to minimize the establishment and spread of new invasive species through a coordinated framework of public and private processes (FICMNEW 2003). Invasive plants are managed in cooperation with county governments and represent a landscape-level approach across management jurisdictions.

Impact Analysis. Increased surface disturbance, motorized transportation, and animal and human activity would increase the chance for the establishment and spread of invasive plants. As discussed in *Spread of Invasive Plants* in **Section 5.1.6**, the Proposed Plan would provide the greatest protections for GRSG populations and habitat of all alternatives from the threat of invasive plants and would be in accordance with the COT objective for this threat. Other alternatives would also reduce the threat of invasive plants relative to the No Action Alternative. As discussed above, BLM actions in the sub-region could be expected to considerably affect GRSG habitat in MZ V due to the amount of GRSG habitat on BLM-administered lands in the sub-region relative to the wider MZ.

Relevant cumulative actions that result in surface-disturbing activities would increase the potential for the spread of invasive plants on both federal and non-federal lands. The Nevada state plan includes stipulations for including control of noxious and invasive plant species and use of native seed mixes during reclamation, as well as addresses invasive species considerations in wildfire management. Voluntary conservation guidelines in the Oregon state plan include methods to prevent, detect, treat, and restore areas of invasive plant infestation. These stipulations and guidelines would benefit GRSG core habitat areas by limiting the spread or establishment of invasive species, particularly on lands that lack BLM protective regulatory mechanisms. A number of projects are ongoing or in the planning phase to treat nonnative, invasive plants in MZ V (see **Section 5.1.3** above and **Table 5-39** for additional information).

Reasonably foreseeable invasive plant management efforts are projected to increase (**Section 5.1.16**), including other state and county noxious weed regulations and the implementation of the Oregon Sub-region BLM RMPA in MZ V. When the impacts of the Nevada and Northeastern California LUPA are added to these actions, this would result in a net conservation gain to GRSG habitats and populations in MZ V. The Proposed Plan may result in the greatest net conservation gain due to its 3 percent anthropogenic disturbance cap that should reduce potential for the spread of weeds during the 20-year analysis period.

Conifer Encroachment

Nature and Type of Effects. The impacts of conifer encroachment on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ V. Conifer encroachment risk is high on approximately 1.4 million acres of GRSG habitat in MZ V (Manier et al. 2013, p.

93). Approximately 73 percent of conifer encroachment risk in priority habitat (and 65 percent in general habitat) occur on BLM-administered lands within MZ V (Manier et al. 2013, p. 94). In comparison, 13 percent of conifer encroachment risk in priority habitat (and 25 percent in general habitat) occur on private lands and 1 percent in priority habitat occurs on National Forest System lands (5 percent in general habitat). Therefore, BLM actions are likely to have a greater potential to ameliorate the effects of conifer encroachment on GRSG in both priority habitat and general habitat than any other single land management entity.

Impact Analysis. The COT objective for conifer encroachment is to remove conifer woodlands from areas of sagebrush that are most likely to support GRSG (post-removal) at a rate that is at least equal to the rate of encroachment (USFWS 2013a, p. 47). As discussed in *Conifer Encroachment* in **Section 5.1.6**, the Proposed Plan would provide the greatest protections for GRSG populations and habitat of all alternatives from the threat of conifer encroachment. As discussed above, BLM actions in the sub-region could be expected to considerably affect GRSG habitat in MZ V due to the amount of GRSG habitat on BLM-administered lands in the sub-region relative to the wider MZ.

Relevant cumulative actions on federal, private, and state lands within the MZ include several large conifer removal projects (see **Table 5-39**). Additional actions in MZ V include conifer removal projects guided by existing California BLM field office RMPs in the southern portion of MZ V, which incorporate the Sage Steppe Ecosystem Restoration Strategy (BLM 2008f). This strategy includes conifer removal projects in specific project areas. Further, the NRCS includes conservation measures to remove encroaching conifers near leks and lek seasonal habitats while minimizing disturbance to GRSG (NRCS 2012, p. 13). SGI has helped reduce the threat of early succession conifer encroachment through mechanical removal on 175,595 acres of private lands within MZ V. The majority of these efforts were located inside PACs (NRCS 2015), helping to preserve historic fire return intervals and important GRSG habitat. The Nevada state plan provides management actions for treating early-phase conifer encroachment. Similarly, the Oregon state plan provides voluntary conservation measures for treating early-phase juniper expansion.

Reasonably foreseeable conifer encroachment management efforts are projected to increase (**Section 5.1.16**), including efforts on private land and implementation of the Oregon Sub-region BLM RMPA in MZ V. When the impacts of the Nevada and Northeastern California LUPA are added to these actions, this would result in a net conservation gain to GRSG habitats and populations in MZ V. The Proposed Plan would have the greatest reduction in the threat from conifer encroachment and provides a net conservation gain to GRSG. Alternatives D and E would also reduce the threat, though to a lesser degree than the Proposed Plan because they do not specify acres for treatment or habitat objectives.

Infrastructure

Rights-of-Way

Nature and Type of Effects. The impacts of ROWs on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ V. Infrastructure, such as ROWs and associated facilities and urbanization, is widespread throughout MZ V. In some locations, infrastructure development has affected GRSG habitat. Development of roads, fences, and utility corridors has also contributed to habitat loss and fragmentation in portions of MZ V. The best available estimates suggest about 20 percent of MZ V is within approximately 4 miles of urban development (Knick et al. 2011, p. 214). Impacts of infrastructure development in MZ V are primarily related to highways, roads, power lines, and communication towers, with 95 percent of MZ V within 4 miles of a road, 15 percent within 4 miles of a power line, and 5 percent within 4 miles of a communication tower (Knick et al. 2011, pp. 215-216).

Although not representative of all infrastructure ROWs, transmission lines greater than 115 kilovolts indirectly influence 26 percent of priority habitat and 33 percent of general habitat across MZ V. Indirect effects are assumed to occur to a radius of 4 miles (Manier et al. 2013, p. 41). Approximately 77 percent of transmission lines in priority habitat and 64 percent in general habitat are on BLM-administered lands across GRSG habitats in MZ V (Manier et al. 2013, p. 41). In contrast, private and National Forest System lands contain 13 percent and 1 percent of transmission lines in priority habitat, respectively, and 27 percent and 2 percent in general habitat, respectively. Therefore, BLM actions are likely to have the greatest potential to affect transmission line ROWs in GRSG habitat than any other land management entity. Designating ROW exclusion and avoidance areas in PHMA and GHMA on BLM-administered lands could reduce the threat on these lands. However, in areas with scattered federal landownership, infrastructure may be routed around federal lands, often increasing its length and impact. ROW avoidance and exclusion areas on BLM-administered lands could increase this tendency.

Impact Analysis. **Table 5-26** provides a quantitative summary of ROW conditions on BLM-administered lands across MZ V. As shown in the table, the largest impacts on GRSG would result from Alternatives B, C, and F, which would designate PHMA as ROW exclusion. Alternative F would also manage GHMA as ROW exclusion. Alternatives D and the Proposed Plan would designate PHMA as ROW avoidance, and though Alternative E would not designate PHMA, measures in the Nevada state plan for ROW permitting would be similar to ROW avoidance in PHMA. These actions are reflected in the ROW avoidance portion of **Table 5-26**.

**Table 5-26
Acres of Rights-of-Way Designations in GRSG Habitat in MZ V**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-Region	MZ V	Percent Within Sub-Region
Open to Rights-of-Way				
Alternative A	1,678,000	97%	1,095,000	94%
Alternative B	57,000	2%	65,000	0%
Alternative C	57,000	2%	65,000	0%
Alternative D	57,000	2%	65,000	0%
Alternative E	57,000	2%	65,000	0%
Alternative F	57,000	2%	65,000	0%
Proposed Plan	91,000	40%	102,000	36%
Right-of-Way Exclusion				
Alternative A	964,000	74%	460,000	38%
Alternative B	2,608,000	90%	460,000	38%
Alternative C	3,816,000	93%	284,000	0%
Alternative D	1,142,000	78%	284,000	0%
Alternative E	967,000	74%	460,000	38%
Alternative F	2,608,000	90%	1,493,000	81%
Proposed Plan	965,000	74%	459,000	38%
Right-of-Way Avoidance				
Alternative A	2,031,000	0%	3,353,000	0%
Alternative B	2,031,000	0%	4,386,000	24%
Alternative C	2,031,000	0%	3,353,000	0%
Alternative D	3,672,000	45%	4,386,000	24%
Alternative E	3,672,000	45%	4,386,000	24%
Alternative F	2,031,000	0%	3,353,000	0%
Proposed Plan	3,663,000	45%	4,324,000	22%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within rights-of-way designations in MZ V; it also displays the percentage of those acres that are found within the sub-region.

The acres in **Table 5-27** depict existing utility corridors in GRSG habitat in MZ V. As shown in **Table 5-27**, the contribution from the Nevada and Northeastern California Sub-region would not differ substantially across alternatives. Under the Proposed Plan, acres of utility corridors in GRSG habitat in MZ V would be somewhat reduced relative to the No Action and other alternatives. Under Alternative C, the contribution of acres of utility corridors in PHMA in MZ V would be slightly more than other alternatives.

Table 5-27
Acres of Existing Utility Corridors in GRSG Habitat in MZ V

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-Region	MZ V	Percent Within Sub-Region
Alternative A	120,000	53%	122,000	47%
Alternative B	120,000	53%	122,000	47%
Alternative C	130,000	57%	0	0%
Alternative D	123,000	55%	118,000	45%
Alternative E	120,000	53%	122,000	47%
Alternative F	120,000	53%	122,000	47%
Proposed Plan	97,000	42%	38,000	34%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within existing and proposed utility corridors in MZ V; it also displays the percentage of those acres that are found within the sub-region.

Projects in the Nevada portion of MZ V that require state agency review or approval would be subject to the Nevada state plan (SETT 2014a) approval and consultation process. This would require project avoidance of GRSG core habitat, or minimization of impacts and mitigation for any remaining impacts on GRSG habitat through the state conservation credit system. Oregon has also developed a state plan (Hagen 2011) to achieve no net loss of GRSG core habitat from development; however, management guidelines in the plan, including avoidance, design features, and mitigation, are generally voluntary. Thus, the current Oregon plan may not be as protective of GRSG habitat as plans containing regulatory mechanisms for GRSG conservation on private lands, such as the Nevada state plan. However, the Oregon Sage-Grouse Action Plan currently under development will provide regulatory mechanisms for GRSG conservation on private and state lands. While the current Oregon plan is composed of voluntary management guidelines, the guidelines may be used by state regulatory agencies, including the Energy Facility Siting Council as conditions of approval on a case-by-case basis for certain energy projects. For example, the council has jurisdiction on wind energy projects greater than 105 MW (Dave Budeau, phone conversation with author, March 26, 2015). Because they would manage the most GRSG habitat as ROW exclusion, Alternatives C

and F would provide the greatest net conservation gain to GRSG in MZ V and are most likely to meet the COT report objective, which is to avoid development of infrastructure in GRSG priority areas for conservation.

The effect of the alternatives and other conservation actions in the MZ (most notably the Nevada state plan) could be synergistic. By implementing restrictions on infrastructure in PHMA and on state and private lands together, the cumulative beneficial effect on GRSG would be greater than the sum of their individual effects because protections would be applied more consistently across the landscape. This is especially important in areas of mixed land ownership patterns where complementary protections can benefit leks, early brood-rearing habitat, or other important areas that do not follow geopolitical boundaries.

Reasonably foreseeable ROW development in MZ V is expected to increase over the 20-year analysis period (**Section 5.1.16**), though state and private GRSG conservation efforts as well as implementation of the Oregon Sub-region BLM RMPA in MZ V would reduce the threat by restricting the type and location of developments. When restrictions in the Nevada and Northeastern California LUPA are added to these conservation actions, the impacts of future ROW developments would be further reduced. Alternatives C and F would provide the greatest net conservation gain to GRSG habitats and populations in MZ V by providing the greatest amount of ROW exclusion in GRSG habitat. The Proposed Plan would also reduce the threat to a lesser degree by providing the flexibility to site ROWs with the least impact on GRSG habitat.

Renewable Energy: Wind and Solar

Nature and Type of Effects. The impacts of renewable energy on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ V. Wind energy development is an increasing threat in some populations within MZ V. Renewable energy development, including wind, have been identified as a threat to GRSG habitat in portions of Oregon's Western Great Basin population (Hagen 2011), with at least two proposed projects currently authorized and others in planning stages (see **Table 5-39**). No commercial-scale wind developments have currently been constructed in MZ V.

No current solar energy facilities measurably affect GRSG within the range (however, USFWS did identify small solar developments in California and Wyoming in the listing decision) (Manier et al. 2013, p. 66), and solar resources comparable to the areas where utility-scale solar production projects are being proposed or built are generally not present in MZ V. However, given technological developments, transmission infrastructure, and market forces within the lifespan of this analysis, solar potential across the southern range of GRSG, including within MZ V, may become attractive to solar development projects (Manier et al. 2013, p. 66). Several solar facilities under 5 MW are

currently in operation in MZ V (Renewable Northwest Project 2015), and several additional solar facilities ranging in size from less than 1 MW to 12 MW are currently in the planning (Bend Bulletin 2015), permitting, or development stages (County of Lake 2015, Renewable Northwest Project 2015).

The numbers of ROW authorizations, including wind and solar ROWs, are anticipated to grow in the sub-region. Increasing populations and continued renewable energy development, including proposed wind projects in the sub-region, drive the need for new ROWs on both federal and non-federal lands. Geothermal energy development is discussed under *Energy Development and Mining*, below.

Impact Analysis. **Table 5-28** provides a quantitative summary of renewable energy (wind) development conditions on BLM-administered lands across MZ V. As shown in the table, Alternative C would have the greatest contribution to acres of GRS habitat open to wind ROWs in MZ V; however, the total acreage open is small under this alternative. Alternatives C, D, and F would contribute the most acres of GRS habitat managed as exclusion and would be the most protective of GRS and its habitat. Though Alternative E would not designate PHMA or GHMA, core and priority habitats designated under this alternative would be equivalent to PHMA and GHMA, respectively, and additional stipulations and the Nevada state plan’s avoid, minimize, mitigate strategy would apply to wind ROW developments and would provide additional protections over Alternative A. Under the Proposed Plan, PHMA would be managed as exclusion for commercial wind facilities. GHMA would be ROW avoidance for wind facilities. Wind developments would also be subject to the anthropogenic disturbance criteria, a 3 percent disturbance cap, RDFs consistent with applicable law, buffers, and a mitigation requirement.

Table 5-28
Acres of Wind Energy Management Designations in GRS Habitat in MZ V

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-Region	MZ V	Percent Within Sub-Region
	Open to Wind Rights-of-Way			
Alternative A	1,623,000	100%	1,030,000	100%
Alternative B	0	0%	0	0%
Alternative C	1,000	100%	0	0%
Alternative D	0	0%	0	0%
Alternative E	0	0%	0	0%
Alternative F	0	0%	0	0%
Proposed Plan	0	0%	0	0%

Table 5-28
Acres of Wind Energy Management Designations in GRSG Habitat in MZ V

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-Region	MZ V	Percent Within Sub-Region
Wind Right-of-Way Exclusion				
Alternative A	2,301,000	31%	425,000	41%
Alternative B	3,945,000	60%	425,000	41%
Alternative C	5,153,000	69%	249,000	0%
Alternative D	4,120,000	62%	1,282,000	81%
Alternative E	2,304,000	31%	425,000	41%
Alternative F	3,945,000	60%	1,458,000	83%
Proposed Plan	3,969,000	60%	424,000	41%
Wind Right-of-Way Avoidance				
Alternative A	750,000	0%	3,437,000	0%
Alternative B	750,000	0%	4,470,000	23%
Alternative C	750,000	0%	3,437,000	0%
Alternative D	750,000	0%	3,437,000	0%
Alternative E	2,391,000	69%	4,470,000	23%
Alternative F	750,000	0%	3,437,000	0%
Proposed Plan	750,000	0%	4,445,000	23%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within wind energy management designations in MZ V; it also displays the percentage of those acres that are found within the sub-region.

Across MZ V, the Oregon RMPA/EIS Proposed Plan would exclude solar and wind development in SFAs and would allow for wind and solar ROW avoidance as opposed to exclusion in PHMA in Lake, Harney, and Malheur Counties. In the Nevada and Northeastern California Sub-region, wind and solar installations could be considered in PHMA only to provide power for an existing facility; these approvals would be subject to a net conservation gain for GRSG.

In Nevada, new wind ROW authorizations that require state agency review or approval would be subject to the permitting process and stipulations for development in the SGMA under the Nevada state conservation plan for GRSG. These stipulations would benefit GRSG in the Nevada and Northeastern California portion of MZ V by ensuring that projects avoid, minimize, and mitigate impacts on GRSG habitat from ROWs developments. Oregon has also developed a state plan to achieve no loss of GRSG core habitat from

development as discussed under the *Rights-of-Way* subheading of **Section 5.1.14**. However, because measures in the plan are not currently required by a regulatory mechanism within the state, the Oregon plan may not be as protective of GRSG habitat as plans containing regulatory mechanisms for GRSG conservation on private lands, such as the Nevada state plan.

The effect of the alternatives and other conservation actions in the MZ (most notably the Nevada state plan) could be synergistic. By implementing restrictions on infrastructure in PHMA and on state and private lands together, the cumulative beneficial effect on GRSG would be greater than the sum of their individual effects because protections would be applied more consistently across the landscape. This is especially important in areas of mixed land ownership patterns where complementary protections can benefit leks, early brood-rearing habitat, or other important areas that do not follow geopolitical boundaries.

Reasonably foreseeable energy development in MZ V is expected to increase over the 20-year analysis period (**Section 5.1.16**), though state and private GRSG conservation efforts as well as wind energy restrictions in the Oregon Sub-region BLM Proposed Plan in MZ V would reduce the threat by restricting the type and location of developments. When restrictions in the Nevada and Northeastern California LUPA are added to these conservation actions, the impacts of future energy developments would be further reduced. Alternatives C, D, and F would provide the greatest net conservation gain to GRSG habitats and populations in MZ V by providing the greatest amount of wind exclusion in GRSG habitat. The Proposed Plan would also reduce the threat to a lesser degree by providing the flexibility to site energy developments with the least impact on GRSG habitat.

Livestock Grazing and Free Roaming Equids

Nature and Type of Effects. The impacts of livestock grazing and free-roaming equids on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ V. Livestock grazing is present and widespread on many land types, including federal and private lands, across MZ V. Rangeland health assessments have found that nearly 12 percent (417,000 acres of priority habitat and 158,700 acres of general habitat) of BLM-administered grazing allotments in GRSG habitat in MZ V are not meeting wildlife standards with grazing as a causal factor (Manier et al. 2013, p. 97).

One of the most pervasive changes associated with grazing management in GRSG habitats throughout MZ V is the construction of fencing (Knick et al. 2011, p. 224). The Nature Conservancy of Oregon and the BLM Burns District (BLM 2013a) conducted a study of livestock fence GRSG collision risk in the district to identify potential fences for marking, relocation, or removal. Results of the study indicate that there are 52 miles of high-risk fence in the district.

Over 56 percent (2,190,000 acres of priority habitat and 1,476,300 acres of general habitat) of GRSG habitat within MZ V is federally managed wild horse and burro range (Manier et al. 2013, p. 102). Within MZ V, 31 percent of priority habitat and 25 percent of general habitat is negatively influenced by free-roaming equids (Manier et al. 2013, p. 103). Within MZ V, 91 percent of HMAs in priority habitat occur on BLM-administered lands, similarly 95 percent of HMAs in general habitat are on BLM-administered lands (Manier et al. 2013, p. 103) The BLM establishes an AML for each HMA, which represents the population objective.

Impact Analysis. **Table 5-29** provides a quantitative summary of acres available and unavailable to livestock grazing on BLM-administered land and across MZ V. As shown in the table, with the exception of Alternative C, the Nevada and Northeastern California LUPA action alternatives would have a similar contribution to acres available and unavailable to livestock grazing in GRSG habitat in MZ V. Alternative C would exclude livestock grazing from PHMA.

Table 5-29
Acres Available and Unavailable to Livestock Grazing in GRSG Habitat in MZ V

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-Region	MZ V	Percent Within Sub-Region
Available to Livestock Grazing				
Alternative A	4,596,000	50%	4,758,000	25%
Alternative B	4,596,000	50%	4,758,000	25%
Alternative C	2,278,000	0%	3,572,000	0%
Alternative D	4,771,000	52%	4,584,000	22%
Alternative E	4,596,000	50%	4,758,000	25%
Alternative F	4,596,000	50%	4,758,000	25%
Proposed Plan	4,622,000	51%	4,733,000	25%
Unavailable to Livestock Grazing				
Alternative A	49,000	0%	102,000	0%
Alternative B	49,000	0%	102,000	0%
Alternative C	3,554,000	99%	102,000	0%
Alternative D	49,000	0%	102,000	0%
Alternative E	49,000	0%	102,000	0%
Alternative F	49,000	0%	102,000	0%
Proposed Plan	49,000	0%	102,000	0%

Source: BLM 2015

This table displays the acres of PHMA and GHMA available and unavailable to livestock grazing in MZ V; it also displays the percentage of those acres that are found within the sub-region.

As discussed in *Livestock Grazing and Free Roaming Equids* in **Section 5.1.6**, the alternative that most reduces acres available for grazing would not necessarily have the greatest benefit on GRSG populations and habitat. Given these considerations, and because the Proposed Plan contains additional measures that would improve GRSG habitat as discussed in **Section 5.1.6**, the Proposed Plan would provide the greatest benefit to GRSG of all the alternatives.

Relevant cumulative actions that improve grazing management with respect to GRSG within MZ V include rangeland health improvements through the NRCS SGI. These improvements are described in *Livestock Grazing and Free Roaming Equids* in **Section 5.1.6**. Within MZ V, SGI has implemented 88,306 acres of prescribed grazing systems. This program is likely the largest and most impactful program on private lands within MZ V. Because of its focus on priority areas for conservation, which often overlap PHMA, the SGI's past, present, and reasonably foreseeable work has had and likely will continue to have a cumulative beneficial impact on GRSG when considered alongside protective BLM management actions in PHMA.

Reasonably foreseeable livestock grazing management efforts in MZ V are expected to increase over the analysis period (**Section 5.1.16**), through increased NRCS conservation actions under the Sage-Grouse Initiative (e.g., fence marking and conservation easements), state efforts to maintain ranchland, and the implementation of the Oregon Sub-region BLM RMPA in MZ V. When grazing management within the Nevada and Northeastern California LUPA is added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ V.

Under all alternatives the BLM has the authority to adjust wild horse and burros AMLs if resource damage occurs; however, only Alternatives B through F and the Proposed Plan provide management guidelines specific to GRSG habitat, which would benefit the species more than Alternative A. Under most action alternatives, management actions and range improvements for wild horses and burros would follow management action for livestock range improvements and be aligned with GRSG habitat objectives, as described in **Section 5.1.6**.

Reasonably foreseeable wild horse management efforts are projected to increase over the analysis period (**Section 5.1.16**) with implementation of the Oregon BLM RMPA in MZ V. When wild horse management within the Nevada and Northeastern California LUPA is added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ V. Impacts may be reduced to the greatest extent under the Proposed Plan, where AMLs would be evaluated with consideration of GRSG habitat objectives for BLM-administered lands.

Conversion to Agriculture

Nature and Type of Effects. The impacts of agricultural conversion on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ V. Regional assessments estimate that while only 1 percent of priority habitat and general habitat in MZ V are directly influenced by agricultural development, over 66 and 85 percent of priority habitat and general habitat, respectively, are within approximately 4 miles of agricultural land and are therefore negatively indirectly affected (Manier et al. 2013, p. 28).

Impact Analysis. The BLM does not convert public lands to agriculture. As such, the only direct authority these agencies have over conversion to agriculture is by retaining or disposing of lands in the realty program. Lands retained under BLM and Forest Service management will not be converted to agriculture, and disposing of lands could increase the likelihood they will be converted to agriculture, depending on their location and new management authority.

Table 5-30 provides a quantitative summary of acres identified for retention and disposal on BLM-administered across MZ V. As shown in the table, the Nevada and Northeastern California LUPA/EIS action alternatives for acres of PHMA identified for retention would not vary substantially across alternatives and would have a similar contribution to acres identified for retention across MZ V. Alternative C would retain approximately twice the PHMA as the other alternatives in the sub-region, which would translate to additional retained acres of PHMA across MZ V. Since Alternatives B, C, D, and F would retain all PHMA in public ownership, acres of PHMA identified for disposal under these alternatives would be zero. Current land tenure retention guidance include retaining lands supporting threatened and endangered species and species of high interest, and existing California BLM field office RMPs and PMU conservation strategies specify retention of GRSG habitat, which would mean that GRSG habitat would be retained under the No Action Alternative. Under the Proposed Plan, PHMA would be retained unless there is a net conservation gain to GRSG by disposal of PHMA.

**Table 5-30
Acres Identified for Retention and Disposal in GRSG Habitat in MZ V**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-Region	MZ V	Percent Within Sub-Region
	Acres Identified for Retention			
Alternative A	4,612,000	49%	4,823,000	24%
Alternative B	4,665,000	50%	4,823,000	24%
Alternative C	5,871,000	60%	3,686,000	0%

**Table 5-30
Acres Identified for Retention and Disposal in GRSG Habitat in MZ V**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-Region	MZ V	Percent Within Sub-Region
Alternative D	4,840,000	52%	4,717,000	22%
Alternative E	4,612,000	49%	4,823,000	24%
Alternative F	4,665,000	50%	4,823,000	24%
Proposed Plan	4,684,000	50%	4,804,000	23%
Acres Identified for Disposal				
Alternative A	122,000	100%	112,000	100%
Alternative B	0	0%	68,000	100%
Alternative C	0	0%	0	0%
Alternative D	0	0%	0	0%
Alternative E	53,000	100%	68,000	100%
Alternative F	0	0%	68,000	100%
Proposed Plan	7,000	100%	61,000	100%

Source: BLM 2015

This table displays the acres of PHMA and GHMA identified for retention and disposal in MZ V; it also displays the percentage of those acres that are found within the sub-region.

Cumulative impacts vary relatively little across alternatives because BLM management has little impact on alleviating this threat. Restrictions on grazing on federal land could increase agricultural pressure on adjacent private lands. If the loss of federal grazing rights makes ranching economically unviable, the potential conversion of private grazing lands to agriculture could increase. However, the Proposed Plan does not substantially increase acreage unavailable to grazing.

The COT report objectives for converting land to agriculture are to avoid further loss of sagebrush habitat for agricultural activities (both plant and animal production) and to prioritize restoration. In areas where taking agricultural lands out of production has benefited GRSG, the programs supporting these actions should be targeted and continued (USFWS 2013a, p. 48). In accordance with this objective, the NRCS's SGI program focuses on maintaining rangeland that provides habitat for GRSG, as described under *Conversion to Agriculture* in **Section 5.1.6**. As of 2014, SGI has secured conservation easements on 28,871 acres within MZ V and marked or removed 80 miles of fence (NRCS 2015). This has preserved habitat and reduced the risk of direct mortality on these lands.

As discussed in **Section 5.1.6**, the Proposed Plan would provide the greatest protections for GRSG populations and habitat of all alternatives from the threat of agricultural conversion. Over the analysis period, conversion to agriculture is expected to increase (**Section 5.1.16**), though state and private conservation efforts as well as implementation of the Oregon Sub-region BLM RMAP in MZ V would reduce the threat. When land tenure decisions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in net conservation gain to GRSG habitats and populations in MZ V.

Energy Development and Mining

The COT report states that energy development should be designed to ensure that it will not impinge on stable or increasing GRSG population trends. For energy development and mining, the COT report objective is to maintain stable to increasing GRSG populations and no net loss of GRSG habitats in areas affected by mining (USFWS 2013a, p. 49).

Energy development and mining within MZ V is generally limited to geothermal energy development and wind energy development. Wind development is discussed under the *Renewable Energy* subheading above. No coal or oil and gas development is presently occurring in MZ V; mining activities, including for mineral materials, locatable minerals, and nonenergy minerals, within the sub-region is limited, as discussed under *Mineral Materials, Locatable Minerals, and Nonenergy Leasable Minerals*, below.

Oil and Gas

Nature and Type of Effects. The impacts of oil and gas development on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and MZ V. Oil and gas development in habitats used by GRSG and construction of accompanying transmission lines, roads, and pipelines began in the late 1800s with the discovery of oil in the Interior West (Connelly et al. 2004). However, locations of geologic fields for traditional oil and gas (Copeland et al. 2013) suggest the greatest potential for oil and gas development is across the eastern portion of GRSG range (MZs I, II/VII, and eastern MZ III) (Manier et al. 2013, p. 51). No active oil and gas wells currently exist in MZ V (Manier et al. p. 52), and no measurable additional acreage has been leased for fluid mineral exploration within MZ V (Manier et al. 2013, p. 55).

For the Oregon Sub-region, no RFD scenario for oil and gas development was developed for the RMPA/EIS; instead, future-looking estimates are based on broad-scale “trends” review, as described in **Chapter 5** of the Oregon Sub-Region RMPA/EIS. The potential for impacts from oil and gas development would be reduced where areas are closed to fluid mineral leasing or where NSO and CSU/TL stipulations are applied. Given the small acreage and implementation of RDFs consistent with applicable law, the likelihood for impacts on GRSG habitat on BLM-administered lands in the Oregon Sub-region portion of MZ V is

anticipated to be small and localized. Though an RFD scenario was produced for the Nevada and Northeastern California Sub-region (**Appendix P**), oil and gas disturbance within the MZ V portion of the sub-region is also anticipated to be small and localized. There are two oil-producing basins in the sub-region; both are located in MZ III and/or IV in central-eastern Nevada: Railroad Valley in Elko County and Pine Valley in Eureka County (**Section 3.13**).

Although oil and gas activities on private lands would not be subject to BLM regulatory oversight, regulatory mechanisms on both federal surface and split-estate lands in MZ V would be influential should fluid mineral development occur. Development on BLM-administered split-estate lands would require mitigation for impacts on GRSG habitat on private surface lands that would not be required on lands with both privately held surface and mineral estate.

Impact Analysis. **Tables 5-31** and **5-32** provide a quantitative summary of fluid mineral leasing conditions on BLM-administered and National Forest System lands across MZ V.

Table 5-31
Acres Open* and Closed to Fluid Mineral Leasing in GRSG Habitat in MZ V

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-Region	MZ V	Percent Within Sub-Region
Open* to Fluid Mineral Leasing				
Alternative A	1,623,000	100%	1,030,000	100%
Alternative B	0	0%	1,031,000	100%
Alternative C	1,000	100%	0	0%
Alternative D	0	0%	0	0%
Alternative E	0	0%	0	0%
Alternative F	0	0%	0	0%
Proposed Plan	0	0%	0	0%
Closed to Fluid Mineral Leasing				
Alternative A	1,666,000	43%	1,336,000	13%
Alternative B	3,310,333	71%	1,335,000	13%
Alternative C	4,519,000	79%	1,159,000	0%
Alternative D	1,845,000	48%	1,159,000	0%
Alternative E	1,669,000	43%	1,335,000	13%
Alternative F	3,310,000	71%	2,368,000	51%
Proposed Plan	1,670,000	43%	1,334,000	13%

Source: BLM 2015

*Open with standard stipulations. This table displays the acres of PHMA and GHMA open and closed to fluid mineral leasing in MZ V; it also displays the percentage of those acres that are found within the sub-region.

**Table 5-32
Acres with NSO and CSU/TL Stipulations in GRSG Habitat in MZ V**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-Region	MZ V	Percent Within Sub-Region
NSO Stipulations				
Alternative A	1,718,000	0%	350,000	0%
Alternative B	1,718,000	0%	350,000	0%
Alternative C	1,718,000	0%	350,000	0%
Alternative D	3,359,000	49%	1,383,000	75%
Alternative E	1,718,000	0%	350,000	0%
Alternative F	1,718,000	0%	350,000	0%
Proposed Plan	3,384,000	49%	350,000	0%
CSU/TL Stipulations				
Alternative A	0	0%	2,279,000	0%
Alternative B	0	0%	2,279,000	0%
Alternative C	0	0%	2,279,000	0%
Alternative D	0	0%	2,279,000	0%
Alternative E	1,641,000	100%	3,312,000	31%
Alternative F	0	0%	2,279,000	0%
Proposed Plan	0	0%	3,288,000	31%

Source: BLM 2015

This table displays the acres of PHMA and GHMA with NSO Stipulations and CSU/TL Stipulations in MZ V; it also displays the percentage of those acres that are found within the sub-region.

As shown in **Tables 5-31** and **5-32**, fluid mineral closures and stipulations within the Nevada and Northeastern California Sub-region exert a fairly large influence on closures or stipulations within MZ V as a whole. Alternatives B, D, E, and F and the Proposed Plan would all reduce the amount of open acres in PHMA within MZ V relative to the No Action Alternative. Alternatives C and F would close the most GRSG habitat to fluid mineral leasing and would therefore be the most protective of GRSG and its habitat. As such, reasonably foreseeable future leasing projects would be less likely to impact GRSG populations on federal lands. Alternative D and the Proposed Plan would impose major constraints on the greatest amount of PHMA, and the Proposed Plan would provide additional protections to GRSG from fluid mineral development by requiring anthropogenic disturbance criteria, a 3 percent disturbance cap, buffers, mitigation requirements, RDFs consistent with applicable law, and by managing SFAs as NSO with no waivers, exceptions, and modifications.

All BLM and Forest Service Proposed Plans within MZ V include BMPs (consistent with applicable law) to minimize impacts on GRSG from oil and gas development on federal lands. In areas where mineral estate is currently unleased, these tools can be applied to future leases; in areas that are already leased, RDFs can be applied consistent with applicable law as conditions of approval for development of existing leases. Similarly, state plans contain similar measures to reduce impacts. Together, these measures would help protect unfragmented habitats, minimize habitat loss and fragmentation, and maintain conditions that meet GRSG life history needs. Recent research indicates that restored habitats lack many of the features sought by GRSG in their habitat areas and may not support GRSG for long periods following restoration activities. In order to conserve GRSG populations on the landscape, protecting existing habitat by minimizing development would provide the best hope for GRSG persistence (Arkle et al. 2014).

Reasonably foreseeable oil and gas development is limited in the MZ. When the impacts of the Nevada and Northeastern California LUPA are added to these actions, the impact would be a net conservation gain due in large part to implementation of NSO stipulations, anthropogenic disturbance caps, and adaptive management that would minimize future disturbances to GRSG populations and habitats.

In Nevada, new oil and gas leases or authorizations that require state agency review or approval would be subject to the permitting process and stipulations for development in the SGMA under the Nevada state conservation plan for GRSG. These stipulations would benefit GRSG in the MZ V portion of the sub-region by ensuring that projects avoid, minimize, and mitigate impacts on GRSG habitat. Oregon has also developed a state plan to achieve no net loss of GRSG core habitat from development as discussed under the *Rights-of-Way* subheading of **Section 5.1.14**. However, because measures in the plan are not currently required by a regulatory mechanism within the state, the Oregon plan may not be as protective of GRSG habitat as plans containing regulatory mechanisms for GRSG conservation on private lands, such as the Nevada state plan.

The effect of the Nevada and Northeastern California LUPA alternatives and other past, present, and reasonably foreseeable future conservation actions in the MZ (most notably the Nevada state plan) could be synergistic, meaning that the effects of the actions together is greater than the sum of their individual effects. For example, applying buffers in PHMA and on state and private land would effectively conserve larger blocks of land than if these actions occurred individually. This would provide a landscape-scale net conservation benefit, especially in areas where little development has occurred to date.

Reasonably foreseeable oil and gas development in MZ V is expected to increase over the 20-year analysis period (**Section 5.1.16**), though state and private GRSG conservation efforts as well as implementation of the Oregon Sub-region

BLM RMPA in MZ V would reduce the threat by restricting the location of developments and requiring mitigation. When restrictions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ V. Alternatives C and F would provide the greatest net conservation gain to GRSG habitats and populations in MZ V by providing the greatest amount of GRSG habitat closed to leasing. The Proposed Plan would also reduce the threat to a lesser degree through designation of NSO stipulations and additional conservation measures.

Geothermal

Nature and Type of Effects. The impacts of geothermal development on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and MZ V. Current geothermal energy production within the GRSG range is primarily within MZs III, IV, and V. Approximately 10,900 acres of geothermal leases on priority habitat and 31,800 acres of leases on general habitat currently exist in MZ V (Manier et al. 2013, p. 71). This acreage represents less than 1 percent of total GRSG habitat in the MZ.

The RFD scenario for the Nevada and Northeastern California Sub-region (**Appendix P**) predicts up to 12 new geothermal power plants and estimates between 53 and 367 acres of disturbance would be required for each plant. Therefore, between 636 and 4,404 acres of temporary and permanent disturbance associated with geothermal development over the next 20 years is expected under the No Action Alternative throughout the sub-region on both BLM and National Forest System lands. The conservative assumption that all 4,404 acres of disturbance would be located within MZ V, on PHMA, would mean that less than 1 percent of PHMA within MZ V would be directly affected under this scenario. It is reasonable to assume that not all 4,404 acres of disturbance would occur within GRSG habitat. This acreage would be reclaimed after operations cease or wells are abandoned. However, indirect impacts from such development would affect a considerably larger area than the direct footprint of development, as discussed for several threats above. Typical geothermal development includes roads, transmission lines, and associated linear features in addition to power plant development, and as discussed above, these features may contribute to spread of invasive plants, habitat fragmentation, and increased predation on GRSG.

Under the RFD scenario for the action alternatives, estimated disturbance would generally decrease between 0 and 70 percent relative to the No Action Alternative. The potential for impacts would be reduced where areas are closed to fluid mineral leasing and where NSO and CSU/TL stipulations are applied. Given the small acreage and implementation of RDFs consistent with applicable law (**Appendix D**), the likelihood for impacts on GRSG habitat is anticipated to be small and localized under all alternatives, including the No Action Alternative.

The potential for impacts from geothermal development would be reduced where areas are closed to leasing and where stipulations are applied. Given the relatively small acreage of projected geothermal development, and implementation of the disturbance cap, stipulations, RDFs consistent with applicable law, and mitigation, the likelihood for impacts on GRSG habitat on BLM-administered lands is anticipated to be small and localized under all alternatives.

Impact Analysis. The quantitative analysis of effects from geothermal leasing would be the same as described for oil and gas because allocations and past, present, and reasonably foreseeable future actions would be the same.

Coal

Nature and Type of Effects. The impacts of coal development on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ V. There are currently no direct or indirect effects from surface coal leases in the MZ (Manier et al. 2013, p. 74). There are no leasable coal deposits in the Nevada and Northeastern California Sub-region (**Section 3.13**). This threat will not be described further for this MZ.

Mineral Materials

Nature and Type of Effects. The impacts of mineral materials on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ V. There are 111,400 acres of mining sites for mineral materials and locatable minerals on BLM-administered surface land on priority habitat and general habitat in MZ V. This total does not include minerals mined as energy sources. There are 119,300 acres of mining sites across all landownership types, making BLM-administered land the largest contributor to potential direct effects from this threat (82 percent of potentially affected priority habitat and 74 percent of potentially affected general habitat, respectively, are on BLM-administered lands). National Forest System lands do not contribute to direct effects on priority habitat and general habitat (Manier et al. 2013, p. 78).

GRSG may be directly impacted by mining and mineral materials disposal sites by being in the path of development; however, indirect impacts on habitat affect a much wider population of birds. Manier et al. (2013, p. 77) estimate that indirect impacts from this type of development extend 1.5 miles from the development footprint. Therefore, direct and indirect impacts taken together affect 800,900 acres of priority habitat and general habitat on BLM-administered lands in MZ V. National Forest System lands indirectly affect only 1,500 acres of GRSG habitat in MZ V (Manier et al. 2013, p. 78).

Impact Analysis. **Table 5-33** provides a quantitative summary of acreages of BLM-administered lands open and closed to mineral material disposal across MZ V. As shown in the table, both Alternatives A and E would contribute substantially more acres of PHMA open to mineral disposal in MZ V. Under the other action alternatives, PHMA would be closed to mineral material disposal. Under Alternative E, core habitat would be open to mineral materials disposal but would require SETT consultation under the Nevada state plan. Alternatives B, C, D, and F and the Proposed Plan would all contribute substantially to PHMA acres closed in MZ V; Alternative D would have the greatest contribution and would potentially have the greatest benefit for GRSG populations and habitat.

**Table 5-33
Acres Open and Closed to Mineral Material Disposal in GRSG Habitat in MZ V**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-Region	MZ V	Percent Within Sub-Region
Open to Mineral Material Disposal				
Alternative A	1,623,000	100%	3,646,000	28%
Alternative B	0	0%	3,646,000	28%
Alternative C	1,000	100%	2,615,000	0%
Alternative D	0	0%	2,615,000	0%
Alternative E	1,621,000	100%	3,646,000	28%
Alternative F	0	0%	3,646,000	28%
Proposed Plan	0	0%	3,621,000	28%
Closed to Mineral Material Disposal				
Alternative A	3,384,000	21%	1,350,000	13%
Alternative B	5,028,000	47%	1,349,000	13%
Alternative C	6,237,000	57%	1,174,000	0%
Alternative D	5,204,000	49%	2,207,000	47%
Alternative E	3,387,000	21%	1,349,000	13%
Alternative F	5,028,000	47%	1,349,000	13%
Proposed Plan	5,053,000	47%	1,349,000	13%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open and closed to mineral material disposal in MZ V; it also displays the percentage of those acres that are found within the sub-region.

Despite not contributing the most acres closed within MZ V, the Proposed Plan would provide additional protections that would provide the greatest benefit to GRSG populations and habitat. The Proposed Plan would close PHMA to new mineral materials sales, though PHMA would remain open to expansion of existing pits. The Proposed Plan would also require anthropogenic disturbance criteria, a 3 percent disturbance cap, RDFs consistent with applicable law, buffers, and mitigation. These closures and restrictions would reduce the effect on GRSG from mineral material development on BLM-administered in MZ V compared to the action alternatives. However, these actions may shift development onto non-federal lands, with potentially greater impacts on GRSG. This is because similar protective stipulations and permit requirements might not apply on those other lands.

In Nevada, new mineral material leases or authorizations that require state agency review or approval would be subject to the permitting process and stipulations for development in the SGMA under the Nevada state conservation plan for GRSG. These stipulations would benefit GRSG in the Nevada and Northeastern California Sub-region portion of MZ V by ensuring that projects avoid, minimize, and mitigate impacts on GRSG habitat. Oregon has also developed a state plan to achieve no net loss of GRSG core habitat from development as discussed under the *Rights-of-Way* subheading of **Section 5.1.14**. However, because measures in the plan are not currently required by a regulatory mechanism within the state, the Oregon plan may not be as protective of GRSG habitat as plans containing regulatory mechanisms for GRSG conservation on private lands, such as the Nevada state plan.

Reasonably foreseeable mineral materials development in MZ V is expected to increase over the 20-year analysis period (**Section 5.1.16**), though state and private GRSG conservation efforts as well as implementation of the Oregon Sub-region BLM RMPA in MZ V would reduce the threat by restricting the location of developments and requiring mitigation. When restrictions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ V.

Locatable Minerals

Nature and Type of Effects. The impacts of locatable minerals management on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ V. Current locatable mineral exploration and production in MZ V is limited and includes diatomaceous earth, limestone, perlite, sunstone, bentonite, gold, silver, and copper.

Impact Analysis. **Table 5-34** provides a quantitative summary of acreages of BLM-administered lands open to and recommended for withdrawal from mineral entry across MZ V.

Table 5-34
Acres Open and Recommended for Withdrawal from Locatable Mineral Entry
in GRSG Habitat in MZ V

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-Region	MZ V	Percent Within Sub-Region
Open to Locatable Mineral Entry				
Alternative A	3,167,000	68%	4,326,000	26%
Alternative B	1,013,000	<1%	4,326,000	26%
Alternative C	1,013,000	<1%	3,204,000	0%
Alternative D	3,258,000	69%	4,324,000	24%
Alternative E	3,167,000	68%	4,326,000	26%
Alternative F	1,013,000	<1%	4,326,000	26%
Proposed Plan	2,769,000	63%	4,300,000	25%
Recommended for Withdrawal from Locatable Mineral Entry				
Alternative A	1,170,000	0%	5,000	0%
Alternative B	3,346,000	65%	5,000	0%
Alternative C	4,470,000	74%	5,000	0%
Alternative D	1,170,000	0%	5,000	0%
Alternative E	1,170,000	0%	5,000	0%
Alternative F	2,176,000	100%	5,000	0%
Proposed Plan	1,593,000	27%	5,000	0%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open to mineral entry and recommended for withdrawal from locatable mineral entry in MZ V; it also displays the percentage of those acres that are found within the sub-region.

As shown in the table, Alternatives A, D, E and the Proposed Plan would contribute most of the PHMA open to locatable entry in MZ V. Contributions of GHMA open would not differ substantially, with the exception of Alternative C and the Proposed Plan. Alternatives B, C, and F would recommend PHMA for withdrawal, and would contribute most or all of the PHMA recommended for withdrawal from locatable mineral entry in MZ V. While acres of PHMA would still be available for locatable mineral entry under the Proposed Plan, additional protections under this alternative would provide the greatest benefit to GRSG populations and habitat compared to the other action alternatives as discussed in **Section 5.1.6**. This includes recommending SFAs for withdrawal from locatable mineral entry, which would help protect the highest-quality habitat for GRSG. However, implementation of this alternative could push development onto private lands with fewer restrictions, thereby increasing impacts on GRSG.

In Nevada, new locatable mineral leases or authorizations that require state agency review or approval would be subject to the state permitting process and stipulations for development in the SGMA under the Nevada state conservation plan for GRSG. These stipulations would benefit GRSG in the Nevada and Northeastern California Sub-region portion of MZ V by ensuring that projects avoid, minimize, and mitigate impacts on GRSG habitat. Oregon has also developed a state plan to achieve no net loss of GRSG core habitat from development as discussed under *Rights-of-Way* in **Section 5.1.14**. However, because measures in the plan are not currently required by a regulatory mechanism within the state, the Oregon plan may not be as protective of GRSG habitat as plans containing regulatory mechanisms for GRSG conservation on private lands, such as the Nevada state plan.

Reasonably foreseeable locatable mineral development in MZ V is expected to increase over the 20-year analysis period (**Section 5.1.16**), though state and private GRSG conservation efforts as well as implementation of the Oregon Sub-region BLM RMPA in MZ V would reduce the threat by applying RDFs as Conditions of Approval. The disturbance caps in the Proposed Plans would not block locatable mineral entry projects, but any locatable mineral entry would be considered as disturbance under the cap. When restrictions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ V.

Nonenergy Leasable Minerals

Nature and Type of Effects. The impacts of nonenergy leasable minerals management on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ V. Existing leases for nonenergy leasable minerals represent a relatively small threat across the range of GRSG (Manier et al. 2013, p. 71). No current nonenergy leasable development is present in MZ V (Manier et al. 2013, p. 79), and nonenergy leasable minerals are not discussed further for this MZ.

Recreation

Nature and Type of Effects. The impacts from recreation management on GRSG are described in **Section 4.2** and above in **Section 5.1.6**.

Conditions in the Sub-region and in MZ V. Human populations have increased and expanded, primarily over the past century and in the western portion of the sagebrush distribution (Knick et al. 2011, p. 212). With these expanding populations come greater human impacts (Leu et al. 2008), including from recreational uses of BLM and National Forest System lands. Uninhabited areas within the Great Basin ecoregion (portions of MZs III, IV, and V) decreased 90 percent (from 22.2 million acres to less than 3 million acres), with expansion

driven in part by economic and recreation opportunities in the region (Torregrosa and Devoe 2008, p. 10).

The COT report objectives for recreation are to maintain healthy native sagebrush communities, based on local ecological conditions, and to manage direct and indirect human disturbance (including noise) to avoid interruption of normal GRSG behavior (USFWS 2013a, p. 49). Limits on road use under the action alternatives and limits on OHVs would help meet these objectives.

In the Oregon sub-region, the BLM has designated all BLM-administered lands as open, limited, or closed to OHV travel. This policy has resulted in the implementation of a system of designated or existing roads and trails whereby cross-country travel is only allowed in specified areas; however, most areas in Oregon are currently designated open. Similarly, the Forest Service has published Motor Vehicle Use Maps for nine National Scenic Areas, National Grasslands, and National Forests in the sub-region. The remaining four National Forests are currently undergoing travel management planning (**Chapter 3** of the Oregon Sub-Region RMPA/EIS). In the Nevada and Northeastern California Sub-region, travel management planning is complete for all National Forest System lands (**Section 3.10**).

Impact Analysis. **Table 5-35** shows Acres of Travel Management Designations in GRSG Habitat in MZ V.

Table 5-35
Acres of Travel Management Designations in GRSG Habitat in MZ V

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-Region	MZ V	Percent Within Sub-Region
Open				
Alternative A	742,000	100%	513,000	100%
Alternative B	0	0%	513,000	100%
Alternative C	0	0%	0	0%
Alternative D	0	0%	0	0%
Alternative E	0	0%	0	0%
Alternative F	0	0%	0	0%
Proposed Plan	0	0%	0	0%
Limited				
Alternative A	3,687,000	39%	4,162,000	15%
Alternative B	4,425,000	49%	4,162,000	15%
Alternative C	5,554,000	59%	3,553,000	0%
Alternative D	4,521,000	50%	4,586,000	23%

**Table 5-35
Acres of Travel Management Designations in GRSG Habitat in MZ V**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-Region	MZ V	Percent Within Sub-Region
Alternative E	4,428,000	49%	4,678,000	24%
Alternative F	4,428,000	49%	4,678,000	24%
Proposed Plan	4,469,000	49%	4,652,000	24%
Closed				
Alternative A	247,000	71%	215,000	39%
Alternative B	247,000	71%	215,000	39%
Alternative C	331,000	78%	131,000	0%
Alternative D	330,000	78%	131,000	0%
Alternative E	247,000	71%	215,000	39%
Alternative F	247,000	71%	215,000	39%
Proposed Plan	247,000	71%	215,000	39%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within travel management designations of open, limited and closed in MZ V; it also displays the percentage of those acres that are found within the sub-region.

As shown in **Table 5-35**, none of the action alternatives would contribute to the acres of GRSG habitat designated as open to cross-country motorized travel in MZ V, with the exception of Alternative B, which would contribute all of the GHMA open in MZ V. For acres closed to cross-country motorized travel, Alternatives C and D would contribute the most acres of PHMA in MZ V, though these two alternatives would contribute the least amount of GHMA. All other alternatives would contribute the same amount of closed acres in GRSG habitat in MZ V. For acres designated as limited in PHMA, Alternative A contributes slightly less than, and Alternative C contributes slightly more than, the other action alternatives. As a result of travel management planning, impacts on GRSG from recreational motorized vehicle use would be greatest under Alternative A; impacts would be reduced most under Alternatives C, D, and the Proposed Plan.

For recreation, Alternatives B, D, and the Proposed Plan would aim to reduce impacts on GRSG with issuance of SRPs and RSUAs. Alternative F would take a similar approach, but with the addition of seasonal restrictions within 4 miles of active leks. Alternative E would require SETT consultation upon issuance of SRPs/RSUAs within GRSG habitat to avoid, minimize, and mitigate impacts on GRSG consistent with the Nevada state plan. Alternatives A and C would not manage recreation to reduce impacts on GRSG.

Reasonably foreseeable recreation in MZ V is expected to increase over the 20-year analysis period (**Section 5.1.16**). However, state and private GRSG conservation efforts as well as implementation of the Oregon Sub-region BLM RMPA in MZ V would reduce the threat by providing additional protections such as disturbance caps and limitations on National Forest System lands. When restrictions within the Nevada and Northeastern California LUPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ V.

5.1.15 Conclusions

In addition to BLM and Forest Service management in the Nevada and Northeastern California Sub-region and other sub-regions in MZs III, IV, and V, GRSG in these MZs will also be impacted by management and conservation at state, regional, tribal, and local levels. This cumulative effects analysis takes into account each alternative in the Nevada and Northeastern California LUPA in conjunction with state and private initiatives, as well as past, present, and reasonably foreseeable future actions at the federal, state, and local levels. The analysis assumes that the Proposed Plans would be implemented in the other BLM and Forest Service LUPA/RMPA sub-regions in MZs III, IV, and V.

Some of the most important past and present actions benefitting GRSG populations on private land in MZs III, IV, and V are the conservation easements coordinated by the NRCS SGI with private ranchers. SGI has also worked with landowners to develop compatible grazing systems, increase fence marking, seeding of native vegetation, and conifer removal to improve GRSG habitat quality. Future coordination of private landowners with SGI is expected to provide further benefits to GRSG habitat.

Coordination with private landowners enhances conservation in addition to what BLM and Forest Service management can accomplish on federal lands. In addition to SGI conservation easements, other coordination includes CCA or CCAA agreements between the USFWS and private, state, or federal landowners. CCA or CCAAs covering several million acres are in place or in preparation within MZ V, particularly in the Oregon Sub-region.

As discussed in **Sections 5.1.4, 5.1.8, and 5.1.12**, Oregon, Nevada, Utah, and Montana have adopted statewide plans to promote GRSG conservation. The Montana plan implements a Core Population Area Strategy with well density limitations, timing restrictions, and a uniform 5 percent disturbance cap across all landownership types. These measures would improve GRSG population levels if effectively enforced (Copeland et al. 2013). The Utah executive order directs state agencies whose actions may affect GRSG to implement Utah Division of Wildlife Resources' *Conservation Plan for Greater Sage Grouse in Utah* (Utah Greater Sage-Grouse Working Group 2013). The conservation plan identifies 11 population areas in Utah that are the focus of GRSG conservation efforts, with the goal to protect, maintain, improve, and enhance GRSG

populations and habitats on public and private lands within the established management areas.

The Oregon and Nevada plans both define key GRSG habitat and provide measures to maintain, enhance, or restore habitats for GRSG. In Nevada, this is accomplished through project avoidance, design features, and compensatory mitigation through consultation with the state. While the Nevada plan provides a regulatory mechanism to reduce impacts on GRSG from development on non-BLM-administered or National Forest System lands, the Oregon plan generally includes voluntary guidelines. However, the Oregon Governor's natural resources department is currently in the process of developing regulations for GRSG conservation. The forthcoming Sage Grouse Conservation Action Plan will supplement the state plan and provide land use regulations and mitigations for Oregon core habitat areas.

Currently, a majority of MZ V, including the states of California and Oregon, and a majority of MZ IV, including the states of Idaho and Oregon, do not have regulatory mechanisms in place to protect GRSG habitat on non-BLM-administered or National Forest System lands. These states do have GRSG conservation plans, but these plans generally include voluntary guidelines, not regulatory mechanisms. This could allow for more impacts on the 17 percent of GRSG habitat in MZ V and the 31 percent of GRSG habitat in MZ IV that is state land or privately owned. Since most GRSG habitat in MZ V (74 percent) and IV (68 percent) is under federal management, BLM and Forest Service regulatory mechanisms will have a substantial contribution to cumulative effects.

BLM and Forest Service restrictions on ROWs, renewable energy, energy development, mining, and travel management and recreation in GRSG habitat would help reduce loss and disturbance of GRSG populations. The Nevada and Northeastern California LUPA Proposed Plan includes numerous measures to allow development while reducing the likelihood for impacts on GRSG, such as requirements for anthropogenic disturbance criteria, a 3 percent disturbance cap, buffers, mitigation, and RDFs consistent of applicable law, among other measures.

The most challenging threats to manage in MZs III, IV, and V are wildfire, the spread of invasive annual grasses, and conifer encroachment. Fire regimes are complex and vary tremendously across the sagebrush region and through time; furthermore, the ecological role of wildfire has changed dramatically since the European settlement era (circa 1850) due to changing fuel and habitat patterns (Manier et al. 2013, p. 79). Effects of wildfire are exacerbated by invasive plants, particularly in warm-dry sagebrush types, where the invasion by invasive annual grasses has resulted in an increase in the number and frequency of fires and decreased fire return intervals to the point where native sagebrush-steppe cannot recover, causing widespread, detrimental effects on habitat conditions (Manier et al. 2013, p. 88). Expansion of conifer woodlands, especially juniper

woodlands, do not provide suitable habitat for GRSG, and mature trees displace shrubs, grasses and forbs through direct competition (Manier et al. 2013, p. 91). These threats are at the landscape scale and are extensive throughout MZs III, IV, and V. The Nevada and Northeastern California LUPA Proposed Plan, along with other Proposed Plans for other sub-regions in MZs III, IV, and V, include comprehensive strategies to address these major threats.

Alternative A: Current Management

Under Alternative A, current management would continue on BLM-administered and National Forest System lands in the Nevada and Northeastern California Sub-region. Several protective measures would not be implemented; for example, the BLM and Forest Service would not designate PHMA or GHMA and would not manage any additional ROW avoidance or exclusion areas. Alternative A does not include any consistent management prescriptions to protect GRSG across the sub-region, though several individual BLM district offices and National Forests have some protections in place currently. Appropriate and allowable uses and restrictions with regard to such activities as mineral leasing and development, recreation, utility corridors, and livestock grazing would also remain unchanged.

Under current management, widespread wildfire and subsequent spread of nonnative, invasive plants have destroyed and degraded GRSG habitat throughout MZs III, IV, and V. Under Alternative A, this trend would likely continue, and the cycle of wildfire and invasive plant spread would continue. Further, the expansion of conifers at a rate exceeding treatment rates, particularly juniper, would continue to reduce the suitability of sagebrush habitats for GRSG throughout the MZs.

In the remainder of MZs III, IV, and V, other BLM and Forest Service LUPA planning efforts would implement their Proposed Plans to improve protection of GRSG and GRSG habitat in those portions of MZs III, IV, and V outside of the Nevada and Northeastern California Sub-region. In addition, GRSG conservation strategies would be implemented on state and private lands under the various state plans, CCAs and CCAAs, and initiatives such as the NRCS SGI as discussed in **Sections 5.1.4, 5.1.8, and 5.1.12**. As a result, the lack of protections under the Nevada and Northeastern California LUPA Alternative A would be partially offset by more protective management elsewhere in the MZs. Within the sub-region, though, continuation of current management would do little to reduce the major threats to GRSG in the sub-region: wildfire, invasive plants, and conifer encroachment. Current management provides a limited number and extent of regulatory mechanisms to avoid continued degradation of GRSG habitat in MZs III, IV, and V; however, current management would not meet the COT report objectives for conservation of GRSG. Current management direction in the existing LUPs does not explicitly address all elements of the COT report objectives. While nothing in the existing LUPs prevents vegetation treatments intended to address the threats of invasive plant

spread, conifer encroachment, and wildfire, there is less certainty that GRSG habitat would be the focus of management effort concerning these threats. Current management allows for more development than recommended by the COT report, potentially leading to greater fragmentation and increased risk that the unintentional spread of invasive plants would be facilitated.

Alternative B

Under Alternative B, the BLM and Forest Service would manage lands to conserve, enhance, and restore sagebrush ecosystems. In conjunction with NRCS and state initiatives on private land, several aspects of BLM and Forest Service management under Alternative B would benefit GRSG conservation at a landscape level. These include designation of PHMA and GHMA, implementation of RDFs consistent with applicable law, retention of GRSG habitat, restrictions on resource uses such as managing PHMA as ROW exclusion and recommended for locatable mineral withdrawal, managing grazing and free-roaming equids and wildfire fuels management using GRSG habitat objectives, and prioritizing restoration in GRSG habitat. Implementing these protective measures on BLM-administered and National Forest System lands within the Nevada and Northeastern California Sub-region would help reduce damage to GRSG habitat, minimize loss of connectivity, and minimize the spread of invasive plants by limiting human activities that disturb soil or introduce seeds. However, such restrictions could also risk pushing development onto adjacent, nonfederal lands with less restrictive management where land ownership patterns are mixed. This is particularly a concern where nonfederal lands have fewer protections (e.g., most of MZs IV and V where state plans currently lack regulatory mechanisms for GRSG conservation). In MZ III and parts of MZ IV, some nonfederal lands have similarly restrictive measures such as the SGMA in Nevada, Core habitat in Montana, and GRSG Management Areas in Utah, which would reduce the likelihood for impacts in these areas.

Under Alternative B, in the remainder of MZs III, IV, and V, other BLM and Forest Service LUPA planning efforts would implement their Proposed Plans to improve protection of GRSG and GRSG habitat in those portions of MZs III, IV, and V outside of the Nevada and Northeastern California Sub-region. In addition, GRSG conservation strategies under the state plans, NRCS, and private initiatives would be implemented as discussed in **Sections 5.1.4, 5.1.8, and 5.1.12**. As a result, protections under the Nevada and Northeastern California LUPA Alternative B would be in addition to protective management elsewhere in the MZs.

In combination with other past, present, and reasonably foreseeable future actions, Alternative B would likely meet the objectives laid out in the COT report for infrastructure, livestock grazing and free-roaming equids, conversion to agriculture, energy development, and recreation. However, because Alternative B lacks a comprehensive strategy to address fire, invasive plants, and conifer encroachment, it likely will not meet the COT objectives for these

major threats. In addition, the vague and very general language used in Alternative B increases the likelihood of differing interpretations during project development both within a given sub-region and across sub-regions, likely leading to project designs that are less consistent or outcomes that are less desirable for GRSB habitat conservation.

Alternative C

Under Alternative C, the BLM and Forest Service would manage lands to conserve, enhance, and restore sagebrush ecosystems. Management actions under Alternative C are applied to PHMA and focus on the complete removal of livestock grazing from the landscape to alleviate threats to GRSB. In conjunction with NRCS and state initiatives on private land, several aspects of BLM and Forest Service management under Alternative C would benefit GRSB conservation at a landscape level. These include implementation of RDFs consistent with applicable law, restrictions on resource uses such as managing PHMA as ROW exclusion and closed to mineral development, and retention of PHMA. Though Alternative C would result in removal of livestock grazing from BLM-administered and National Forest System lands, this action may have additional associated negative impacts on GRSB from the increased fencing in GRSB habitat required to accomplish this. Additionally, well-managed grazing can benefit GRSB habitat through reduction of fuels and reduced risk of wildfire severity.

Under Alternative C, in the remainder of MZs III, IV, and V, other BLM and Forest Service LUPA planning efforts would implement their Proposed Plans to improve protection of GRSB and GRSB habitat in those portions of MZs III, IV, and V outside of the Nevada and Northeastern California Sub-region. In addition, GRSB conservation strategies under the state plans, NRCS, and private initiatives would be implemented as discussed in **Sections 5.1.4, 5.1.8, and 5.1.12**. As a result, protections under the Nevada and Northeastern California LUPA Alternative C would be in addition to protective management elsewhere in the MZs. Together with other past, present, and reasonably foreseeable future actions, Alternative C would likely meet the objectives laid out in the COT report for infrastructure, conversion to agriculture, energy development, and recreation. Without a comprehensive strategy to address fire, invasive plants, and conifer encroachment, it likely would not meet the COT objectives for these major threats. Further, it is unknown whether removal of grazing would meet the COT objectives for range management, as analyzed above and in greater detail in **Section 4.2**. Because Alternative C draws on much of the language used in Alternative B, it would also likely result in differing interpretations within and across sub-regions, with less consistency and less desirable outcomes.

Alternative D

Under Alternative D, the BLM and Forest Service would manage lands to conserve, enhance, and restore sagebrush ecosystems. Management and impacts

would be similar to Alternative B, though Alternative D would incorporate more flexibility and adaptive management applied to resource uses to account for sub-regional conditions. The BLM and Forest Service would require a no net unmitigated loss of PHMA and GHMA and would implement numerous conservation measures to reduce impacts from human activities, such as RDFs consistent with applicable law, management of GRSG habitat as ROW avoidance areas, and closure to some mineral development. Alternative D also includes additional measures and planning for habitat restoration, vegetation, and wildfire management using GRSG habitat objectives, and for managing livestock grazing and free-roaming equids and wildfire fuels management using GRSG habitat objectives. Mitigation would be accomplished by specific measures and through the Nevada Conservation Credit System.

Under Alternative D, in the remainder of MZs III, IV, and V, other BLM and Forest Service LUPA planning efforts would implement their Proposed Plans to improve protection of GRSG and GRSG habitat in those portions of MZs III, IV, and V outside of the Nevada and Northeastern California Sub-region. In addition, GRSG conservation strategies under the state plans, NRCS, and private initiatives would be implemented as discussed in **Sections 5.1.4, 5.1.8, and 5.1.12**. As a result, protections under the Nevada and Northeastern California LUPA Alternative D would be in addition to protective management elsewhere in the MZs.

Under Alternative D, the BLM and Forest Service would increase GRSG habitat protection over current management, but with less restrictive actions than under Alternatives B or C. In conjunction with state and regional planning efforts, implementation of state measures in GRSG core areas in Nevada and Montana, and in GRSG Management Areas in Utah, conservation easements on private lands, implementation of other BLM and Forest Service LUPAs/RMPAs in MZs III, IV, and V, and other past, present, and reasonably foreseeable future actions, Alternative D would likely meet the objectives laid out in the COT report for fire, invasive plants, conifer encroachment, infrastructure, livestock grazing and free-roaming equids, conversion to agriculture, energy development, and recreation. However, because climate and weather factors that BLM cannot control often govern invasive plant spread and large wildfires, the ability of Alternative D to meet the COT report objectives for these two threats is less certain.

Alternative E

Under Alternative E, management actions developed by the State of Nevada would apply to BLM and National Forest System lands throughout the State of Nevada portion of the sub-region. Since the State of California did not submit management recommendations as part of this alternative, management actions in Alternative E would not apply to the California portion of the sub-region; instead, management actions in Alternative A would apply in the State of California. Under Alternative E, the BLM and Forest Service would manage to

maintain, conserve, enhance, and restore sagebrush ecosystems. Key elements of this alternative include achieving no net unmitigated loss of GRSG habitat by implementation of a strategy to avoid, minimize, and mitigate impacts on GRSG, and establishing the SETT and Nevada Conservation Credit System. Under Alternative E, the BLM and Forest Service would increase GRSG habitat protection over current management, but with less restrictive actions than under Alternatives B, C, or D.

Under Alternative E, in the remainder of MZs III, IV, and V, other BLM and Forest Service LUPA planning efforts would implement their Proposed Plans to improve protection of GRSG and GRSG habitat in those portions of MZs III, IV, and V outside of the Nevada and Northeastern California Sub-region. However, as described above, portions of California within the sub-region would continue to be managed under current guidance (Alternative A). In addition, GRSG conservation strategies under the state plans, NRCS, and private initiatives would be implemented as discussed in **Sections 5.1.4, 5.1.8, and 5.1.12**. As a result, protections under the Nevada and Northeastern California LUPA Alternative E would be in addition to protective management elsewhere in the MZs. In combination with other past, present, and reasonably foreseeable future actions, Alternative E would likely meet the objectives laid out in the COT report for infrastructure, grazing and free-roaming equids, conversion to agriculture, energy development, and recreation. However, because Alternative E lacks a comprehensive strategy to address fire, invasive plants, and conifer encroachment, it likely would not meet the COT objectives for these major threats.

Alternative F

Management under Alternative F would be largely similar to that described for Alternative B, though with more stringent guidance and restrictive management in sagebrush ecosystems. Livestock grazing and free roaming equids levels would be reduced by 25 percent.

Under Alternative F, in the remainder of MZs III, IV, and V, other BLM and Forest Service LUPA planning efforts would implement their Proposed Plans to improve protection of GRSG and GRSG habitat in those portions of MZs III, IV, and V outside of the Nevada and Northeastern California Sub-region. In addition, GRSG conservation strategies under the state plans, NRCS, and private initiatives would be implemented as discussed in **Sections 5.1.4, 5.1.8, and 5.1.12**. As a result, protections under the Nevada and Northeastern California LUPA Alternative F would be in addition to protective management elsewhere in the MZs. In combination with other past, present, and reasonably foreseeable future actions, Alternative F would likely meet the objectives laid out in the COT report for infrastructure, grazing/free-roaming equids, conversion to agriculture, energy development, and recreation. Without a comprehensive strategy to address fire, invasive plants, and conifer encroachment, it likely would not meet the COT objectives for these threats.

Proposed Plan

Under the Proposed Plan, the BLM and Forest Service would manage lands to conserve, enhance, and restore GRSG habitat and the sagebrush ecosystem upon which GRSG populations depend. Management and impacts would be similar to Alternative D, though the Proposed Plan would incorporate robust additional strategies and approaches to GRSG management, including wildfire and invasive species management, conifer removal, adaptive management, mitigation, a 3 percent disturbance cap, anthropogenic disturbance criteria, buffers, habitat objectives, and monitoring. In addition to habitat management areas, SFAs would also be managed to protect the most important areas for the species. The Proposed Plan provides vegetation treatment acres by decade sufficient to meet desired habitat conditions (70 percent of the analysis area meeting 10-30 percent sagebrush cover; NTT 2011).

The Proposed Plan would provide a higher level of GRSG habitat protection compared to current management, while allowing flexibility for resource uses when there would be no impacts on GRSG.

In the rest of MZs III, IV, and V, other BLM and Forest Service LUPA planning efforts would implement their Proposed Plans to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies as discussed in **Section 5.1.4, 5.1.8, and 5.1.12**, would be implemented on non-federal lands. Reasonably foreseeable future actions in MZs III, IV, and V such as proposed wind energy projects, geothermal development, vegetation management projects, interstate transmission lines, and other land disturbance projects would be subject to the requirements set forth in the BLM and Forest Service Proposed Plans that encompass the MZs, where those projects occur on federal decision area lands. For non-federal lands, reasonably foreseeable future projects may be subject to measures of GRSG state plans, as well as site-specific mitigation.

In conjunction with state and regional planning efforts, implementation of state conservation measures in GRSG core areas, conservation easements on private lands, implementation of other BLM and Forest Service LUPAs/RMPAs in MZs III, IV, and V, and other past, present, and reasonably foreseeable future actions, the Proposed Plan would help meet the objectives laid out in the COT report for wildfire, livestock grazing and free-roaming equids, conversion to agriculture, invasive plants, conifer encroachment, and recreation. Because climate and weather factors that BLM cannot control often govern the spread of invasive plant spread and large wildfires, the ability of the Proposed Plan to meet the COT report objectives for these two threats is less certain. Specifically, the following measures that would be implemented under the Proposed Plan, or are considered reasonably foreseeable future actions, would help meet COT report objectives:

- By prioritizing and conducting vegetation and fuels treatments based on GRSG habitat objectives, the Proposed Plan would increase the resistance of GRSG habitat to invasive annual grasses and the resiliency of GRSG habitat to disturbances such as fire and climate change to reduce habitat loss and fragmentation and help meet the COT report objective for wildfire.
- By reducing the area dominated by invasive annual grasses in GRSG habitat in accordance with the VDDT, the Proposed Plan would help meet COT report objective for invasive plants.
- By reducing encroaching conifer cover in GRSG habitat and near leks in accordance with the VDDT, the Proposed Plan would help meet the COT report objective for conifer encroachment.
- By managing livestock grazing and free-roaming equids to maintain or improve GRSG habitat, including prioritizing rangeland health assessments in GRSG habitat and completing assessments for GRSG habitat indicators within HMAs, the Proposed Plan would help meet COT report objectives for livestock grazing.
- By generally retaining GRSG habitat in land tenure transactions, the Proposed Plan would reduce fragmentation of GRSG habitat and help meet COT report objectives for agricultural conversion.
- By managing travel designations to conserve GRSG habitat and populations, the Proposed Plan would help meet COT report objectives for recreation.
- Continued implementation of the NRCS SGI would help meet the COT objective for the threat of agriculture conversion by securing conservation easements on private lands. Fence marking, implementing prescribed grazing systems, and vegetation seeding would help meet the COT objectives for range management structures, grazing, and nonnative, invasive plant species.
- Implementation of state conservation plans and/or state executive orders would help meet all COT report objectives, particularly on non-BLM-administered and non-National Forest System lands.

Summary

Overall, GRSG populations across MZs III, IV, and V face the greatest pressures from wildfire, invasive plants, and conifer encroachment. Additional threats include energy development, including wind and geothermal, infrastructure, mining, conversion to agriculture, and recreation. Due to the amount of federal lands in the MZs relative to other land ownerships, and in particular BLM-administered lands, BLM and Forest Service actions within the Nevada and Northeastern California Sub-region would contribute to cumulative effects on populations and habitats within MZs III, IV, and V.

Infrastructure projects are of particular concern in MZs III and IV, because such projects affect a large amount of land. Numerous multi-state transmission lines are proposed through GRSG habitat, as are utility-scale wind projects. Implementation of the BLM and Forest Service Proposed Plans in MZs III and IV are unlikely to preclude such projects from proceeding, especially Presidential Priority transmission line projects that are not subject to GRSG protective measures in the BLM and Forest Service LUPA planning efforts. However, GRSG protective measures are being considered in the project-specific analyses for these projects. The cumulative effect of the conservation measures in the Proposed Plan will result in protection of GRSG populations. Some small, localized populations may be at continued risk due to the cumulative effect of 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 GRSG habitat quality. However, the Proposed LUPA/Final EIS restrictions on land use in combination with project-specific RDFs consistent with applicable law and other regional efforts would achieve an overall net conservation for the regional population and would help mitigate the effects on small, at-risk populations.

Of particular concern is that threat reduction for fire and invasive plants, especially invasive annual grasses, is difficult and costly. Given the intensity and widespread distribution of these threats, they may never be fully eliminated (USFWS 2013a, p. 40), but the comprehensive strategies for both fire and invasive plants under the Proposed Plan may be able to reduce the threat considerably.

Although small at-risk populations may continue to decline in the next 20 years, implementing the Proposed Plan in combination with other regional efforts (such as the Proposed Plans for other BLM and Forest Service sub-region LUPAs, conservation strategies in state plans, increased land protections through initiatives like the NRCS SGI, and local habitat restoration efforts) would contribute to conservation of GRSG populations in MZs III, IV, and V. Because Alternatives B, C, D, E, and F lack comprehensive strategies to manage wildfire, invasive plants, and/or conifer encroachment, these alternatives likely will not meet COT objectives for these major threats within MZs III, IV, and V.

5.1.16 MZ-Wide Reasonably Foreseeable Future Actions Summary Tables

Tables 5-36 through **5-38** include a selection of some of the larger projects from the reasonably foreseeable future actions tables in the RMPAs/LUPAs for MZs III, IV, and V. The full tables can be found in each EIS within each MZ.

Table 5-36
Reasonably Foreseeable Future Actions in Management Zone III Likely to Impact GRSG Habitat

MZ	Sub-Region	GRSG Population Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
Energy and Mining						
III	Utah	Carbon	South Unit Oil and Gas Development	Duchesne County, UT	Field development plan for leases held by Berry Petroleum; up to 356 new wells on up to 162 well pads may be drilled over the next 5 to 20 years; each well is subject to site-specific review and approval through the APD process. Includes GRSG mitigation.	Ongoing
III	Utah	Emery	Greens Hollow	Emery County, UT	Lease by application of 6,700 acres for coal extraction.	Planning phase
III	Utah	Emery	Flat Canyon Coal Lease by application	Sanpete County, UT	The Flat Canyon Coal Lease Tract is approximately 2,692 acres of federal coal reserves. Approximately 23 acres are within the Emery Population Area.	Forest Service completed consent to BLM
III	Utah	Panguitch	Alton Coal Tract SITLA	Kane County, UT	Add 3,576 acres of federal surface or mineral estate to existing 300-acre mine on private land.	Planning phase
III	Utah	Parker Mountain	Parker Knoll Pump Storage Hydro-electric Federal Energy Regulatory Commission Project	Piute County, UT	Create electricity using a two-reservoir, gravity-fed system; approximately 200 acres of GRSG habitat would be lost; mitigation involves GRSG habitat-improvement work in areas adjacent to the lost habitat.	Planning phase
III	Utah	Carbon	West Tavaputs Plateau Natural Gas Full Field Development Plan	Carbon County, UT	Project approved 626 well and 120 pads along with the infrastructure of roads, pipelines, compressor facilities and other facilities needed to produce oil and gas from the project area.	Ongoing
III	Utah	Carbon	Williams Draw Lease by Application	Emery County, UT	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.	Planning phase

Table 5-36
Reasonably Foreseeable Future Actions in Management Zone III Likely to Impact GRSG Habitat

MZ	Sub-Region	GRSG Population Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
III	Utah	Carbon	Gasco Energy Inc. Uinta Basin Natural Gas Development Project	Uintah and Duchesne counties, UT	Approximately 206,826 acres west of the Green River and north of the Duchesne/Uintah and Carbon County line.	Ongoing
III	Utah	Sheeprocks	August 2015 Oil and Gas Lease Sale	Juab County, UT	Proposed sale of 9 parcels, approximately 12,943 acres, and subsequent lease issuance to successful bidders	Planning phase
III	Nevada and North-eastern California	Southern Great Basin	Long Canyon Mine	30 miles east of Wells, Nevada, and 32 miles west of West Wendover, Nevada, on Interstate 80.	Open-pit gold mining operation located on the east side of the Pequop Mountains. Operations would include one open pit, a heap leach pad, waste rock dump, tailing storage facility, and other ancillary facilities. The operator, Newmont Mining, is also proposing a natural gas pipeline for self-power generation on site. The pipeline would run from the Ruby pipeline south on existing ROWs to the project site, approximately 40 miles. The proposed disturbance acreage for operations is 2,116 acres, including public, private, and split-estate lands. The projected life of mine is 14 years, including construction, operations, and closure and post-closure monitoring.	Planning phase
III	Nevada and North-eastern California	Southern Great Basin	Salt Wells Geothermal Utilization Project	Nevada	120 MW power plant	Approved. Construction not initiated
Lands and Realty						
III	Utah; Nevada and North-eastern California; North-west Colorado; 9-Plan	Bald Hills; Sheeprocks; Southeast Nevada; Northwest Colorado; Wyoming Basin	Transwest Express	WY, UT, CO, NV	725 mile 600-kV transmission line.	Planning phase

Table 5-36
Reasonably Foreseeable Future Actions in Management Zone III Likely to Impact GRSG Habitat

MZ	Sub-Region	GRSG Population Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
III	Utah; North-west Colorado; 9-Plan	Sheeprocks; Northwest Colorado; Wyoming Basin	Energy Gateway South Transmission Line EIS	WY, UT, CO	650-mile 500-kV transmission line	Planning phase
III	Utah; Nevada and North-eastern California; North-west Colorado; 9-Plan	Bald Hills; Sheeprocks; Southeast Nevada; Northwest Colorado; Wyoming Basin	Zephyr Transmission Line	WY, UT, CO, NV	500-kV transmission line	Planning phase
III	Utah	Carbon	Emery Telecom Ford Ridge Fiber Optic Line	Carbon and Utah counties, UT	Installation of 18.38 miles of fiber optic line (2.76 miles on BLM-administered lands); 13.06 miles of line would be buried along existing roads, and 5.32 miles would be attached to existing PacifiCorp power poles; the line would run from Helper, Utah, to the towers on Ford Ridge and back out to US Highway 6; the project would affect approximately 3.25 acres of BLM-administered lands.	Ongoing
III	Nevada and North-eastern California	Southeast Nevada	Southern Nevada Water Authority ROW	Begins near Ely, Nevada and ends northeast of Las Vegas, Nevada	241 miles of 230 kV, 69 kV, and 25 kV power lines; 258 miles of pipeline; ancillary facilities include pump stations, water treatment facility within corridor.	Ongoing
Fuels and Vegetation						
III	Utah	All populations in UT	Noxious weed treatments	UT	Noxious weed treatments	Ongoing
III	Utah	Sheeprock	Black Crook Treatment	Tooele County, UT	Treatment of 1,820 acres of pinion-juniper to enhance sagebrush habitat.	Ongoing
III	Utah	Sheeprock	Vernon Sage Harrow	Tooele County, UT	1,792 acres of treatment.	Ongoing

Table 5-36
Reasonably Foreseeable Future Actions in Management Zone III Likely to Impact GRSG Habitat

MZ	Sub-Region	GRSG Population Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
III	Utah	Sheeprocks	Furner Valley Habitat Improvement Project	East Tintic Mountains	800 acres of treatment	Scheduled for Fall 2015
III	Utah	Carbon	Ford Ridge Fuels Reduction and Vegetation Restoration	Ford Ridge, UT	The project would remove dead and dying trees, and reduce live crown spacing by thinning the remaining live trees within approximately 6,840 acres	NEPA completed in 2013
III	Utah	Carbon	Cottonwood Ridge Pinyon-Juniper Treatment	Carbon County, UT/ West Tavaputs Plateau	The project would remove encroaching pinyon and juniper trees within 2,070 acres of BLM and State Surface	Planning phase
III	Utah	Carbon	Upper Anthro Lop and Scatter	Duchesne County, UT	Remove encroaching conifers from up to 11,800 acres of sagebrush and mountain brush communities on Anthro Mountain; project will maintain habitat for GRSG and sagebrush-obligate species.	Ongoing. Implementation over a 5- to 7-year period beginning in 2013.
III	Utah	Panguitch	Johns Valley Vegetation	Dixie National Forest, UT	Vegetation management project that includes 9,000 acres of treatment, including sagebrush.	Planning phase
III	Utah	Panguitch	Hodge Ranch and Angle Bench Vegetation Enhancement	Piute County, UT	Remove 1,500 acres of Phase I and II pinyon-juniper and up to 1,400 acres of sagebrush enhancement.	Planning phase
III	Utah	Parker Mountain	Boulder Foothills Fuels Reduction	Fishlake National Forest, UT	Mechanically treat 3,834 acres with bobcat and chainsaw, pile, and burn.	Ongoing
III	Utah	Parker Mountain	Porcupine Fuels Treatment	Fishlake National Forest, UT	Prescribe burn insect and disease infected conifer stands, and regenerate aspen within 35,000-acre analysis area.	Planning phase
III	Utah	Carbon and Emery	Shalom Timber Sale	Manti National Forest, UT	Timber and fuels management 9,000 acres; work to be accomplished through 2020; traditional timber harvest treatments, followed with prescribed burning treatments	Ongoing

Table 5-36
Reasonably Foreseeable Future Actions in Management Zone III Likely to Impact GRSG Habitat

MZ	Sub-Region	GRSG Population Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
III	Utah	Emery	Swasey Wildlife Improvement and Hazardous Fuels Reduction Project	Emery County, UT	Multi-phase project that will treat a total of 8,422 acres; most of the project has been treated; phase IV (400 acres) was just submitted for funding; project is a combination of pinyon-juniper mastification and prescribed fire.	Ongoing
III	Utah	Panguitch	Upper Kanab Watershed Vegetation Creek	Kane County, UT	Vegetation management project that includes 51,600 acres of treatment in a 130,000 acres area over the next 15 years using a variety of treatment methods; average of 1,800 to 2,000 acres per year.	Ongoing
III	Utah	Parker Mountain	GRSG Habitat Improvement Projects	Piute and Garfield counties, UT	Over the next 10 years, a total of 40,000 acres of pinyon-juniper and sagebrush habitat will be improved for GRSG; a variety of mechanical treatments will be used to expand and improve existing habitat along the Parker Front. Yearly projects of 1,000-3,000 acres would be completed.	Ongoing
III	Utah	Hamlin Valley, Bald Hills, and Panguitch	Programmatic EA	Cedar City Field Office, UT	Vegetation management project to enhance previous treatments that have occurred over the past 60 years using a variety of management tools	Project under NEPA review; decision anticipated in 2014-2015
III	Nevada and North-eastern California	Southern Great Basin	Battle Mountain WUI EA	Battle Mountain District, NV	EA	Planning phase
III	Nevada and North-eastern California	Southern Great Basin	Overland Pass	Ruby Mountains Ranger District, NV	Fuels treatment.	Ongoing
III	Nevada and North-eastern California	Southern Great Basin	Spruce Mountain Restoration Project	Wells Field Office, NV	Restoration of up to 10,000 acres to improve wildlife habitat, reduce hazardous fuels, improve forest health, and protect cultural resources.	Ongoing

Table 5-36
Reasonably Foreseeable Future Actions in Management Zone III Likely to Impact GRSG Habitat

MZ	Sub-Region	GRSG Population Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
III	Nevada and North-eastern California	Southern Great Basin; Quinn Canyon Range	Pioche/ Caselton WUI Project	Ely District, NV	11,300 acre project area; 3,246 to 4,711 acres identified for treatment. Reduce fire threat and improve wildlife habitat by thinning pinyon/juniper.	Ongoing
III	Nevada and North-eastern California	Southern Great Basin	Stonehouse WUI/ Non-WUI Project	Ely District, NV	23,676 acres project area. Reduce fire threat and improve wildlife habitat by thinning pinyon/juniper in PPH adjacent to low value habitat, affects three major GRSG leks.	Ongoing
III	Nevada and North-eastern California	Northwest Interior	Montana Mountain Fuels Project	Winnemucca District, NV	346,000 acre planning area to reduce fire threat and improve wildlife habitat.	Ongoing
III	Nevada and North-eastern California	Northwest Interior	Double H/Bilk Creek	Winnemucca District, NV	390,856 acre planning area to reduce fire threat and improve wildlife habitat.	Planning phase
III	Nevada and North-eastern California	Quinn Canyon Range	Cave/Lake Valley Watershed Plan	Ely District, NV	121,600 acres of treatments identified with interdisciplinary objectives.	Planning phase
Livestock Grazing						
III	Utah	Panguitch	Grand Staircase-Escalante National Monument Livestock Grazing Plan Amendment	Kanab Field Office, Kane County, Utah	2.1 million acre planning area to update and integrate livestock and rangeland management with the other resources in the Monument Management Plan.	Planning phase
III	Utah	All populations in UT	Fence Marking	UT	The NRCS is planning to mark fences within 3.2 miles of throughout Utah on private lands.	Ongoing
III	Utah	Parker Mountain	Coyote Hollow Grazing Assessment	Dixie National Forest, UT	Environmental analysis of the Coyote Hollow C&H Allotment.	Analysis anticipated in 2015.
Travel Management						
III	Utah	All population areas in UT	Motorized Travel Plan Implementation	UT	Implementation of motorized route designation plans across the sub-region	Ongoing

Table 5-36
Reasonably Foreseeable Future Actions in Management Zone III Likely to Impact GRSG Habitat

MZ	Sub-Region	GRSG Population Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
III	Utah	Sheeprocks	OHV Organized Races	Sheeprock/Tintic Mountain OHV Area	Three sanctioned motorcycle races permitted annually	Annual
Other Projects/Actions						
III	Utah	Box Elder, Ibapah, Sheeprocks	Use of Military Operating Area	West Desert, UT	Department of Defense testing and training exercises	Ongoing

This table includes a selection of some of the larger projects from the reasonably foreseeable future actions tables in the RMPAs/LUPAs for MZ III. The full tables can be found in each EIS.

Table 5-37
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
Energy and Mining						
IV	Idaho and South-western Montana	Northern Great Basin	Sawtooth #4 Plan of Operation Modification	Twin Falls District, Idaho	Locatable mineral surface mining over 20 acres.	NEPA in progress.
IV	Idaho and South-western Montana	Northern Great Basin	Mineral Extraction	Dillon Field Office, Montana	Approximately 25 notices for locatable mineral extraction covering less than 50 acres.	Ongoing
IV	Idaho and South-western Montana	Northern Great Basin	Quarry Expansions	Sawtooth National Forests, Utah and Idaho	Several quarry expansions covering 40 acres total.	Planned for 2016.
IV	Idaho and South-western Montana	East Central	Dairy Syncline Phosphate Mine	Soda Springs, Idaho	Phosphate mine on estimated 580 acres (281 acres of open pit) within PGH/PHMA.	Planning phase
IV	Idaho and South-western Montana	Northern Great Basin	Oil and gas lease nominations	Rogerson-Brown's Bench, Idaho	Determine whether to offer leases on up to 90,000 acres.	Deferred, pending completion of Jarbidge RMP and GRSG EIS

Table 5-37
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
IV	Idaho and South-western Montana	East Central	Oil and gas lease nominations	Payette-Weiser area, Idaho	Determine whether to offer oil and gas leases. Several nominations, totaling an estimated 181,000 acres.	Deferred, pending completion of Four Rivers RMP and GRSG EIS
IV	Oregon	Northern Great Basin	Malheur Queen Placer Project	North-central Malheur County, Oregon	Approximately 800 acres approved for development of placer gold extraction.	Development underway
IV	Oregon	Northern Great Basin	High Bar/Upper and Lower Pine Creek Placer Mining Project	Baker County, Oregon	Up to 250 acres of activity would be disturbed for mineral extraction.	Planning phase
IV	Nevada	Northern Great Basin	Round Mountain Gold Mine			
Expansion	Nye County, Nevada	Expansion of existing facilities at the Round Mountain Mine and development of new mining and leaching facilities at the adjacent Gold Hill ore deposit.	Planning phase			
IV	Nevada	Northern Great Basin	Angel Wing Exploration Plan	60 miles northwest of West Wendover, Nevada, on the Utah/ Nevada State Line	Expansion of mining exploration activities, including construction of drill pads and access roads and existing road maintenance, from a 3.3 acre Notice to 60 acres. Access to the proposed Plan is through Utah near the town of Grouse Creek.	Planning phase

Table 5-37
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
IV	Nevada	Northern Great Basin	Murdock Mountain Phosphate Prospecting Permit	35 miles northwest of West Wendover, Nevada, and 10 miles southwest of Montello, Nevada	Phosphate exploration drilling and trenching in the Murdock Mountain area. The operator is proposing to construct 31 drill pads with 2 drill holes per pad and 29 exploration trenches measuring 100 feet long by 5 feet wide by 5 feet deep. Exploration roads will also be constructed and existing roads will be used. Exploration operations are anticipated to take 200 days to complete.	Planning phase
Lands and Realty						
IV	Idaho and South-western Montana	Northern Great Basin; Snake-Salmon-Beaverhead	Gateway West 230/500 Transmission Line Project	Wyoming, Southern Idaho	Authorize ROW for 1,100-mile 500-kV transmission line.	Pending; Scheduled for implementation starting 2016
IV	Idaho and South-western Montana; Oregon	Baker; Northern Great Basin	Boardman to Hemingway Transmission Line Project	From Boardman, Oregon to Melba, Idaho	A proposal for an approximately 300-mile 500-kV transmission line.	Project under NEPA review.
IV	Oregon	Northern Great Basin	North Steens 230-kV Transmission Line Project	Harney County, Idaho	North Steens is a 29-mile 230-kV transmission line that would convey 104 MW of power generated from wind farms proposed on private land on the north side of Steens Mountain.	Project approved and ROD signed in December 2011; in litigation.
IV	Nevada	Northern Great Basin	China Mountain Wind Project	Northeastern Nevada	Utility-scale wind facility	Temporarily deferred pending NVCA GRSG EIS
IV	Idaho and South-western Montana	Northern Great Basin	Owyhee Land Exchange	Western Owyhee County, Idaho	Proposing to dispose of approximately 33,000 acres of non-GRSG habitat and acquiring around 38,000 acres of primarily GRSG habitat	Proposal

Table 5-37
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
Fuels and Vegetation						
IV	Idaho and South-western Montana	Northern Great Basin	Juniper Treatments in Pole Creek Allotment	Owyhee Field Office, Idaho	Juniper removal to enhance resource conditions on 24,486 acres of public, private, and state lands.	Decision issued; treatment implementation pending litigation
IV	Idaho and South-western Montana	Northern Great Basin	Juniper Treatment in Trout Springs Allotment	Owyhee Field Office, Idaho	Juniper removal to enhance resource conditions on 29,475 acres of public, private, and state lands.	Planning
IV	Idaho and South-western Montana	Northern Great Basin	Upper Castle Creek Fuels Project	Bruneau Field Office, Idaho	Juniper control project on approximately 33,000 acres. 25,000 acres implemented; anticipate 2,000-4,000 acres per year for the remaining areas.	Ongoing through 2014
IV	Idaho and South-western Montana	Northern Great Basin	Curlew Fuel Breaks and Juniper Reduction Project	Southeast Idaho	Compartmentalize the Curlew area using existing roads to improve wildfire suppression and reduce wildfire growth over 60,000 acres. Efforts will help to retain existing intact Wyoming sagebrush habitat. Remove encroaching junipers from within Wyoming sagebrush.	Planning; project implementation anticipated in 2017.
IV	Idaho and South-western Montana	Northern Great Basin	Burley Landscape Sage-Grouse Habitat Restoration	Burley Field Office, Idaho	Treat encroaching juniper on approximately 38,000 acres.	Approx. 8,500 acres already completed. Implementation of remaining 29,500 acres expected over the next 7 years

Table 5-37
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
IV	Idaho and South-western Montana	Snake-Salmon-Beaverhead	Paradigm Project	Four Rivers Field Office, Idaho	Fuel break project that would create up to 294 miles of fuel breaks between 50 and 300 feet wide over a 10-year period. Fuel breaks would be associated with roads and other linear disturbances. At the maximum width of 300 feet, up to 10,690 acres would be directly affected. 2,111 acres of PPH/PHMA and 24,667 acres of PGH/GHMA in project area; fuel breaks would affect 61 acres of sagebrush in PPH/PHMA and 606 acres in PGH/GHMA.	Pending
IV	Idaho and South-western Montana	Northern Great Basin	South Owyhee Fuel Breaks	Boise District, Idaho	Fuel breaks over 2,000,000 acres, 850 miles.	Draft EA
IV	Idaho and South-western Montana	Snake-Salmon-Beaverhead	Big Desert Fuel Breaks	Idaho Falls and Twin Falls Districts, Idaho	Compartmentalize the Big Desert management area using existing roads to improve wildfire suppression and reduce wildfire growth; efforts will help to retain intact Wyoming sagebrush habitat within the northern portion of the management area. 291 miles of existing desert roads with a footprint of 10,581 acres. Upper Snake Field Office: 245 miles of roads with 8,908 footprint acres. Shoshone Field Office: 46 miles of roads with 1,673 footprint acres.	NEPA is complete and project began in 2012 within the Upper Snake Field Office; those fuel breaks identified within the Shoshone Field Office require further analysis and consultation before NEPA can be finalized.
IV	Idaho and South-western Montana	Snake-Salmon-Beaverhead	Big Desert Noxious Weed Treatments	Idaho Falls District, Idaho	Treating noxious weeds within the Big Desert management area over 600,000 acres. Annual treatment target of 5,000 acres.	Ongoing, began in 2006.
IV	Idaho and South-western Montana	Snake-Salmon-Beaverhead	Cheatgrass Treatments	Idaho Falls District, Idaho	Chemically reduce cheatgrass densities over 7,000 acres to modify fire return intervals and allow for seeded native species to become established.	Planning phase

Table 5-37
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
IV	Idaho and South-western Montana	Snake-Salmon-Beaverhead	Salmon-Challis National Forest Forest-wide Invasive Plant Treatment EIS	Salmon-Challis National Forest	Programmatic noxious weed treatment planning within the nonwilderness portion of the Salmon-Challis National Forest (3.2 million acres)	Planning phase
IV	Idaho and South-western Montana	Northern Great Basin	Twin Falls District Noxious Weed and Invasive Plant Treatments	Twin Falls District, Idaho	Proposed action is to use prevention, prescribed fire, herbicides, and manual, mechanical, and biological methods to treat areas dominated by annual invasive species to restore perennial grasses, forbs, and shrubs. This is a programmatic planning effort. Estimated annual restoration is 5,000-10,000 acres in Burley Field Office (FO), 10,000-15,000 acres in Shoshone FO, and 10,000-15,000 acres in Jarbidge FO. Ten-year total for each office could approach 100,000 acres in Burley FO, 150,000 acres in Shoshone FO, and 150,000 acres in Jarbidge FO.	Planning phase. Implementation is planned to cover 10 years starting in 2015.
IV	Idaho and South-western Montana	Northern Great Basin	Shrub Planting	Twin Falls District, Idaho	Reintroduction of shrub species through hand planting of seedlings; up to 200,000 seedlings (13,000 acres) may be planted annually.	Implementation since 2010 and expected to continue over the next 10 years.
IV	Idaho and South-western Montana	Northern Great Basin	Twin Falls District Wildlife Tracts Restoration	Twin Falls District, Idaho	Proposed action is to use prescribed fire, chemical, drill and harrow seeding, shrub seeding, and plantings to establish perennial vegetation and restore native shrub habitat on wildlife tracts. 500-1,000 acres per year, for a cumulative total of 10,000 acres over ten years.	Implementation has been occurring since 2011 and is planned to continue over the next 8 years.

Table 5-37
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
IV	Oregon	Northern Great Basin	Five Creeks Rangeland Restoration Project	Three Rivers and Andrews/ Steens Resource Areas, Oregon	A landscape-scale vegetation treatment encompassing approximately 73,500 acres (approximately 26,000 acres in the CMPA) to return vegetation communities to historic compositions and reduce hazardous fuel loads. Various forms of prescribed fire and mechanical treatments have been used to reduce influence of encroaching western juniper.	Ongoing
IV	Oregon	Northern Great Basin	Multiple restoration projects	Three Rivers Resource Area, Oregon	Implementation plans include thinning, piling, pile burning, and implementing a forest underburn.	Ongoing
IV	Oregon	Northern Great Basin	District-wide noxious weed treatments	Oregon	Ongoing interagency noxious weed treatment efforts with Oregon Department of Agriculture and Oregon counties.	Ongoing
IV	Oregon	Northern Great Basin	District-wide Vegetation Management (Weed EA)	Harney County, Oregon	Use new chemicals to treat noxious and invasive species.	Planning phase
IV	Oregon	Baker; Northern Great Basin	Baker Habitat Restoration and Fuels Treatment projects	Baker County, Oregon	Multi-year phased hazardous fuels and wildlife habitat restoration project on approximately 45,000 acres.	Planning phase
IV	Utah	Box Elder	Noxious weed treatments	Utah	Treating noxious weeds	Ongoing
IV	Nevada	Northern Great Basin	Santa Rosa Fuels Project	Winnemucca District, Nevada	355,699 acre planning area to reduce fire threat and improve wildlife habitat.	Ongoing
IV	Nevada	Northern Great Basin	North Tuscarora Sage-Grouse Habitat Restoration Project	Elko District Office, Nevada	Restoration of up to 10,000 acres of GRSG habitat. Treatments would improve, protect GRSG habitat, protect PPH/PHMA, protect Lahontan Cutthroat Trout Streams, improve wildlife habitat, reduce invasive weeds, and reduce hazardous fuels.	Planning phase
IV	Nevada	Northern Great Basin	Spruce Mountain Project	Elko District Office, Nevada	Spruce Mountain seeding maintenance over 700 acres. Mastication and seeding to reduce fire threat and improve wildlife habitat.	Ongoing

Table 5-37
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
Livestock Grazing						
IV	Idaho and South-western Montana	Snake-Salmon-Beaverhead	Grazing Permit Renewals	Challis Field Office	Renewing/modifying 2 to 5 grazing permits per year for the next ten years over 770,000 acres	Project under NEPA review.
IV	Idaho and South-western Montana	Snake-Salmon-Beaverhead	Range NEPA for C&H allotments	Boise National Forest, Idaho	Allotments cover over 53,000 acres.	Projects under NEPA review.
IV	Idaho and South-western Montana	Northern Great Basin	Allotment Management Plan Updates	Sawtooth National Forest, Idaho and Utah	Cattle and sheep allotment management plan updates on over 350,000 acres.	Ongoing
IV	Idaho and South-western Montana	Snake-Salmon-Beaverhead	Allotment Management Plan Updates	Sawtooth National Forest, Idaho	Cattle and sheep allotment management plan updates on over 140,000 acres.	Ongoing
IV	Idaho and South-western Montana	Snake-Salmon-Beaverhead	Grazing Allotment Management NEPA	Salmon-Challis National Forest	Grazing allotment management NEPA on over 2 million acres.	Ongoing
IV	Idaho and South-western Montana	Southwest Montana	Cessation of Lima-Tendoy Sheep Grazing	Beaverhead -Deerlodge National Forest	Permittee waiving sheep permits on 11,700 acres in PPH/PHMA back to Forest Service. Allotments will be closed to future domestic sheep grazing. No new grazing permits for any livestock will be issued for the Indian Creek Allotment. Three-year trial of 100 AUMs fall cattle grazing for Bear Canyon.	Ongoing. NEPA review and new AMP after 2015 grazing season.
IV	Nevada	Northern Great Basin	White Rock Mountain Aspen Enclosures	North-eastern Nevada	Place up to nine enclosures around aspen stands to protect from overgrazing by livestock.	Planning process
IV	Utah	Box Elder	Fence marking	Utah	The NRCS is planning to mark fences within 3.2 miles of leks throughout Utah on private lands.	Ongoing

Table 5-37
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
Wild Horses and Burros						
IV	Idaho and South-western Montana	Northern Great Basin	Wild horse gathers	Owyhee Field Office, Idaho	Gather, fertility treatment, removal of excess wild horses from HMAs. Covers 128,389 acres of public and other (private and state) land.	EAs and decisions have been approved; gathers and treatment are pending due to funding and other priority treatments within the BLM wild horse program.
IV	Oregon	Northern Great Basin	Wild horse gathers	Oregon	Gather wild horses.	Ongoing
Recreation						
IV	Idaho and South-western Montana	Northern Great Basin	Special Recreation Permits	Owyhee Field Office, Idaho	Various motorcycle, foot, and mountain bike races, horse endurance rides, dog trials, pioneer treks, and poker runs on 260,000 acres.	Ongoing
Travel Management						
IV	Idaho and South-western Montana	Northern Great Basin	Curlew/Deep Creek Travel Management Plan Implementation	Idaho Falls District, Idaho	Implement Travel Management Plan on 375,000 acres; limit motorized travel to designated routes, prohibit cross-country travel	Ongoing
IV	Idaho and South-western Montana	Snake-Salmon-Beaverhead	North Highway 20 Travel Plan	Idaho Falls District, Idaho	Designate 127 miles of existing trails; construct 52 miles of new trails, construct 3 acres of parking areas, close and rehabilitate 116 miles of existing routes.	Pending
IV	Utah	Box Elder	Motorized Travel Plan Implementation	Utah	Implementation of motorized route designation plans across the planning region.	Ongoing
Land Use Planning						
IV	Idaho and South-western Montana	Northern Great Basin	Jarbidge RMP	Jarbidge Field Office, Idaho	Revise the Jarbidge RMP that provides a comprehensive plan for 1,366,000 acres that further restores or maintains resource conditions and provides for the economic needs of local communities over the long term	Ongoing

Table 5-37
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
IV	Idaho and South-western Montana	Snake-Salmon-Beaverhead	Craters LUP Amendment	Craters of the Moon National Monument and Preserve, Idaho	Analyze a range of alternatives for livestock grazing in the Craters of the Moon covering 300,000 acres (i.e., identify lands available or unavailable for grazing, identify the amount of forage available, seasons of use, range improvements)	Ongoing

This table includes a selection of some of the larger projects from the reasonably foreseeable future actions tables in the RMPAs/LUPAs for MZ IV. The full tables can be found in each EIS.

Table 5-38
Reasonably Foreseeable Future Actions in Management Zone V Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
Energy and Mining						
V	Oregon	Western Great Basin; Central Oregon	Wagon Tire Wind Energy Development Project	Harney County, OR	Develop a wind farm.	Planning phase
V	Oregon	Western Great Basin	Buckskin Mountain Wind Energy Development Project	Harney County, OR	Develop a wind farm.	Planning phase
V	Oregon	Western Great Basin	Locatable Mining	Lake, Oregon	Two areas in the Lakeview RA, where locatable mining activity is ongoing, either will continue or will expand in the near future; Tucker Hill and Rabbit Basin Sunstone areas. Tucker Hill, active 23-acres perlite mine, authorized to expand to 75 acres. Rabbit Basin Sunstone area; approximately 43 open notices and plans of operations for sunstone mines currently affecting 61 acres. Three to five new open notices received or plans of operations approved each year, for up to 25 acres of additional disturbance added each year.	Ongoing

Table 5-38
Reasonably Foreseeable Future Actions in Management Zone V Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
Lands and Realty						
V	Oregon	Western Great Basin; Northern Great Basin	North Steens 230-kV Transmission Line Project	Harney County, OR	North Steens is a 29-mile 230-kV transmission line that would convey 104 MW of power generated from wind farms proposed on private land on the north side of Steens Mountain.	Project approved and ROD signed in December 2011; in litigation
V	Oregon	Western Great Basin; Central Oregon	Pacific Direct Intertie Upgrade and Maintenance	Deschutes and Lake, Oregon	Maintain and upgrade the existing Bonneville Power Administration power line from Columbia River south to the northern Nevada border.	Ongoing
V	Oregon	Central Oregon	West Butte Wind Power ROW	32 miles east of Bend, Oregon	The West Butte Wind Power ROW Project includes a permanent 4.5-mile access road, a pole-mounted 115-kV electrical transmission line, a 14.4-kV electrical utility line that would convey 104 MW of power generated from 52 wind turbines proposed on private land.	NEPA and ROD completed 2011. Implementation date unknown.
Fuels and Vegetation						
V	Nevada and North-eastern California	Western Great Basin	Vya Population Management Unit Programmatic Habitat Restoration and Fuels Reduction Project	Northeast California/ Northwest Nevada	Up to a total of 100,000 acre of treatment over a 10-year period. A combination of juniper thinning or removal and prescribed burning. 16,274 acres identified for prescribed fires and up to 83,726 acres of juniper treatment.	Planning phase
V	Nevada and North-eastern California	Western Great Basin	NE California Juniper Treatments	Northeast California/ Northwest Nevada	Multiple juniper removal treatments throughout the Alturas, Surprise and Eagle Lake Field Offices. Total 32,099 acres.	Ongoing
V	Nevada and North-eastern California	Western Great Basin	Northeast California Prescribed Fires	Northeast California/ Northwest Nevada	Multiple prescribed fire treatments throughout the Alturas, Surprise and Eagle Lake Field Offices. Burns include broadcast timber understory burns, Aspen regeneration, pile burns and small meadow broadcast burns. A total of 3,015 acres.	Ongoing

Table 5-38
Reasonably Foreseeable Future Actions in Management Zone V Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
V	Oregon	Western Great Basin	North Steens Ecosystem Restoration Project	Steens Mountain Cooperative Management and Protection Area, OR	Treat expansion western juniper on a landscape scale, encompassing approximately 336,000 acres CMPA to return vegetation communities to historic compositions and reduce hazardous fuel loads.	Ongoing
V	Oregon	Central Oregon	Vegetation Treatments	Three Rivers Resource Area, OR	A number of vegetation and fuels treatments projects to control expansion of juniper and ponderosa pine and reducing fuels.	Ongoing
V	Oregon	Western Great Basin; Northern Great Basin	Five Creeks Rangeland Restoration Project	Three Rivers and Andrews/ Steens Resource Areas, OR	A landscape-scale vegetation treatment encompassing approximately 73,500 acres (approximately 26,000 acres in the CMPA) to return vegetation communities to historic compositions and reduce hazardous fuel loads. Various forms of prescribed fire and mechanical treatments have been used to reduce influence of encroaching western juniper.	Ongoing
V	Oregon	Western Great Basin; Central Oregon	District-wide noxious weed treatments	Harney County, OR	Interagency noxious weed treatment efforts with Oregon Department of Agriculture and Harney County.	Ongoing
V	Oregon	Western Great Basin	Several ES&R Projects	Andrews Resource Area, OR	Rehabilitation following wildland fire.	Ongoing
V	Oregon	Western Great Basin	South Warner Sagebrush Sage-Grouse Habitat Restoration	Lake, OR	Juniper removal from a 50,000-acre South Warner Rim project area adjacent to the pipeline.	Ongoing
V	Oregon	Central Oregon	High Desert Shrub Steppe EA	Between Millican and Hampton, OR	Cut or burn up to 10,000 acres of juniper per year.	Ongoing
Livestock Grazing						
V	Oregon	Central Oregon	Multiple grazing permit renewals	Prineville District, OR	Renew 37 grazing permits and leases. Effects on local economy, wildlife.	Planning phase

Table 5-38
Reasonably Foreseeable Future Actions in Management Zone V Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
Wild Horses and Burros						
V	Oregon	Western Great Basin; Central Oregon	Wild Horse Gathers	District-wide, OR	Gather wild horses.	Ongoing
Recreation						
V	Oregon	Western Great Basin	Steens Mountain Comprehensive Recreation Plan	Steens Mountain Cooperative Management and Protection Area, OR	Multiyear plan to manage recreation on Steens Mountain, including maintaining facilities, creating new facilities and trails, closing roads, and providing interpretation.	Planning phase

This table includes a selection of some of the larger projects from the reasonably foreseeable future actions tables in the RMPAs/LUPAs for MZ V. The full tables can be found in each EIS.

5.2 CUMULATIVE ANALYSIS METHODOLOGY

The cumulative impacts discussion that follows considers the alternatives in the context of the broader human environment – specifically, actions that occur outside the scope and geographic area covered by the planning area. Cumulative impact analysis is limited to important issues of national, regional, or local significance.

The cumulative impact analysis tends to be broad and generalized to address potential effects that could occur from a reasonably foreseeable management scenario combined with other reasonably foreseeable activities or projects. Consequently, this assessment is primarily qualitative for most resources because of lack of detailed information that would result from project-level decisions and other activities or projects. Quantitative information is used whenever available and as appropriate to portray the magnitude of an impact. The analysis assesses the magnitude of cumulative impacts by comparing the environment in its baseline condition with the expected impacts of the alternatives and other actions in the same geographic area. The magnitude of an impact is determined through a comparison of anticipated conditions against the naturally occurring baseline as depicted in the affected environment (see **Chapter 3**) or the long-term sustainability of a resource or social system.

The following factors were considered in this cumulative impact assessment:

- Federal, nonfederal, and private actions.
- Potential for synergistic effects or synergistic interaction among or between effects.

- Potential for effects across political and administrative boundaries.
- Other spatial and temporal characteristics of each affected resource.
- Comparative scale of cumulative impacts across alternatives.

Temporal and spatial boundaries used in the cumulative analysis are developed on the basis of resources of concern and actions that might contribute to an impact. The baseline date for the cumulative impacts analysis is 2015. The temporal scope of this analysis is a 20-year planning horizon. Land use planning documents are generally evaluated on a 5-year cycle.

Spatial boundaries vary and are larger for resources that are mobile or migrate (e.g., migratory birds) compared with stationary resources or uses. Occasionally, spatial boundaries could be contained within the planning area boundaries or an area within the planning area. Spatial boundaries were developed to facilitate the analysis and are included under the appropriate resource section heading. The cumulative effects analysis for all topics included an analysis of cumulative effects at the planning area level. For GRSG, cumulative effects analysis included an analysis at the WAFWA Management Zones 3, 4, and 5, in addition to the planning level analysis. WAFWA Management Zones are biologically based delineations that were determined by GRSG populations and sub-populations identified within seven floristic provinces. Analysis at this level enables the decision maker to understand the impacts on GRSG at a biologically meaningful scale.

5.3 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Past, present, and reasonably foreseeable future actions are considered in the analysis to identify whether and to what extent resources or resource uses have been degraded or enhanced, whether ongoing activities are causing impacts, and trends for activities in and impacts on the area. Projects and activities are evaluated on the basis of proximity, connection to the same environmental systems, potential for subsequent impacts or activity, similar impacts, the likelihood a project will occur, and whether the project is reasonably foreseeable.

Reasonably foreseeable future actions are human-generated actions that are considered against a backdrop of ongoing resource and habitat trends. The three dominant trends in the planning area that are expected to contribute most to the location and intensity of cumulative impacts are:

1. The intensifying effects of wildfire due in part to the feedback loop associated with an expanding footprint of invasive annual grasses,
2. The invasion of conifer into sagebrush habitats, and
3. Climate change.

For this broad-scale assessment, impacts associated with the three dominant trends are anticipated to far exceed any effects generated by discrete anthropogenic activities. Nonetheless, understanding the discrete impacts of localized human-generated actions is important to maintaining and restoring GRSG habitats because of the potential for environmental degradation associated with these activities. Projects and activities considered in the cumulative analysis were identified through coordination with cooperators and BLM and Forest Service employees with local knowledge of the area. Each was asked to provide information on the most influential past, present, or reasonably foreseeable future actions. Additional information was obtained through discussions with agency officials and review of publicly available materials and websites.

Effects of past and present actions and activities are manifested in the current condition of the resources, as described in the affected environment (see **Chapter 3**). Reasonably foreseeable future actions are actions that have been committed to or known proposals that would take place within a 20-year planning period and would be typically reviewed during the 5-year evaluation.

Reasonably foreseeable future action scenarios are projections made to predict future impacts – they are not actual planning decisions or resource commitments. Projections, which have been developed for analytical purposes only, are based on current conditions and trends and represent a best professional estimate. Unforeseen changes in factors such as economics, demand, and federal, state, and local laws and policies could result in different outcomes than those projected in this analysis.

Other potential future actions have been considered and eliminated from further analysis because there is a small likelihood these actions would be pursued and implemented within the life of the plan or because so little is known about the potential action that formulating an analysis of impacts is premature. In addition, potential future actions protective of the environment have less likelihood of creating major environmental consequences alone, or in combination with this planning effort. Federal actions such as species listing would require the BLM and the Forest Service to reconsider decisions created from this action because the consultations and relative impacts might no longer be appropriate. These potential future actions may have greater capacity to affect resource uses within the planning area; however, until more information is developed, no reasonable estimation of impacts could be developed.

Data on the precise locations and overall extent of resources within the planning area are considerable, although the information varies according to resource type and locale. Furthermore, understanding of the impacts on and the interplay among these resources is evolving. As knowledge improves, management measures (adaptive or otherwise) would be considered to reduce

potential cumulative impacts in accordance with law, regulations, and applicable LUPs.

Projects and activities identified as having the greatest likelihood to generate potential cumulative impacts when added to the Nevada and Northeastern California GRSG LUPA/EIS alternatives are displayed in **Table 5-39**.

In addition, there are on-going planning efforts both within (e.g., Carson City RMP) and adjacent to the sub-region (e.g., Idaho/ Montana Sub-Region Sage-Grouse LUPA/EIS) with which this planning effort has been coordinated and aligns. The collective actions proposed in these ongoing efforts could result in cumulative effects throughout the Great Basin Region, including on this Nevada and Northeastern California Sage-Grouse LUPA/EIS.

Table 5-39

Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation

Name of Action	Description of Action	Location	Status of Action
Central Nevada Sage-Grouse Subpopulation — Management Zone III			
Ruby 6 Vegetation Treatments	Mowing, seeding, chemical treatments to enhance sagebrush communities.	Wells Field Office, Elko District	EA being prepared.
Cedar Ridge Oil and Gas Exploration	Includes the installation of a well pad, a new access road and upgrading a portion of an existing access road for 28.6 acres of surface disturbance.	Tuscarora Field Office, Elko District	Permit application received, draft EA to be published for public comment and FONSI being developed.
Rain Mine Closure	Mine closure.	Tuscarora Field Office, Elko District	Initiating EA
Mill Canyon Exploration	Proposal for portal and twin declines, road upgrade, facilities including rapid infiltration basins in valley to support dewatering. Proposed total disturbance is 250 acres.	Tuscarora Field Office, Elko District	EA initiated.
Pinyon Range-Railroad Exploration	Exploration of 3,169 acres over 20 years.	Tuscarora Field Office, Elko District	Implementation.
Cortez Range - Goldrush	Currently an exploration project with possibility of being developed as a mine.	Battle Mountain and Elko Districts	Cortez Range – Goldrush
Phoenix Mine	Open-pit gold mining operation. Expansion of existing operations. Includes copper heap leach, mill for gold, silver and copper beneficiation. Expansion of waste rock dumps and all other facilities.	Battle Mountain District	Plan of Operation submitted.
Fire Creek Mine	Existing underground operation. Currently the project is an underground exploration operation. The project may expand.	Battle Mountain District	Plan of Operation expected.
Oil and Gas – Marys River Project	20 proposed oil wells and associated facilities.	Wells Field Office, Elko District	Four APDs have been approved and one well has been drilled and is being evaluated for production.

Table 5-39**Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation**

Name of Action	Description of Action	Location	Status of Action
Lookout Mountain Mine	Open-pit gold mining operation. Operations would include one open pit, a heap leach pad, waste rock dump, tailing storage facility, and other ancillary facilities. The projected life of mine is 14 years, including construction, operations, and closure and post-closure monitoring.	Battle Mountain District	Plan of Operation expected.
Oil and Gas –Huntington Valley Project	20 proposed oil wells and associated facilities.	Tuscarora Field Office, Elko District	Six APDs have been approved and one well has been drilled and is being evaluated for production.
3 Bars Restoration Project	This project is a landscape scale, multi discipline project that is examining potential vegetation treatments across an 800,000 acre assessment area in Eureka County.	Battle Mountain District	EIS in progress.
Battle Mountain Wildland Urban Interface (WUI) EA	The goal of this project is to reduce the threat of wild fire to the community of Battle Mountain, NV.	Battle Mountain District	EA in progress.
Heath Canyon Ponderosa Hazardous Fuels EA	Hazardous fuels reduction in relic ponderosa pine and white fir stands.	Battle Mountain District	EA in progress.
Multiple existing Hazardous Fuels Projects	Project maintenance of up to 21,000 acres to improve wildlife habitat, reduce hazardous fuels, improve forest health, and protect cultural resources. Project includes: mastication, seeding, prescribed fire, and herbicide treatments.	Battle Mountain District	Implementation and maintenance.
Gold Bar	Expansion of the old Atlas Gold Bar Mine. This includes expanding pits and new waste rock and heap leach facilities.	Battle Mountain District	Plan submitted.
Antelope Restoration Project	Apply mechanical treatment and prescribe fire to restore vegetation condition.	Humboldt-Toiyabe National Forest, Austin-Tonopah Ranger District	Planning.

Table 5-39**Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation**

Name of Action	Description of Action	Location	Status of Action
Monitor Valley-Little Fishlake, Pasco and Toiyabe Bench Pinyon-Juniper Removal	This project involves the cutting of small pinyon and juniper trees that are invading the sagebrush habitats in the eastern portions of the Toiyabe, Toiyabe, and Monitor mountain ranges. This project is expected to benefit GRSG and mule deer.	Humboldt-Toiyabe National Forest, Austin-Tonopah Ranger District	Planning.
Kingston	Treatment of sage-steppe vegetation for wildlife habitat improvement and fuels reduction adjacent to the community of Kingston, NV.	Humboldt-Toiyabe National Forest, Austin-Tonopah Ranger District, Kingston, NV	Planning.
Goldwedge 2014 Exploration	Proposal is for gold-silver minerals exploratory drilling at up to 49 drill sites and construction of approximately 2,800 feet of new temporary access roads, use of existing roads and overland travel on National Forest System lands, totaling approximately 3.2 acres.	Humboldt-Toiyabe National Forest, Austin-Tonopah Ranger District	Planning.
Emergency Stabilization and Rehabilitation	Priority rehabilitation of wildfire-affected GRSG habitat.	Northwestern Interior Population Nevada	Ongoing rehabilitation of GRSG habitat affected by wildfires, including sagebrush planting/seeding.
Gemfield Mine	Project is proposed to include open pit, waste rock and heap leach facility and relocating Highway 95.	Goldfield, NV. Tonopah Field Office, Battle Mountain District.	Draft EIS being developed.
Gibellini Mine	New open pit mine. This includes acid leach and ancillary facilities.	Located about 25 miles south of Eureka, NV. Mt. Lewis Field Office, Battle Mountain District	Draft EIS being developed.

Table 5-39

Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation

Name of Action	Description of Action	Location	Status of Action
Southeastern Nevada Sub-Population Area — Management Zone III			
Multiple existing Hazardous Fuels Projects	Project maintenance of up to 50,000 acres to improve wildlife habitat, reduce hazardous fuels, improve forest health, and protect cultural resources. Project includes: mastication, seeding, prescribed fire, and herbicide treatments.	Ely District	Implementation and maintenance.
Pioche/Caselton WUI Project	11,300 acre project area. 3,246 to 4,711 acres identified for treatment. Reduce fire threat and improve wildlife habitat by thinning pinyon and/or juniper, mastication, mowing, seeding, chaining, and cut, pile, and burn.	Ely District	Implementation, 3,157 acres completed.
Lincoln County Chain Maintenance Project	Project completed by NDOW using Nevada Department of Forestry (NDF) crews to cut trees surrounding active GRSG leks. BLM completed NEPA for the project. Maintenance of several tree chainings in Lincoln County: Woods McCulloch, Reeds Cabin, and Burnt Canyon.	Ely District	Completed. Monitoring phase.
Spruce Mountain Restoration Project	Restoration of up to 10,000 acres to improve wildlife habitat, reduce hazardous fuels, improve forest health, and protect cultural resources. Project includes: mastication, seeding, prescribed fire, and herbicide treatments.	Wells Field Office-Elko District	Implementation.
Kinsley Exploration Plan	Expansion of mining exploration activities, including construction of drill pads, wells and access roads. Amended Plan of Operations submitted adding 20 acres.	Wells Field Office- Elko District	Decision Record signed 2013. Decision for Amendment to be determined.

Table 5-39**Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation**

Name of Action	Description of Action	Location	Status of Action
Spruce Mountain Project	Spruce Mountain seeding maintenance of 700 acres. Mastication and seeding to reduce fire threat and improve wildlife habitat	Wells Field Office- Elko District	Implementation.
Long Canyon Mine	Open-pit gold mining operation located on the east side of the Pequop Mountains. Operations would include one open pit, a heap leach pad, waste rock dump, tailing storage facility, and other ancillary facilities. A natural gas pipeline for self-power generation on site is proposed. The proposed disturbance acreage for operations is 2,116 acres, including public, private, and split-estate lands. The projected life of mine is 14 years, including construction, operations, and closure and post-closure monitoring.	Wells Field Office, Elko District	Final EIS available online. Decision expected Spring, 2015.
TransWest Express	TransWest Express is a proposed 725-mile 600kV transmission line.	Begins in south central Wyoming, crosses Utah diagonally from northeast to southwest, and crosses into Nevada and ends south of Las Vegas, NV	Final BLM ROW and Forest Service SUP anticipated in early 2016.
Zephyr Transmission line	500kV transmission line.	Begins in south central Wyoming, crosses Utah diagonally from northeast to southwest, and ends south of Las Vegas, NV	Application has been suspended until further notice.
Southwest Intertie Transmission Line	500kV transmission line.	Eastern NV from ID border to Las Vegas, NV	Portion of the line completed from Ely to Las Vegas. Northern segment is authorized but not constructed. ROW holder has requested a 5 year extension.
Southern Nevada Water Authority ROW	241 miles of 230kV, 69kV, and 25kV power lines; 306 miles of water pipeline; ancillary facilities include pump stations, and a water treatment facility.	Begins near Ely, NV and ends northeast of Las Vegas, NV	Decision signed; ROW issued.

Table 5-39
Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation

Name of Action	Description of Action	Location	Status of Action
Stonehouse WUI/Non-WUI Project	23,676 acre project area. Reduce fire threat and improve wildlife habitat by thinning pinyon and/or juniper in priority GRSG habitat adjacent to low value habitat, affects 3 major GRSG leks. Treatments includes: chaining, seeding, lop and scatter, cut and pile, mowing and drill seeding.	Ely District	Implementation; 16,660 to 19,000 acres identified for mechanical treatments; 12,359 acres treated in 2010-2012.
Pleasant Valley WUI Project	15,725 acres project area. 11,008 to 12,580 acres identified for treatment. Treatments include: mastication, chaining, broadcast burning, biomass use, hand cut, and aspen restoration.	Ely District	Implementation, 1,840 acres treated in 2010-2012.
Cold Springs Project	Implementation, 521 acres of cut, pile, and burn and 18 acres of cut and pile as of June 2013.	Ely District	Completed-In monitoring phase.
South Steptoe Watershed Plan	49,000 acres of treatments including: mastication, chaining, broadcast burning, biomass use, hand cut, and aspen restoration.	Ely District NV	BLM Decision Affirmed On Appeal.
Centennial Mine Plan	Conduct mine and exploration operations in the disturbance footprint of previously mined Mount Hamilton area on National Forest System lands and private land. There would be about 426 acres of surface disturbance on Forest Service lands	Humboldt-Toiyabe National Forest, Ely District	Decision.
Oil and Gas – Pluto Exploration Well	Reentered a previously drilled oil well to see if it can produce oil and gas. Total surface disturbance is approximately 6 acres.	Ely District	Well has been drilled and now being tested for production capabilities.
Oil and Gas – Bestoso Exploration Well	Proposed surface disturbance of 5 acres for access road and well pad.	Ely District	NEPA review for well was completed in 2012. Well is expected to be drilled by September 2016.

Table 5-39
Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation

Name of Action	Description of Action	Location	Status of Action
Ward Mtn. Watershed	This project continues thinning on the Ward Mountain Bench to protect the town of Ely, Nevada, and the surrounding developments from wildfire.	Ely District	Implementation.
Overland Pass	Hand-thinning pinyon/juniper in the Overland Pass area.	Ely District	Planning.
Combs Creek	Restore riparian areas by removing excess fuels to allow native plants to thrive and water flow rates to increase.	Ely District	Implementation.
Kious Basin/Snake Range Aspen	Kious Basin pinyon/juniper thinning project. Cooperative project with Great Basin National Park.	Ely District	Planning.
Smith Valley	Hand thinning conifer and prescribed fire pile burning.	Ely District	Implementation.
North Antelope	Treatment to improve ecological function and condition. Project includes an emergency wild horse gather and 12,000-acre conifer removal.	Ely District	An EA was completed in 2007. Implementation on-going.
Kern Mountain Stewardship Agreement	Pinyon/juniper mastication project in the Kern Mountain area.	Ely District	Identifying areas for potential 10 year stewardship contracting, NEPA in progress.
Currant/Ellison Mountain EA	Woodland removal by the use of prescribed fire and mechanical treatments.	Humboldt-Toiyabe National Forest, Ely Ranger District	Planning. 500 acres to be completed in FY15.
Ward Mountain	Reduce the Fire Regime Condition Class and reduce the threat of wildfire to City of Ely and surrounding area, and improve wildlife habitat. Using a variety of treatment methods.	Humboldt-Toiyabe National Forest, Ely Ranger District	Planning.
Green Springs Mining Exploration Project	Mineral exploration with approximately 75 acres of surface disturbance within approximately 800 acres over a period of approximately five years.	Humboldt-Toiyabe National Forest, Ely Ranger District	Implementation.

Table 5-39**Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation**

Name of Action	Description of Action	Location	Status of Action
Overland Pass Habitat Restoration	Joint project with Ely BLM District to treat approximately 40,000 acres of pinyon/juniper woodlands spread across multiple jurisdictions. Objectives are to eliminate hazardous concentrations of fuels and improve sage steppe habitat.	Humboldt-Toiyabe National Forest, Ely Ranger District	Planning.
Bald Mountain Mine	Expansion of existing, authorized Bald Mountain Mine gold mine operation. Operations would include existing and new open pits, rock disposal areas, heap leach facilities, ore process areas, interpit areas, access & haul roads, growth media stockpiles, and ancillary & support facilities. The proposed new construction/operation disturbance acreage is 6,905, consisting of public lands. Projected mine life is 20 years.	Ely District	Draft EIS being developed.
Gold Rock Mine	Open-pit gold mine. Operations would include an open pit, a heap leach pad and associated ponds, process facility and refinery, a mill, a carbon-in-leach plant, waste rock dumps, a tailings storage facility, exploration, water supply wells and ancillary facilities, a six-mile transmission line, and associated maintenance road. The proposed construction/operation disturbance acreage is 3,946. Projected mine life is 48 years.	Ely District	Draft EIS published; public comment period ended 3/30/15. Decision anticipated summer/fall of 2015.
Northwestern Interior Sub-Population Area — Management Zone III			
Emergency Stabilization and Rehabilitation	Priority rehabilitation of wildfire-affected GRSG habitat.	Northwest Interior Population	Ongoing rehabilitation of GRSG habitat affected by future wildfires, including sagebrush planting/seeding.

Table 5-39**Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation**

Name of Action	Description of Action	Location	Status of Action
Montana Mountain Fuels Project	346,000 acre planning area to reduce fire threat and improve wildlife habitat. This project will be a multi-year project with multiple treatments and multiple cooperators. Thus far this project includes restoration of cheatgrass die-off areas, improvement of roads (for fire access and fuelbreaks), improvement of wet meadows (fencing), mastication and seeding of decadent sagebrush stands, and creation of fuelbreaks, as well as infrastructure for the communities of Kings River and McDermitt.	Winnemucca District	Implementation.
Double H/Bilk Creek	390,856-acre planning area to reduce fire threat and improve wildlife habitat Fuel Reduction and Rangeland Health	Winnemucca District	Planning.
Coeur-Rochester Mine	Expansion of operations at the existing Coeur Rochester Mine, which is located in the Humboldt Range, Pershing County, Nevada.	Winnemucca District, approximately 18 miles northeast of Lovelock, NV.	Draft EIS being developed.
Hycroft Mine	Plan modification for the addition of a tailings pond to accommodate the proposed and permitted mill.	Winnemucca District	Baseline data being developed. EIS initiated.
Quinn Range Sub-Population Area — Management Zone III			
Lincoln County Chain Maintenance Project	Project completed by NDOW using NDF crews to cut trees surrounding active GRSG leks. BLM completed NEPA for the project. Maintenance of several tree chainings in Lincoln County: Woods McCulloch, Reeds Cabin, and Burnt Canyon.	Ely District	Completed. In monitoring phase.

Table 5-39**Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation**

Name of Action	Description of Action	Location	Status of Action
Pioche/Caselton WUI Project	11,300 acre project area, 3,246 to 4,711 acres identified for treatment. Reduce fire threat and improve wildlife habitat by thinning pinyon and/or juniper, mastication, mowing, seeding, chaining, and cut, pile, and burn.	Ely District	Implementation. 3,157 acres completed.
Cave/Lake Valley Watershed Plan	121,600 acres of treatments identified. Project is set-up for the Cave and Lake Valley Watershed Treatments Plan Environmental Assessment. Treatments includes: chaining, seeding, lop and scatter, cut and pile, mowing and drill seeding.	Ely District	Planning.
North Central Nevada/Southeastern Oregon Sub-Population Area — Management Zone IV			
Double H/Bilk Creek	390,856 acre planning area to reduce fire threat, improve wildlife habitat and rangeland health.	Winnemucca District	Planning.
Montana Mountain Fuels Project	346,000 acre planning area to reduce fire threat and improve wildlife habitat. This project entails the creation of a fuels management plan. It will be a multi-year project with multiple treatments and multiple cooperators. Thus far this project includes restoration of cheatgrass die-off areas, improvement of roads (for fire access and fuelbreaks), improvement of wet meadows (fencing), mastication and seeding of decadent sagebrush stands, and creation of fuelbreaks as well as infrastructure for the communities of Kings River and McDermitt.	Winnemucca District	Implementation.

Table 5-39**Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation**

Name of Action	Description of Action	Location	Status of Action
Santa Rosa Fuels Project	Ongoing 355,699-acre planning area to reduce fire threat and improve wildlife habitat. The Santa Rosa project is a landscape scale project designed to restore and protect important wildlife habitat, sensitive species habitat for GRSG and pygmy rabbit, streams containing Lahontan Cutthroat Trout, a federally listed threatened trout species, and areas within watersheds on public lands administered by BLM and the US Forest Service.	Winnemucca District	Implementation.
Multiple existing Hazardous Fuels Projects	Project maintenance of up to 16,000 acres to improve wildlife habitat, reduce hazardous fuels, improve forest health, and protect cultural resources. Project includes: mastication, seeding, prescribed fire, and herbicide treatments.	Winnemucca District	Implementation and maintenance.
Northeastern Nevada Sub-Population Area — Management Zone IV			
Hazardous fuels reductions and fuels maintenance projects	Hazardous fuels reduction and maintenance projects.	Owyhee, Squaw Valley, 25, SANE group allotments; Elko and Wells Field Offices	Implementation.
Multiple Hazardous Fuels Projects	Project maintenance of up to 9,000 acres to improve wildlife habitat, reduce hazardous fuels, improve forest health, and protect cultural resources. Project includes: mastication, seeding, prescribed fire, and herbicide treatments.	Elko District	Implementation and maintenance.
Big Ledge Barite Mine Amended	Mine closure.	Wells Field Office, Elko, District	Plan submitted.

Table 5-39
Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation

Name of Action	Description of Action	Location	Status of Action
Murdock Mountain Phosphate Prospecting Permit	Phosphate exploration drilling and trenching in the Murdock Mountain area. The operator is proposing to construct 31 drill pads with 2 drill holes per pad and 29 exploration trenches measuring 100 feet long by 5 feet wide by 5 feet deep. Exploration roads will also be constructed and existing roads will be used. Exploration operations are anticipated to take 200 days to complete.	35 miles northwest of West Wendover, Nevada	Project deferred pending EIS decision.
North Tuscarora Sage-Grouse Habitat Restoration Project	Restoration of up to 10,000 acres of GRSg habitat. Treatments would improve, protect GRSg habitat, protect Lahontan Cutthroat Trout, improve wildlife habitat, reduce invasive weeds, and reduce hazardous fuels.	Tuscarora Field Office-Elko District	Implementation.
Sage Grouse Habitat Mitigation Arturo Mine	Off-site habitat restoration of approximately 1,616 acres.	Tuscarora Field Office- Elko District	Early stages of implementation.
Hollister Mine	Underground mine and power lines. 222 acres disturbance permitted.	Tuscarora Field Office- Elko District	Record of Decision signed March 1, 2014; project approved.
Arturo Mine	Open pit expansion. 2774 acres permitted disturbance.	Tuscarora Field Office- Elko District	Record of Decision signed in 2014.
Big Bird Mine	Proposed barite mine, approximately 200 acres proposed disturbance.	Tuscarora Field Office- Elko District	Baseline stage. POO not submitted.
Midas Vent Raises	Ventilation for underground mine & power lines.	Tuscarora Field Office- Elko District	DR and Plan approval signed May 2013
Heavy Spar Mine	Barite mine, approximately 280 acres proposed disturbance.	Tuscarora Field Office- Elko District	Baseline stage. POO not submitted.
Midas Tails	Mine expansion, approximately 100 acres proposed disturbance.	Tuscarora Field Office- Elko District	Baseline stage. No POO yet.
China Mountain Wind Project	Utility-scale wind facility.	Northeastern Nevada	Temporarily deferred pending NV/CA GRSg LUPA/EIS.

Table 5-39**Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation**

Name of Action	Description of Action	Location	Status of Action
White Rock Mountain Aspen Enclosures	Place up to nine enclosures around aspen stands to protect from overgrazing by livestock.	Northeastern Nevada	Undergoing NEPA/archaeological review.
Southwest Intertie Transmission Line	500-kilovolt alternating current transmission line.	Idaho and southern Nevada, eastern Nevada	Portion of line completed from Ely to Las Vegas. Northern segment authorized but not constructed. ROW holder has requested a 5-year extension.
Eureka Pipeline Project	Natural gas pipeline from Goldstrike to Gold Quarry.	Elko District	2014 ROW issued; Decision Record signed.
Rossi Mine Expansion	Existing barite mine in operation since 1947. Currently permitted 912 acres. Proposal to expand to 3,731 acres.	Located approximately 50 miles northeast of Battle Mountain, Nevada-Elko District	Plan of Operation submitted. Plan under review.
Oil and Gas Lease Sale	Lease sale.	Elko District	March 8, 2016 competitive auction of lease parcels.
Tuscarora Geothermal Plant Expansion	Geothermal development.	Elko District	EA being prepared.
Coyote Project	Barite removal.	Elko District	EA being prepared.
Elko Area Expansion Project	35-mile 8-inch diameter natural gas pipeline primarily parallel to SR Hwy 225. Estimate of less than 400 acres of disturbance.	Ruby Pipeline Compressor Station to Elko Lateral, near Elko, Nevada	Planned for May 2015 to in-service by November 2015. Recommended avoidance and minimization action initiated. Mitigation pending.
North Elko Pipeline Project	Natural gas pipeline; Spring 2014: Approved mitigation action to install 32,559 sagebrush plants on 167 acres.	Elko District near Tuscarora, Nevada	Implemented. Augments 39,749 sagebrush and 1600 bitterbrush plants installed on approximately 198 acres as part of mitigation actions during Spring 2013.
Ormat Tuscarora Geothermal Project	Geothermal plant. Voluntary mitigation funds via Tuscarora Geothermal Project Cooperative Agreement for Sage-Grouse Conservation and Habitat Improvement.	Elko District near Tuscarora, Nevada	Implemented; Initiate expenditure of \$622,500.00 in voluntary mitigation account for conservation of GRSG habitat.

Table 5-39
Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation

Name of Action	Description of Action	Location	Status of Action
Ruby Pipeline Project	Voluntary GRSB mitigation funds.	Elko District	Ongoing expenditure of \$3,071,218.00 in voluntary mitigation account on Elko District for conservation of GRSB habitat.
Fence Modifications and Wildlife Protection Devices	Installation of GRSB flight diverters on livestock control fencing. Installation of approximately 60,000 diverters on approximately 63-miles of fence.	Elko District	Categorical Exclusion. Ongoing.
Emergency Stabilization and Rehabilitation	Priority rehabilitation of wildfire-affected GRSB habitat.	Elko District	Ongoing rehabilitation of GRSB habitat affected by wildfires, including sagebrush planting/seeding.
Barrick Goldstrike Betze Pit	GRSB mitigation.	Elko District	Ongoing expenditure of approximately \$26,704.00 remaining in \$100,000.00 voluntary mitigation account on Elko District for conservation of GRSB habitat.
Big Springs Gold Mine Project	The exploration project proposes approximately 60 drill holes spread between 16 individual drill sites within previously disturbed areas of the former Big Springs Mine site.	Mountain City Ranger District	Planning.
Black Jack Project	Exploration drilling. Three drill pads.	Mountain City Ranger District	Planning.
Quantum Jarbidge Exploration	Quantum Minerals proposes to drill approximately 40 exploration drill holes from 10-12 drill sites, construct approximately 4000 feet of new road and excavate up to 500 feet of exploration trenching for a total of approximately 3 acres of disturbance	Jarbidge Ranger District	Planning.

Table 5-39

Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation

Name of Action	Description of Action	Location	Status of Action
Northeastern California/Northwest Nevada Sub-Population Area — Management Zone V			
Vya Population Management Unit Programmatic Habitat Restoration and Fuels Reduction Project	Up to a total of 100,000 acre of treatment over a 10-year period. A combination of juniper thinning or removal and prescribed burning. 16,274 acres identified for prescribed fires and up to 83,726 acres of juniper treatment.	Surprise Field Office	Record of Decision signed August 21, 2013. Implementation.
Virginia Mountain Project	10-15 year juniper reduction project: mastication, thinning, lop and scatter and post fire restoration.	Carson City District	EA in progress.
Northeastern California Juniper Treatments	Multiple juniper removal treatments over a total of 32,099 acres.	Alturas, Surprise and Eagle Lake Field Offices	Implementation.
Northeastern California Prescribed Fires	Multiple prescribed fire treatments throughout the Alturas, Surprise and Eagle Lake Field Offices. Burns include broadcast timber understory burns, Aspen regeneration, pile burns and small meadow broadcast burns. A total of 3,015 acres.	Alturas, Surprise and Eagle Lake Field Offices	Implementation.
Lands and Realty Cases within the BLM LR2000 System — All Management Zones			
Other LUAs	795 pending cases.	Within the sub-region	Applications pending and under NEPA review.
ROW- Wind Testing	5 pending ROW cases for testing.	Within the sub-region	Applications pending and under NEPA review.
ROW- Wind Development	4 pending ROW cases for development.	Within the sub-region	Applications pending and under NEPA review.
Land Tenure actions - disposals	3,435,300 acres are identified for disposal.	Within the sub-region	Some applications are pending, other lands are identified.
Locatable Plans of Operation	98 Pending Plans of Operation.	Within the sub-region	Applications pending.
Locatable Notices of Exploration	105 Pending Notices of Exploration.	Within the sub-region	Applications pending.

Table 5-39
Reasonably Foreseeable Future Actions by WAFWA Management Zones and Greater Sage-Grouse Population/Subpopulation

Name of Action	Description of Action	Location	Status of Action
Mineral Material sites	81 Pending cases.	Within the sub-region	Applications pending.
Other Sub-Regional Actions			
Carson Lake Geothermal Utilization Project – Ormat	40-MW power plant.	15 miles southeast of Fallon- MZ III	Construction not initiated.
New York Canyon Geothermal	62-MW power plant.	Pershing County, Nevada	NEPA finalized; construction not initiated.
Ongoing vegetation management actions	Noxious and invasive weed control, post fire rehabilitation seedings, and range improvement seedings.	Across entire sub-region and all Populations	Implementation.
Salt Wells Geothermal Utilization Project	120-MW power plant.	15 miles southeast of Fallon- MZ III	Construction not initiated.
Dixie Hope Geothermal Utilization Project	38.5-MW geothermal energy plant and associated infrastructure, including power line (from site to Jersey Valley power plant) and well fields; a phase II power plant may be constructed if geothermal resources are sufficient.	Dixie Valley	Utilization Plan received, under review.
Tungsten Geothermal Utilization Project	20-MW Geothermal energy plant and associated infrastructure, including power line and well fields.	Carson City District - Edwards Creek Valley	EA in progress.
Wild Rose II Geothermal Utilization Project	35-MW geothermal energy plant to be built in same area as existing power plant.	Carson City District - Gabbs Valley	One power plant constructed, and the second power plant is under construction.
Luning Solar Energy Project	50-MW photovoltaic solar generation facility on approximately 560 acres of public lands, associated infrastructure and a 120-kV gen-tie line.	Carson City District - Mineral County, NV near town of Luning	EA in progress
Enel Salt Wells Solar Project	Proposed 19-MW photovoltaic solar generation facility north of existing Geothermal power plant.	Carson City District - ~20 miles southeast of Fallon, NV	EA in progress

5.4 VEGETATION

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect vegetation and soils resources are locatable and fluid mineral development, lands and realty actions, livestock grazing and range improvements, vegetation management, wildfires, invasive plant species, drought, and climate change.

The combination of all of these actions would likely cause an increased chance of the spread and establishment of invasive weeds. Drought conditions, combined with wildfires and invasive species presence and potential climate change effects could lead to increased invasive annual vegetation and increase the frequency of wildfires, causing a cyclic effect, compounding the vegetation loss and conversion to invasive annual grass communities. The Central Basin and Range REA provides a risk potential of invasive annual grass cover due to a combination of factors, such as proximity to past wildfires, wildfire history, and other criteria. The REA data shows that much of the central Great Basin is at risk of invasive annual grass presence. Also, the potential for soil erosion could increase as invasive weed populations crowd out the native vegetation and its soil holding characteristics. Post-fire vegetation treatments and other restoration projects designed to bring damaged sites to healthy functioning systems, combined with mitigation measures from the above mentioned actions and invasive weed control treatments may offset vegetation and soil disturbances.

Sagebrush is killed by wildfires and recovery requires many years, especially in the case of large fires. Contiguous old-growth sagebrush sites are at high fire risk, as are large blocks of continuous dead sagebrush. Prior to recovery, these sites are of limited use by GRSG except along the edges in unburned islands. As a result of this loss of habitat, fire has been identified as a primary factor associated with GRSG population declines. Depending on the species and the size of a burn, a return to a full pre-burn community cover can take 13 to 100 years (Connelly et al. 2004). In addition, fires can result in a reduction of invertebrate food sources and may facilitate the spread of invasive weeds. Cheatgrass readily invades sagebrush communities especially in drier, lower elevation areas, and disturbed sites after wildfire (Balch et al. 2012). Cheatgrass changes historical fire patterns by providing an abundant, continuous and easily ignitable fuel source that facilitates rapid fire spread. While most sagebrush subspecies are killed by fire and are slow to reestablish, cheatgrass recovers within one to two years of a fire event from seed in the soil.

Invasive weeds alter plant community structure and composition, productivity, nutrient cycling, and hydrology and may cause declines in native plant populations, including sagebrush habitat, through competitive exclusion and niche displacement, among other mechanisms. Invasive plants reduce and, in cases where monocultures occur, eliminate vegetation that GRSG use for food

and cover. Invasive plant species do not provide suitable GRSG habitat, since the species depends on a variety of native forbs and the insects associated with them for chick survival. GRSG also depend on sagebrush, which is eaten year-round and used exclusively throughout the winter for food and cover. Along with competitively excluding vegetation essential to GRSG, invasive weeds fragment existing GRSG habitat or reduce habitat quality. Invasive annual grasses can also create long-term changes in ecosystem processes, such as more frequent and severe fire-cycles and other disturbance regimes that persist even after an invasive plant is removed (Connelly et al. 2004, pp. 5-9).

All the management areas in the planning area are threatened to some extent by the spread of invasive weeds (especially cheatgrass). Beyond managing risk, restoration of potentially valuable areas, such as those that would increase connectivity among seasonal habitats or sub-populations, or increase quality of current seasonal ranges, may become an important management option where natural and anthropogenic patterns and processes have fragmented and degraded habitats (Manier et al. 2013).

Alternatives Analysis

Under Alternative A, grazing by livestock and wild horses and burros would continue under current policies and regulations, resulting in both improved and degraded vegetation conditions. Vegetation would continue to be affected by wildfire and subsequent post fire treatments. Recreational vehicle use could spread invasive plant seeds causing introduction of new populations. Continued vegetation treatments would reduce conifers in GRSG habitat.

Because Alternatives B, C, D, E, F, and the Proposed Plan reduce the potential for cumulative impacts on vegetation, to varying degrees, from livestock grazing, locatable and fluid mineral development, and lands and realty actions, those Alternatives may help to reduce vegetation and soil disturbance on a landscape scale.

Alternative C, in general, includes passive restoration rather than active vegetation manipulation. Although vegetation conditions are likely to improve, the benefit to vegetation resources would be realized over a longer time scale compared to Alternative A.

Increased vegetation treatments under Alternatives B and D, combined with those that are ongoing or planned, may cause more surface disturbance on a short-term scale, but the treatments would benefit GRSG habitat, improve vegetation health, and promote resiliency and resistance to invasive plant encroachment over a longer time period. The combination of past, present, and future active treatments carried out over an extended period of time would reduce invasive plant populations.

Under Alternative E in Nevada, the Nevada Conservation Credit System could provide more sagebrush/perennial grass vegetation and/or limit further disturbance in GRSG habitat.

Restrictions on surface disturbances under Alternative F, such as reduced livestock use combined with reduced wild horse AML levels and other actions would lead to improved vegetation conditions. Proposed restoration in sagebrush communities, combined with past, present, and planned restoration activities would also lead to improved sagebrush stands in GRSG habitat.

Under the Proposed Plan, specific management actions and applicable RDFs intended to enhance sagebrush/perennial grass vegetation, along with reduced disturbance, restricted allocations for resource use, prioritization of fire and fuels treatments, establishment of SFA and resulting prioritization within them, adaptive management and GRSG habitat objectives would be expected to result in sagebrush/perennial grass communities showing improved health, vigor, resilience to disturbance and resistance to invasive plants throughout the planning area. Past, present, and planning active treatments combined with management actions under the Proposed Plan would be expected to reduce the invasive plant population over time.

5.5 SOIL RESOURCES

The cumulative impact analysis area used to analyze cumulative impacts on soils includes the entire planning area. Surface-disturbing activities occurring within the planning area are not expected to affect soil resources outside of the planning area. The cumulative impact analysis area used to analyze cumulative impacts on water quality and watershed resources extends outside of the planning area, following fourth-order watershed boundaries. Given that the hydrologic influence of the surrounding area is primarily focused in the stream channels and that delineation of the cumulative impact analysis area was based on watershed boundaries, the area of analysis is sufficient. The hydrologic influence of the planning area on areas outside the planning area is primarily the result of hydrograph alteration and quality of the water flowing from the area. Areas extending beyond the planning area may be considered for cumulative impact analysis where the hydrologic unit extends outside the planning area.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect soil and water resources are mineral development, livestock grazing, infrastructure development, vegetation treatments, wildfires, recreation, and travel and transportation activities.

Alternatives Analysis

Mineral development, including oil and gas, coal, and other minerals, could cause localized impacts on soils. Intensive mechanical vegetation treatments likely have and would continue to impact soils resources locally, but they would increase vegetation cover, and thus soil health, over the long term. Past livestock grazing

has impacted soil resources. Active management of grazing allotments has led to improvements in soil health over time in the planning area.

An important trend in the planning area is rapidly increasing recreational use. This growth in recreation on public lands is due to local population growth, as well as the planning area's reputation as a national and international recreation destination. All forms of recreational activities can increase potential for erosion, sedimentation, gully creation, biologic soil crust damage, and riparian and upland vegetation damage. Recreation activities may also directly and indirectly impact water quality due to erosion and sediment production potential. However, the significance of such impacts varies with the nature and degree of disturbance as well as site specific environmental conditions. Typically larger disturbances represent greater potential to damage soils and vegetation, degrade water quality, and impair overall watershed function and condition compared to smaller disturbances.

Potential cumulative impacts on water resources would be reduced under Alternatives B, C, D, E, F, and the Proposed Plan due to the reduced potential for activities that would alter functional vegetative communities and lead to increased runoff and sediment/contaminant delivery. Activities with impacts on water resources include management actions attributed to the alteration of natural vegetative communities (e.g., pinyon and/or juniper encroachment and cheatgrass), historic grazing practices, surface-disturbing actions in areas of low reclamation potential, conversion of native rangelands to irrigated agricultural lands (on non-BLM-administered and National Forest System lands), improper maintenance of transportation facilities, spills/leaks of substances used to develop mineral resources, and recreational use. These activities cause surface disturbances by removing vegetation cover, displacing and compacting soils, and altering soil structure and chemistry. The result is exposed surfaces that increase the potential for runoff and erosion, which delivers sediment and contaminants to nearby waterways. Anthropogenic disturbances would be least likely to result in cumulative effects on soil resources under Alternatives B, C, and F. Alternative C would remove any potential for disturbance in GRSG habitat associated with livestock grazing, but could result in degraded soil conditions due to a passive management approach that could promote intense wildfires. Alternatives D and the Proposed Plan would provide lesser protections from anthropogenic disturbances and livestock grazing, but would decrease the likelihood for long-term cumulative effects on soil associated with wildfire.

The cumulative effect of past, present, and reasonably foreseeable future mineral development, invasive species, wildfires, livestock grazing and other ground-disturbing activities could damage biological soil crusts.

5.6 RIPARIAN AREAS AND WETLANDS

The cumulative impact analysis area for impacts from proposed management actions on riparian areas and wetlands includes all GRSG habitats on public and private lands within the sub-region. Effects of alternatives are analyzed over the short term (two years) and over the long term (20 years).

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected or would (in the future) affect riparian areas and wetlands include: leasable, salable, and locatable minerals management; travel management; lands and realty actions; energy development; livestock grazing; wild horse and burro management; vegetation management, wildlife management; recreation management; special use designations; and climate change.

The effects analysis is based on information characterizing current habitat conditions (refer to 3.4 Riparian Areas and Wetlands, Current Conditions) and on general assumptions of how various kinds of land uses or conditions can affect riparian areas and wetlands based on a review of the literature (refer to 4.6 Riparian Areas and Wetlands, 4.6.2 Nature and Types of Effects). Typical direct and indirect negative short and long-term effects from ground-disturbing activities include compaction and loss of infiltration, increased runoff, accelerated erosion, increased infestations of invasive plants and shifts in plant communities from more mesic species to species associated with drier conditions. Where lands are protected through special use designations or where prescriptive management actions are applied (such as a livestock grazing system), direct and indirect effects on riparian areas can be positive, especially over the long term. Project design features and mitigation programs that focus on habitat enhancement can also reduce adverse impacts and/or create positive short and long-term effects. In the case of climate change, effects of a hotter, drier environment on riparian habitats would result in decreased water supplies and increases in evaporation rates. Over the long term, both the extent and viability of riparian plant communities would likely decline.

The following analysis examines relative differences among alternatives in terms of adding incremental effects on the effects of past, present, and reasonably foreseeable actions and conditions on riparian areas and wetlands within the planning area. It is generally assumed that all alternatives, with the exception of alternative A, add incremental positive direct and indirect short and long-term cumulative effects on riparian areas and wetlands. Alternatives B, C, E and F, as well as the Proposed Plan all contain at least some actions designed to reduce disturbance and/or to enhance or restore upland and riparian habitats. In some cases, components of alternatives have the potential to add incremental adverse indirect impacts (these situations are discussed in the following sections).

5.6.1 Alternative A

Disturbance to riparian areas and wetlands is expected to accelerate throughout within the planning area. Under Alternative A, the vast majority of the planning area is open to surface-disturbing activities associated with mineral and energy development. Numerous projects or activities which could adversely impact riparian habitats are foreseeable across the planning area and would add negative direct and indirect and short and long-term cumulative impacts. Some of these impacts would be offset or reduced as result of stipulations or other measures incorporated into the permitting process.

Land uses such as grazing by livestock and wild horses and burros would continue under current policies and regulations. The nature and type of cumulative impacts would depend on the effectiveness of management applications. Where grazing by livestock and/or wild horses and burros exceeds the ability of riparian areas to recover over the long-term, cumulative impacts would be negative. Riparian areas and wetlands will continue to be affected by trampling, soil compaction and loss of vegetative cover. Where prescriptive or managed grazing practices are applied or where wild horses and burros are at or below AML, cumulative impacts would be positive. Reduced levels of grazing or changes in timing of grazing impacts would allow degraded areas to recover.

Recreational use of public lands within the planning area is expected to increase causing additional adverse incremental impacts on riparian areas and wetlands primarily in the form of increased trampling and compaction of wetland soils and of riparian plant. Increases in both vehicular and foot traffic into riparian habitats would also increase opportunities for the spread of invasive weeds.

Numerous vegetation treatments including projects designed to improve wildlife habitat as well as overall rangeland health have or would be implemented within PHMA and GHMA within the planning area (refer to **Table 5-39**). Collectively, these projects, which cover many thousands of acres, could directly and indirectly add positive long-term cumulative effects on riparian areas by promoting overall watershed health leading to increased infiltration rates, decreased erosion, and improved resiliency against fires and invasive plants.

5.6.2 Alternative B

Alternative B adds positive cumulative effects on riparian areas and wetlands by reducing surface-disturbing activities associated with mining, travel, recreation, energy development, and lands actions in GRSG habitat. Fewer acres of riparian areas and wetlands would be directly or indirectly impacted by soil compaction, accelerated erosion and loss of plant cover compared to Alternative A.

Proposals to emphasize managing livestock grazing and wild horses and burros for improved ecological conditions in GRSG summer brood-rearing habitat would also add positive cumulative effects on riparian areas. Compared to Alternative A, more acres of riparian areas would improve where grazing practices and wild horse numbers were managed for vegetative recovery.

However, added restrictions on land uses have the potential to create indirect adverse incremental effects on riparian habitats if tools for better livestock distribution are less available and if certain vegetative treatments for fuels or watershed health are not implemented. Limitations on water developments in GRSG habitats could cause livestock to become further concentrated on water sources in riparian areas, while reductions in upland vegetative treatments could contribute to a decline in overall watershed health.

5.6.3 Alternative C

Compared to Alternative A, Alternative C adds substantial positive direct and indirect cumulative effects on riparian areas and wetlands within PHMA and GHMA. Widespread reductions or eliminations in surface-disturbing activities and in livestock grazing would allow for degraded areas to recover naturally and, in many cases, rapidly. Impacts would persist over the long term.

However, reduced opportunities for collaborative watershed management and for use of tools such as targeted livestock grazing and/or fuels treatments have the potential to add incremental indirect adverse effects. Interest in cooperative restoration of intermingled private riparian and wetland habitats would likely decline, while fire starts affecting riparian habitats could increase over time.

5.6.4 Alternative D

Cumulative impacts on riparian areas and wetlands under Alternative D would be similar to Alternative B with the exception that there would be more opportunities for surface disturbance. Consequently, incremental benefits of reduced disturbance on riparian areas under Alternative D are greater compared to Alternative A but less than compared to Alternative B.

Under Alternative D, incorporation of fallback standards (use restrictions) into the livestock grazing planning process would add more positive impacts on riparian areas in comparison to both Alternatives A and B. Where grazing practices preclude attainment of rangeland health standards, use restrictions would add additional protections to riparian and wetland habitats.

Additional emphasis on collaborative management and on habitat restoration proposed under Alternative D adds additional positive cumulative impacts compared to Alternative A. Collaborative management has the potential to improve riparian habitats at the landscape level and across jurisdictional boundaries, while active restoration has the potential to accelerate recovery of habitats damaged by conditions such as fire or invasive plants infestations.

5.6.5 Alternative E

Compared to Alternative A, Alternative E provides more opportunity for positive cumulative effects on riparian habitats within GRSG habitat in Nevada. If successful, strategies proposed under Alternative E to avoid, minimize, or mitigate impacts on riparian areas and wetlands would both reduce ground disturbance in and around riparian habitats and increase enhancement of

riparian areas through collaboration and through application of the Conservation Credit System. The emphasis on management across jurisdictional boundaries has the potential to improve many more acres of riparian habitats on private lands. In addition, by incentivizing conservation, industry is more likely to advocate for riparian restoration.

Components of Alternative E which reduce certainly for effectiveness of management actions (refer to discussion under Riparian Areas and Wetlands, Alternative E, **Section 4.6.8**) also reduce certainty that cumulative impacts are relatively more positive for riparian areas compared to Alternative A.

5.6.6 Alternative F

Actions proposed under Alternative F add more positive cumulative impacts on riparian areas and wetlands compared to Alternative A. Reduced surface disturbance and incorporation of restrictions on livestock and wild horse and burro use would add incremental beneficial effect on riparian habitats. Surface disturbing activities as well as use of riparian areas by livestock and wild horses and burros have the potential to promote accelerated erosion, soil compaction and alteration of riparian plant communities. Reductions in these activities would contribute to the recovery of degraded habitats.

Implementation of sagebrush restoration and enhancement strategies would improve overall watershed health directly and indirectly benefit riparian habitats by decreasing erosion rates, increasing infiltration and building resiliency against such threats as fire, invasive weeds and climatic events.

As with Alternative C, restrictions in livestock use across the planning area could add incremental adverse indirect effects if opportunities for collaborative watershed management are reduced. Many key riparian habitats for GRSG occur on intermingled or adjacent private lands.

5.6.7 Proposed Plan

Comprehensive strategies and actions designed to better manage GRSG habitat at a landscape level and to ameliorate the effects of anthropogenic disturbance would add more positive cumulative effects on riparian areas and wetlands throughout the planning area compared to Alternative A. Riparian areas and wetlands would benefit from increased collaboration with stakeholders, application of RDFs, establishment of GRSG screening criteria, increased focus on GRSG habitat needs as part of management and planning decisions, ecologically based restoration, more comprehensive fire and fuels management, implementation of adaptive management, and development of innovative strategies to incentivize conservation and to better track and monitor results would collectively improve resiliency and ecological health of riparian areas over the long term. There would be less direct disturbance to riparian areas and surrounding uplands, while targeted management actions would restore and enhance GRSG habitat at a watershed scale. In addition, use of the Conservation Credit System would focus added restoration and enhancement activities on

riparian habitats. Because riparian areas are so important for brood rearing within the planning area and because these areas are so responsive to changes in management, it is assumed riparian and wetland sites on both public and private lands would be targeted for offsite mitigation.

5.7 WILD HORSES AND BURROS

The cumulative impact analysis area used to analyze cumulative impacts on wild horse and burro management includes the planning area because impacts are expected to be limited to those actions originating within the planning area. Under all alternatives, wild horse and burro management would be directed to achieve and maintain AMLs, achievement of Thriving Natural Ecological Balance (TNEB), and preservation of GRSG habitat. Additionally, with the exception of Alternative F, management actions for wild horses and burros would not result in direct changes to HMA/WHBT designation, to AMLs within designated HMAs/WHBTs, or acreage designated as HMAs/WHBTs. Resource management actions (e.g., vegetation treatment, livestock grazing, fuels, leasing limitations and closures, and travel restrictions, etc.) that conserve, enhance, or restore GRSG habitat would also benefit wild horses and burros. Management actions which reduce access to or the availability of water and/or forage or restrict movement could result in the potential need for reduction of the wild horse and burro AML within an HMA/WHBT. Cumulative impacts under all alternatives, with the exception of Alternative F, would be limited to any future changes that may result in potential adjustments, both positive and/or negative, to the AML, acreage adjustments and reconsideration of HMA/WHBT designation that are based on achievement of GRSG habitat objectives for improving habitat conditions.

Under Alternative F, in order to achieve GRSG habitat objectives and reduce utilization levels and other impacts associated with wild horses and burros, all AMLs of the established HMAs/WHBTs within GRSG habitat would be reduced by 25 percent. Cumulatively, reductions to this level could impact herd sustainability and diversity, which could lead to changes in HMA/WHBT designation and long-term management in GRSG habitat.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area, both within and outside GRSG habitat, that have affected and would likely continue to affect wild horse and burro management are actions or external factors (e.g., climate change) that change forage and water availability, access to water and forage sources, range condition, barriers to movement, and population control activities (removal of excess animals, population growth suppression, etc.). Future actions pertaining to such activities as recreational events and development for minerals, energy, and transmission lines that are pushed outside of GRSG habitat areas may result in increased indirect disturbance to wild horses and burros in those areas.

5.8 WILDLAND FIRE AND FIRE MANAGEMENT

The cumulative impact analysis area used to analyze impacts on Wildland Fire Management is equivalent to the planning area but also similar to the activities and trends in adjacent planning areas.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and would likely continue to affect wildland fire management include: leaseable, salable and locatable mineral management; travel management; lands and realty actions; renewable energy development; livestock grazing; wild horse and burros management; vegetation management; recreation management; and climate change.

Wildland Fire Management

Cumulative impacts on wildland fire management reduces the BLM's and Forest Service's ability to respond to uncharacteristic wildland fires. Increases in human caused ignitions risks and fuel loading along with changes in fire behavior and weather conditions alters and intensifies the frequency of nonnative invasive species and species associated with drier fuel conditions. The nature and type of cumulative impacts depend on such variables as management strategies, mitigation programs, project design features, FRCC trends, climate patterns, and other factors.

From 1982 to the present, minerals, lands and realty, and renewable energy developments have impacted fire ecology and management as more areas have been developed, thereby increasing the spatial scope and overall demand for fire suppression to protect buildings and infrastructure. At the same time, energy and mineral development, particularly surface-disturbing activities, have contributed to human-caused ignitions in the past and would do so in the future. The development and expansion of wildland urban interface areas, recreation activities, and OHV use have also increased the potential for human caused fire.

ROWs and associated development may increase the risk of human-caused ignitions due to vehicular travel to and from the site, construction, maintenance, and operation of the facilities. Linear ROWs provide fuels breaks and may decrease the risk of wildfire spread. The development allowed under these authorizations would result in surface disturbance, which would generally contribute to the modification of the composition and structure of vegetation communities in the vicinity of developed areas, which could then be more likely to fuel high intensity fires.

Livestock grazing and wild horse and burro management could reduce the fire risk in the short term but in the long term, without proper management, invasive nonnative species would increase. Any increase in fine fuels within GRSG habitat and FRCC would increase the potential for high intensity fires throughout the planning area.

Continued large wildfires due to drought conditions and increasing fine fuels due to establishment and spread of annual invasive plants have increased demands on fire suppression operations and emergency stabilization and rehabilitation efforts. Emergency stabilization and rehabilitation efforts have limited establishment and spread of annual invasive plants (e.g., cheatgrass) in areas treated. This could impact Wildland Fire Management through increased personnel requirements, and increased need for fire-suppression activities, as well as increased costs to the wildland fire management program.

Past, future and ongoing fuels treatments within the planning area, including hazardous fuels reduction, prescribed fires, chemical and mechanical treatment, and seeding, would likely continue and potentially increase in the future. In the short term, impacts would be greatest from treatment planning and implementation costs (refer to **Table 5-39**). However, in the long term, the past and future treatments would improve FRCC. This would move the areas towards a natural fire regime and a reduced risk of uncharacteristic wildfire. Vegetation would become more resistant and resilient and less likely to lose key ecosystem components after a disturbance. Fuels treatments would benefit firefighter and public safety, as well as decrease fire risk and management costs in the long term. Additionally, treatments aimed to protect natural resources from uncharacteristic wildfire would outweigh the short-term impacts upon the landscapes during treatment.

Wildland fire and management may be impacted from climate change trends in the planning area. Generally, increased temperature and longer growing seasons may result in more rapid accumulation of fuels in forested and montane shrubland systems (Brown et al. 2004). This increase of fuel loading would increase the FRCC departure, affecting fire size, intensity and severity resulting in an increase in fire suppression costs, fuels treatment planning and implementation.

In the same forested and montane shrublands, climate change may increase the frequency and duration of droughts increasing fire frequency (Brown et al. 2004). The increased temperatures and longer growing season would also support the expansion of invasive annual grasses and forbs. This effect would also increase fire frequency and extent which would then promote the expansion of invasive annual grasses. This positive feedback loop of fire and invasive plant species may be the greatest impact on fire ecology and management of GRSG (Abatzoglou and Kolden 2011).

The following cumulative effects analysis for each of the alternatives describes the differences in increasing and decreasing impacts on Wildland Fire Management within the PHMA and GHMA over the short term (two years) and over the long term (greater than 20 years).

5.8.1 Alternative A

Under Alternative A, trends as described above would continue to affect fire ecology and management in the planning area.

5.8.2 Alternative B

Under Alternative B, PHMA and GHMA would be a higher priority for fire suppression, thereby impacting management with higher fire management cost. Fuel treatment restrictions could limit fuel treatment opportunities and fuel treatment effectiveness and increase the risk of large wildland fire in this alternative. Increased restrictions on land uses may reduce new sources of ignition and decrease the risk of human-caused ignitions. Though some of these restrictions may limit the ability of the wildland fire management program to suppress and preventatively treat fires, other restrictions, such as restrictions on types of recreation, may also lessen the occurrence of fires, potentially resulting in fewer fires for the planning area as a whole.

5.8.3 Alternative C

Under Alternative C, livestock grazing would be prohibited within the 16,286,800 acres identified in this alternative as PHMA. In the short term, fine fuels would increase throughout GRSG habitat and fire risk would increase as well as FRCC. If fire is established, the increase in fine fuels would increase surface rate of spread and fire intensity (Launchbaugh et al. 2008). 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.

Under Alternative C, fuels management activities would be limited to the interface of human habitation and previously disturbed areas. Restrictions placed on vegetation management under this alternative would impact the ability to efficiently manage fuels and could increase the potential for wildfire costs of vegetation management and fire suppression. FRCCs would slowly improve over time in areas where natural rehabilitation is achievable. This would indirectly affect fire management actions by increasing fine fuel loads, which increase fire risk and potential burned areas, and increase the need for suppression actions. Alternative C would reduce the flexibility in fuels management activities in the planning area and in fire-suppression activities. Increased restrictions on land uses may reduce new sources of ignition and decrease the risk of human-caused ignitions. The management actions under Alternative C could inhibit the growing need for flexible responses to and preventative treatments for wildland fire.

5.8.4 Alternative D

Alternative D management actions and related impacts would be similar to those described under Alternative B, but with an added emphasis on GRSG seasonal habitat objectives resulting in more site-specific variation in fire ecology

and management impacts. Management under Alternative D would also place added emphasis to pre-suppression planning, prevention, and educational objectives for fire suppression personnel. All vegetation and soils management activities would be prioritized in PHMA and GHMA under this alternative. Treatments would prioritize the use of native seed and establishing appropriate sagebrush species/subspecies that meet GRSG seasonal habitat requirements (see **Table 2-13**, Comparative Allocation Summary of Alternatives). This includes ESR, invasive species/noxious weed, conifer encroachment, and restoration activities. Management actions would be designed to establish and maintain a resilient vegetative community and to reduce habitat fragmentation and maintain or re-establish habitat connectivity over the long term. This would affect FRCCs by trending them to more historic levels. As FRCCs are improved over the planning period, there should be movement towards a natural fire regime and a reduced risk of uncharacteristic wildfire. Vegetation would become more resistant and resilient and less likely to lose key ecosystem components after a disturbance. This could decrease fire size and intensity.

5.8.5 Alternative E

Alternative E would rely on the Nevada Conservation Credit System and an avoid, minimize, and mitigate strategy to achieve a net conservation gain of GRSG habitat. Under this Alternative, the Nevada Sagebrush Ecosystem Technical Team (SETT) would identify and prioritize landscape-level enhancement, restoration, fuel reduction, and mitigation projects to benefit GRSG and its habitat. Without knowing the specific on-the-ground projects that may result from the Conservation Credit System, it is difficult to quantify the level of impacts on fire management. In general, impacts from activities such as planned disturbances or development would be reduced through the application of the avoid, minimize and mitigate strategy, which would decrease the amount of disturbance to vegetation and mitigate any vegetation losses with treatments designed to improve vegetation. This alternative also strives to maintain an ecologically healthy and intact sagebrush ecosystem that is resistant to the invasion of nonnative species and resilient after disturbances such as wildfire. This would affect FRCCs by trending them to more historic levels. As FRCCs are improved over the planning period, there should be movement towards a natural fire regime and a reduced risk of uncharacteristic wildfire. Vegetation would become more resistant and resilient and less likely to lose key ecosystem components after a disturbance. This could decrease fire size and intensity.

5.8.6 Alternative F

Under Alternative F, planning decisions could result in changes in fuel levels or changes to management option for fuels treatments and wildfire suppression. A 25 percent reduction in AUMs for livestock grazing and AMLs for wild horse and burro, in addition to resting 25 percent GRSG habitat from grazing annually could potentially increase fine fuels, making areas more vulnerable to wildfire ignition and increasing the rate of spread in the short term. However, in the long term, there could be a shift toward historical FRCC, an increase in

resilience to disturbance and resistance to invasives thus reducing the risk of high intensity fires, which would increase firefighter safety and decrease wildfire rate of spread potential. Increased restrictions on land uses may reduce new sources of ignition and decrease the risk of human-caused ignitions. These cumulative impacts may result in a greater need for flexibility in access into the planning areas and in fire suppression activities. The management actions under Alternative F that inhibit responses to and preventative treatments for wildland fire may make it difficult to meet the growing need in the future.

5.8.7 Proposed Plan

The Proposed Plan would result in planning decisions that would analyze wildfire/invasive annual grass and conifer expansion threats and identify areas within PHMA and GHMA. The Proposed Plan would emphasize the use of resistance and resilience concepts and the FIAT assessments (see **Appendix G**) that provide a science based background that can inform wildland fire and fuels management strategies as identified in Chambers et al. (2014). The FIAT assessments set the stage for identifying and prioritizing fuel reduction treatments and pre-suppression and suppression activities in PHMA and GHMA. The FIAT would determine potential landscape scale management strategies by considering resilience to disturbance and resistance to invasive annual grasses in GRSG habitat. The management strategies considered in the FIAT include conservation, prevention, restoration, monitoring and adaptive management. The strategies are adapted for fire operations (preparedness, suppression, and prevention activities), fuels management, post-fire rehabilitation, and habitat restoration (Chambers et al. 2014).

Impacts from permitted activities and planned disturbances or development would be reduced under this alternative through the application of the avoid, minimize and compensatory mitigation strategy, which would decrease the amount of disturbance to vegetation and mitigate any vegetation losses with treatments designed to improve vegetation.

5.9 LIVESTOCK GRAZING

The cumulative impact analysis area used to analyze cumulative impacts on livestock grazing includes allotments located entirely or partially within the planning area over the long term (greater than 20 years).

Past, present, and reasonably foreseeable future actions affecting livestock grazing are mainly those that reduce available grazing acreage, restrict management actions or the level of forage production in those areas or that inhibit range improvements, such as water developments or fences.

Relevant examples of past and present actions that have affected livestock grazing include historic grazing practices and wildland fires that have contributed to current ecological conditions, the presence and abundance of competition between grazing wildlife and/or wild horses with livestock, human-caused surface disturbances such as mineral development, transmission and energy

development, infrastructure development, recreation, prescribed burning, vegetation treatments, land disposals, motorized vehicle use, habitat restoration, fuels reduction, and special designations that restrict livestock grazing.

Reasonably foreseeable future actions affecting livestock grazing are similar to past and present actions but include on-going grazing permit renewals. Grazing permit renewals could cumulatively reduce permitted active AUMs and/or restrict livestock grazing management options when management must be altered due to non-attainment or lack of significant progress towards meeting rangeland health standards due to current livestock grazing.

Cumulative projects that increase human disturbance in allotments could also impact livestock grazing forage by increasing the spread of invasive plant species. Invasive plant species can reduce preferred livestock and wildlife forage and increase the chance of invasive species being dispersed by roaming cattle. Cumulative projects that increase human disturbance in allotments could also directly impact livestock grazing by displacing, injuring, or killing animals

5.9.1 Alternative A

Under Alternative A, the majority of the planning area is open to surface-disturbing projects (such as mineral and energy development). While mitigation and stipulations can offset impacts from these projects over time, disturbance to livestock and forage is expected to continue to occur.

On BLM-administered lands, based on environmental conditions and trends (i.e., drought and climate change) livestock grazing management and permitted active use could cumulatively decline over time. This would be due to the implementation of livestock grazing management changes required to meet rangeland health standards for riparian resources and wildlife and special status species habitats (including GRSG) and levels of surface-disturbing activities. These could include changes to type of livestock, timing, duration or frequency of authorized use, including temporary closures and modifications to range improvements.

Restrictions on the ability to construct or maintain range improvements and conduct vegetation treatments could increase due to the above factors. Although in some cases, range improvements may be required in order to meet rangeland health standards.

Increased sustainable forage levels due to improved grazing management over time could result in increased fuel loads and potentially increased frequency and intensity of wildfire on the landscape. This in turn would likely result in the expansion of invasive annual grass and plant species within and outside the planning area. Prescriptive livestock grazing would be used as a tool to manage fuel loads under this alternative, which would provide additional grazing opportunities for permittees.

Management under Alternative A would allow the most surface disturbance, which would decrease forage availability and cumulatively impact livestock grazing more than the other alternatives.

5.9.2 Alternative B

The goal of this alternative is to maintain and/or increase GRSG abundance and distribution by conserving, enhancing or restoring sagebrush ecosystems upon which GRSG populations depend on in cooperation with other conservation partners (NTT 2011). Due to the restrictions on surface-disturbing activities in GRSG habitat under this alternative, disturbance to livestock and their forage would cumulatively decrease when compared to Alternative A.

Permitted active use would likely decline over time, due to the implementation of livestock grazing management changes required to meet the stated goal of this alternative. Restrictions on livestock grazing in GRSG habitat would result in reduced livestock operations within the planning area.

Proposed management action under Alternative B would restrict the construction and/or maintenance of range improvements, and could also require modification of existing range improvements. Existing vegetation treatments specific to increasing forage for livestock could be modified under this alternative and proposed vegetation treatments would be restricted if they did not provide a direct benefit to GRSG and its habitat. These restriction would decrease livestock forage and increase costs to operators in GRSG habitat.

Reductions in grazing could result in increased fuel loads and increased frequency of wildfire on the landscape, which could reduce long-term forage availability. This in turn would likely result in expansion of invasive annual grass and plant species within and outside the planning area, further reducing forage for livestock. However, increased restrictions on other land uses within the planning area may reduce the occurrence of human-caused ignitions. Prescriptive livestock grazing would also be available as a management tool to manage fuel loads under this alternative, which provides additional grazing opportunities for permittees.

Surface disturbing activities would be avoided or excluded in GRSG habitat and encouraged to take place in non-habitat areas. This would result in declines in permitted use and restrictions to range improvements in non-habitat areas. Concentrating range improvements and other anthropogenic surface-disturbing activities to smaller confined areas would increase the effects on forage availability and livestock grazing management options.

5.9.3 Alternative C

Alternative C would result in the greatest overall reduction in livestock grazing compared to all alternatives. Livestock grazing may not be a viable option for operators within the planning area, even if livestock grazing was concentrated on lands outside of GRSG habitat and/or private lands. Livestock operations

dependent upon BLM/Forest Service allotments containing GRSG habitat would be most affected. Range improvements would not be constructed in PHMA.

Increased forage levels due to the elimination of livestock grazing would result in increased fuel loads and increased frequency of wildfire on the landscape affecting forage production on GRSG habitat, non-habitat areas and private lands. This would likely result in the expansion of invasive annual grass and plant species within and outside the planning area, reducing the abundance and availability of preferred livestock forage species.

Surface-disturbing activities would be concentrated outside of GRSG habitat on public and on private lands which would conflict with livestock grazing uses in those areas.

5.9.4 Alternative D

Permitted active use would decline over time due to the implementation of livestock grazing management changes required to maintain or enhance GRSG habitat. Management changes would include changes to type of livestock, timing, duration, intensity or frequency of authorized use, including temporary closures. Restriction on grazing in GRSG habitat could result in livestock operations being scaled down to a point where the viability of ranching operations could be compromised.

Range improvements would only be authorized in GRSG habitat when they directly benefit GRSG and its habitat. Range improvements would be evaluated and modified or removed if they were not beneficial to GRSG or their habitat. Restrictions on constructing or maintaining range improvements and conducting vegetation treatments would cumulatively impact livestock grazing practices and could increase operator's costs. However, in some cases, range improvements may be required to implement changes needed to livestock grazing management.

Reducing levels of grazing could maintain sustainable forage; however it would likely result in increased fuel loads and increased frequency of wildfire both inside and outside the planning area. This situation would be balanced by greater flexibility in fuels management options which would reduce the potential for changes in fuel loads that would increase the cumulative risk of wildland fires in the planning area. Prescriptive livestock grazing would also be available as a management tool to manage fuel loads under this alternative which provides additional grazing opportunities for permittees.

Surface disturbing activities would be avoided or excluded in GRSG habitat and encouraged to take place in non-habitat areas. This would result in declines in permitted use and restrictions to range improvements in non-habitat areas. Concentrating range improvements and other anthropogenic surface-disturbing activities to smaller confined areas would increase the effects on forage availability and livestock grazing management options.

5.9.5 Alternative E

The objective of this alternative is a net conservation gain of core, priority, and general GRSG habitat within the SGMA from anthropogenic surface-disturbing activities, which could protect sustainable livestock forage more than under Alternative A.

Implementation of prescribed livestock grazing practices would result in changes to current permitted grazing use in some areas. These would include changes to type of livestock, timing, duration, intensity or frequency of authorized use.

Construction and maintenance of range improvements would increase under this alternative. Range improvements would be designed to benefit both livestock grazing and GRSG habitat. Implementation of proper grazing management would rely on infrastructure such as pasture fences and water developments designed to mitigate the effects of improper grazing use on GRSG habitat. Riparian management would rely on the development of fencing and off-site water. Due to the extent of riparian area acreage present in GRSG habitat, this would increase the infrastructure footprint in priority habitat.

Surface disturbing activities would likely be concentrated in non-habitat and non-BLM/Forest Service areas outside of GRSG habitat which could cumulatively impact livestock grazing use on those areas.

5.9.6 Alternative F

Sustainable forage would be expected to increase over the long term under Alternative F. This alternative rests 25 percent of the acreage annually and then limits use to 25 percent of current production on the areas that are available each year to livestock grazing. These restrictions on livestock grazing use in GRSG habitat would result in an overall reduction in livestock grazing. Restrictions on grazing in GRSG habitat would result in operations being scaled down and operational viability could be compromised. Fewer range improvements would be constructed.

Existing vegetation treatments specific to increasing forage for livestock could be modified under this alternative and proposed vegetation treatments would be restricted if they did not provide a direct benefit to GRSG and its habitat. These restriction would decrease livestock forage and increase costs to operators in GRSG habitat.

Reducing levels of grazing could maintain sustainable forage. However reductions in livestock grazing on public lands would likely increase fuel loads and contribute to increased wildfire intensity and frequency. Wildland fire would affect lands both inside and outside the planning area and decrease the sustainable forage available for grazing. This situation would be balanced by greater flexibility in fuels management options which would reduce the potential for changes in fuel loads that would increase the cumulative risk of wildland fires. Prescriptive grazing would also be available as a management tool to

manage fuel loads under this alternative, which provides additional livestock grazing opportunities for permittees.

Surface disturbing activities would be avoided or excluded in GRSG habitat and encouraged to take place in non-habitat areas. This would result in declines in permitted use and restrictions to range improvements in non-habitat areas. Concentrating range improvements and other anthropogenic surface-disturbing activities to smaller confined areas would increase the effects on forage availability and livestock grazing management options, as well as the viability of livestock operations within the planning area.

5.9.7 Proposed Plan

Permitted active use would likely decline over time due to the implementation of livestock grazing management actions required under the Proposed Plan which maintain or enhance GRSG habitat. These could include changes to type of livestock, timing, duration, intensity or frequency of authorized use, including temporary closures. Restrictions on livestock grazing in GRSG habitat could result in livestock operations being scaled down and the viability of ranching operations could be compromised.

Range improvements would only be authorized in GRSG habitat when they directly benefit GRSG and its habitat. Range improvements would be evaluated and modified or removed if not beneficial to GRSG and its habitat. Restrictions on constructing or maintaining range improvements and conducting vegetation treatments to directly benefit livestock would cumulatively impact livestock grazing practices and could increase the operator's costs. In some cases, range improvements may be required to implement changes needed to livestock grazing management. Vegetation treatments would be rested for a minimum of two years or until treatment objectives are met; closing the area to livestock grazing. Allotments which fall within SFAs would have the greatest impact on livestock grazing.

The incorporation of the GRSG habitat objectives (**Table 2-2**) when conducting range land health assessment and changes in management would maintain and/or increase livestock forage. However, it could increase forage levels due to reduced levels of livestock grazing and result in increased fuel loads and increased frequency of wildfire, both inside and outside of the planning area, which would reduce forage availability. This situation would be balanced by greater flexibility in fuels management options (such as implementing vegetation treatment acres identified through VDDT modeling, and using the resistance and resilience concepts and FIAT assessments [**Appendix G**]) which would reduce fuel loads, decrease invasive annual grasses and make sagebrush communities more resilient to cumulative impacts from wildland fire. Prescriptive livestock grazing management would allow livestock grazing to be used as a management tool to manage fuel loads under this alternative which provides additional livestock grazing opportunities for permittees.

Surface-disturbing activities would be avoided or excluded in GRSG habitat and encouraged to take place in non-habitat areas. This would result in declines in permitted use and restrictions to range improvements in non-habitat areas. Concentrating range improvements and other anthropogenic surface-disturbing activities to smaller confined areas would increase the effects on forage availability and livestock grazing management options.

5.10 RECREATION

The cumulative impact analysis area for impacts from proposed management actions on recreation includes all GRSG habitats within the sub-region over the long term (greater than 20 years).

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect recreation include large electrical transmission lines, pipeline projects, and similar linear ROW development projects that conflict with recreation opportunities. In addition, mineral extraction and oil and gas development would impact recreation opportunities by conflicting with recreation users and through the creation of noise and visual disruptions that affect recreation user experiences.

Cumulative impacts on recreation include ground disturbance and restrictions on recreational uses from management actions from other programs. The nature and type of cumulative impacts depends on such variables as project design features, management strategies, mitigation programs, special designations and other factors.

5.10.1 Alternatives Analysis

The degree of conflict with recreation users and creation of barriers to recreation opportunities would be greatest under Alternative A because of fewer restrictions on conflicting activities. The implementation of increased restrictions to protect GRSG under Alternatives B, C, D, E, F and the Proposed Plan such as ROW exclusion, and closure to mineral development would result in the fewest impacts on recreation.

At the same time, management to protect GRSG under Alternatives B, D, F and the Proposed Plan would only allow SRPs in PHMA that have a neutral or beneficial effect on GRSG habitat. As a result, some types of permitted activities (e.g., OHV races) that could negatively affect GRSG and its habitat may be impacted, resulting in fewer opportunities to engage in the types of events and activities affected.

Management under Alternative F, which would seasonally prohibit camping and other non-motorized recreation activities within four miles of active and pending leks, would have minimal impact on recreational opportunities such as camping, mountain biking, hiking, and hunting. Additional management actions that would seasonally prohibit camping and other non-motorized recreation

activities between March 1 and May 15 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. Restrictions would occur when recreational activities are minimal due to weather and ground conditions. Reasonably foreseeable trends that would result in cumulative impacts on recreation include continued growth patterns in demand for all recreation experiences, increased demand for close-to-home recreation opportunities for local residents, continued and increased visitation from a growing regional population, and increased popularity of adjacent public lands. In the long term, impacts would likely be greater near urban areas. As populations increase, especially around the Reno/Sparks metropolitan area, restrictions associated with GRSG management could become more constraining due to the increased demand for certain recreational activities. However, restrictions on development of public lands to protect GRSG habitat could cumulatively benefit recreation.

5.11 TRAVEL AND TRANSPORTATION MANAGEMENT

The cumulative impact analysis area for impacts from proposed management actions on travel management includes all GRSG habitats within the sub-region over the long term (greater than 20 years).

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and would likely to continue to affect travel management are the result of management actions to limit motorized travel to existing routes.

5.11.1 Alternatives Analysis

Under Alternative A there would be no new restrictions related to GRSG habitat management, and no change in impacts on travel management. Management under Alternative B would limit motorized travel to existing roads and trails in PHMA, thereby reducing cross-country access in those areas. Alternatives C, D, E and the Proposed Plan would limit motorized use in both PHMA and GHMA, further reducing cross-country travel. Alternatives B and E limit routed construction to realignments of existing routes only. Alternatives D, E and the Proposed Plan provide for new road construction as long as there is a net conservation gain and construction maintains or enhances GRSG habitat. Reduction in road and trail access would be greatest under Alternative F due to management that would limit motorized use in both PHMA and GHMA and prohibit new road construction within four miles of active and pending leks.

Reasonably foreseeable trends that would result in cumulative impacts on travel and transportation include continued growth patterns in demand for OHV recreation experiences, continued and increased visitation from a growing regional population, and increased popularity of adjacent public lands. In the long term, impacts would likely be greater near urban areas. As populations increase, especially around the Reno/Sparks metropolitan area, restrictions associated

with GRSG management could become more constraining due to the increased demand for OHV recreational activities.

5.12 LAND USE AND REALTY

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and would likely continue to affect lands and realty include new electrical transmission line-development projects, utility-scale wind energy development, and other minor ROWs (e.g., distribution lines, roads, and communication sites).

There are currently several ROWs that exist in the planning area for various uses including roads, communication sites, electrical transmission and distribution lines, pipelines, fiber-optic lines, and renewable energy. Currently there is only one utility-scale wind development in the planning area, which is the Spring Valley Wind facility in White Pine County, Nevada. These projects would continue to affect lands and realty over the long term (10 years or more), while helping the state and nation meet its renewable energy goals and provides utilities and access on federally-managed lands.

Anticipated future development within and outside the planning area would also directly and indirectly affect lands and realty in the near- (1-5 years) and long term. For example, the TransWest Express 600kV project is being designed to deliver energy generated at large-scale wind energy development sites in Wyoming and the Dakotas to large load centers, such as Las Vegas, NV. Since California and Nevada are located between generation sources and several load centers throughout the west, the TransWest Express and other transmission lines (e.g., TransWest and others identified in **Table 5-39**) would continue to indirectly affect lands and realty in the sub-region. For example, these new transmission lines may encourage new utility-scale developments in or directly adjacent to the planning area.

Proposed transmission lines within the planning area, including the Southwest Intertie Line in eastern Nevada, which may have been authorized but not fully constructed would be required to meet the GRSG screening criteria and RDFs before the BLM would issue a notice to proceed. Construction of the Southwest Intertie line would allow for the co-location of similar linear ROWs in the future.

Impacts on lands and realty across alternatives are largely dependent on the number of acres where the BLM and the Forest Service would exclude or avoid new ROW development. Since ROW exclusion designations prevent new ROW development, the resulting impact on the lands and realty program would be an inability to accommodate new ROW infrastructure in exclusion areas. **Table 5-40** applies to areas in GRSG habitat.

Table 5-40
ROW Exclusion and Avoidance Areas by Alternative
(BLM-administered Lands and National Forest System Lands)

	Alternative						Proposed Plan ¹
	A	B	C	D	E	F	
Exclusion	1,884,300	10,056,000	16,526,600	1,884,300	1,456,200	10,056,000	1,483,600
Avoidance	0	6,470,600	0	14,642,300	15,070,400	6,470,600	15,329,200

¹Areas shown for the Proposed Plan are for minor ROWs. The Proposed Plan would avoid minor ROW development on 9,255,400 acres, while the remaining 6,073,800 acres would be managed as open.

Source: BLM and Forest Service GIS 2013, acres rounded to the nearest one hundred acres.

The Proposed Plan would result in cumulative impacts on the BLM-administered lands and realty program by placing restrictions on future ROW development (i.e., through avoidance and exclusion criteria). Management under Alternatives B through F would result in varying degrees of restrictions on ROW development, with Alternatives B, C, and F being the most restrictive. Conversely, limitations on mineral development under Alternatives B, C, and F would decrease demand for new ROWs to support those types of activities. Management under Alternative D would be similar to the Proposed Plan, except that it would impose greater restrictions in GHMA.

Limitations on land tenure/landownership adjustments (which provide the BLM with opportunities to sell, exchange, withdraw, or acquire lands and the Forest Service to exchange, purchase, donate, and acquire ROWs to achieve the optimum landownership pattern) would be the most restrictive under Alternatives C and F, and least restrictive under Alternative A. Management under Alternatives D, E, and the Proposed Plan would allow land sales under certain conditions. Under the Proposed Plan, the withdrawal of lands from locatable mineral development in the SFAs would reduce the long-term demand for new ROWs in those areas. Acquisition by purchase, exchange or donation of private lands, including those with intact federal mineral rights, would result in greater land management efficiency where the acquisitions result in a more consolidated land pattern.

The Lincoln County Conservation, Recreation, and Development Act (Public Law 108-424) was signed in 2004 allowing for the disposal of 90,000 acres of federal land as identified in the Ely RMP. Approximately 6,900 acres of PHMA and 200 acres of GHMA have been identified for disposal in the planning area.

The White Pine County Conservation, Recreation, and Development Act (Public Law 109-432) was enacted in 2006. It allowed for the disposal of 45,000 acres of federal lands in White Pine County, of which 5,700 acres of GHMA and 600 acres of PHMA are identified for disposal.

5.12.1 Alternative A

Management under this alternative has the least number of acres (1,884,300 acres) that would be managed as ROWs exclusion areas. Pending and existing ROWs would continue to be managed through the same process as directed by existing LUPs.

Management under this alternative would also have the least amount of restrictions on land tenure/landownership adjustments.

5.12.2 Alternative B

Management under this alternative has an increased number of acres designated as ROW exclusion (10,056,000 acres) and ROW avoidance areas (6,470,600 acres). Pending ROWs within GRSG habitat could be rejected or withdrawn due to restrictions and heightened mitigation cost. Existing ROWs would have to undergo new restrictions. For example, existing power lines within PHMA would be evaluated to determine if removal, burying, or modification is possible. Management of PHMA as exclusion could divert future ROW development to areas outside of PHMA with the potential for higher concentrations of ROW development in non-GRSG habitat areas. Combined with past, present, and reasonably foreseeable future actions, Alternative B may result in new development challenges outside of GRSG habitat if those areas become overly concentrated with ROWs.

In GHMA, the amount of land available for disposal (480,500 acres) would be the same as Alternative A. In PHMA, the BLM would retain land ownership; there would be no lands available for disposal. Limitations on land tenure adjustments (disposals) in PHMA could prevent expansion of rural development or local government uses, including resolution of trespass. Retention, acquisition, and exchange of lands in GRSG habitat could result in more contiguous land patterns and ownership.

5.12.3 Alternative C

Management under this alternative would have the most acres (16,526,600 acres) that would be managed as ROW exclusion areas. Pending ROWs within GRSG habitat could be rejected or withdrawn due to restrictions and potential mitigation cost. New ROWs would have to undergo new restrictions when maintaining and managing the existing ROWs. For example, when new ROWs associated with valid existing rights are needed, they must be co-located within existing ROWs to achieve a net conservation gain of PHMA. Management of GRSG habitat as exclusion, including areas within existing designated corridors (including the Section 368 energy corridor), would divert future ROW development to areas outside of GRSG habitat with the potential for higher concentrations of ROW development in non-GRSG habitat areas.

Under this alternative, land tenure adjustments/landownership adjustments would have less flexibility in GRSG habitat than under Alternative A. For example, all public lands in ACECs, PHMA, and identified restoration and

rehabilitation areas would be retained in public ownership. Limitations on land tenure adjustments (disposals) in GRSG habitat would prevent any expansions of rural development or local government uses, including resolution of trespass. Alternative C would prevent disposal of isolated parcels that are difficult for BLM to manage. Retention and acquisition of lands in GRSG habitat could result in more contiguous land patterns and ownership.

5.12.4 Alternative D

Management under this alternative would increase the amount of ROW avoidance areas (15,070,400 acres) compared to Alternative A. The amount of land managed as ROW exclusion for all ROWs except renewable energy ROWs would be the same as Alternative A. Pending ROWs within GRSG habitat could be rejected or withdrawn due to restrictions and potential mitigation cost. Existing ROWs would not be subject to new restrictions until an amendment or renewal process. Additional requirements for ROW development in avoidance areas could divert future ROW development to areas outside of GRSG habitat with the potential for higher concentrations of ROW development in non-GRSG habitat areas.

The cumulative effects of land tenure under Alternative D would be the same as Alternative B.

Under Alternative D, ROW authorizations in GRSG habitat would be required to apply RDFs to minimize impacts on GRSG and its habitat. Application of RDFs, such as consolidating ROWs within existing utility corridors, could result in long-term impacts on the availability of lands suitable for consolidated development. Over time, if corridors become overcrowded with ROW development, they could become unfeasible for additional development, which could result in costly retrofitting of existing infrastructure to increase capacity or redirect new development to areas outside of GRSG habitat. This could cumulatively impact the utility market by potentially reducing the service availability to customers.

5.12.5 Alternative E

Under Alternative E, for California, the amount of lands managed as ROW avoidance and exclusion areas would be the same as Alternative A with equivalent impacts. In Nevada only, 14,463,000 acres would be managed as ROW avoidance areas and 1,290,800 would continue to be managed as exclusion areas.

Management under this alternative would have an increased amount of acres managed as ROW avoidance on Nevada lands, compared to Alternative A. Pending ROWs within GRSG habitat in Nevada would be subject to the State of Nevada Conservation Credit System and consultation with the SETT, including the concept of “avoid, minimize, and mitigate.” Where development could not be avoided in GRSG habitat, projects would be required to offset disturbance in GRSG habitat through mitigation measures, which could increase costs and

processing times. Additional requirements for ROW development in GRSG habitat in Nevada could divert future ROW development to areas outside of GRSG habitat with the potential for higher concentrations of ROW development in non-GRSG habitat areas.

Cumulative effects on land tenure under Alternative E would be the same as Alternative A.

Under Alternative E, in Nevada only, ROW authorizations in GRSG habitat would be required to apply RDFs to minimize impacts on GRSG and its habitat. Application of RDFs, such as consolidating ROWs within existing utility corridors and burying power lines, could result in long-term cumulative impacts on 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. Over time, new ROW development could become unfeasible in existing corridors if they become overcrowded. This could result in costly retrofitting of existing infrastructure to increase capacity or new development being redirected to areas outside of GRSG habitat. This could impact the utility market by potentially reducing the service availability to customers.

5.12.6 Alternative F

Under Alternative F, the requirement to co-locate new ROW development with existing infrastructure would decrease the total area where new development would be allowed. Identifying the desired locations for future development provides a level of certainty as to the location of future infrastructure, including co-located ROWs. However, the limited amount of lands in the planning area associated with corridors containing existing ROW development could eventually preclude additional development as those corridors become fully occupied. Co-locating new infrastructure would likely increase the complexity and costs of new ROW development. The resulting cumulative impact of Alternative F could be a reduction in service availability to customers within and outside of the planning area.

Under Alternative F, the BLM and the Forest Service would retain public ownership in PHMA with no exceptions. Impacts from land tenure would be the same as those under Alternative B, with the exception that the BLM and the Forest Service would propose all PHMA, including mineral split-estate, for mineral withdrawal. Limitations on land tenure adjustments (disposals) in PHMA could prevent any expansions of rural development or local government uses, including resolution of trespass. Retention and acquisition of lands in GRSG habitat could result in more contiguous land patterns and ownership.

5.12.7 Proposed Plan

Management under the Proposed Plan would result in more acres being managed as ROW avoidance areas for new ROWs compared to Alternative A. Specifically, PHMA and GHMA (15,104,700 acres) would be designated as ROW

avoidance areas for new major ROW's. GHMA would be managed as open to new minor ROWs. The BLM and Forest Service would allow minor ROWs within PHMA to occur if development incorporates specific conditions, mitigation measures and stipulations provided in the GRSG screening criteria and **Appendix D** (RDFs) that would result in a net conservation gain of GRSG habitat. RDFs such as the application of perch deterrents could increase the cost of development for a local utility company to the point where it is not feasible to distribute utilities to a rural area.

Pending and future major and minor ROWs within GRSG habitat could be rejected or withdrawn due to restrictions and potential mitigation cost. Major ROWs would incur higher restrictions and greater cumulative effects than minor ROWs due to the designation of ROW avoidance areas. Existing ROWs would not be subject to new restrictions until the amendment or renewal process. For example, requiring existing ROW holders to retrofit existing authorized infrastructure to minimize impacts on GRSG could result in an increased operating cost, which could be distributed to the consumer (see **Section 5.19**, Social and Economic Impacts).

The proposed TransWest Express project is a high-voltage electric transmission within the southeastern Nevada subpopulation. GRSG conservation measures identified in the Proposed Plan would not be applicable to this project for reasons outlined in Chapter 4. However, if constructed this project would count towards the 3 percent disturbance cap for the applicable BSUs within PHMA. The TransWest Express project would also impact future development within the applicable BSUs and would provide opportunity for co-location for future ROWs.

The authorized Southwest Intertie project is also a high-voltage electric transmission within the southeastern and northeastern Nevada subpopulations. Although authorized in the mid 1990's, the northern half of the line into Idaho has not been constructed to date. If constructed, this project would most likely need to refresh its NEPA review process to ensure consistency with the conservation measures in this Amendment. This project would also impact future development within the applicable BSUs and would provide opportunity for co-location for future ROWs.

Co-location would likely increase costs and project review times, but could allow the BLM and Forest Service to accommodate a portion of the future ROW demand in GRSG habitat, while still achieving GRSG conservation objectives.

The Proposed Plan identifies existing corridors as the preferred locations for future ROW development. However, this alternative would also result in 80 percent fewer acres of designated existing utility corridors compared to Alternative A and would limit corridor widths to 3,500 feet. Accordingly, linear ROW applicants would have fewer opportunities to site infrastructure within

the corridors. If a corridor becomes fully occupied, then the BLM or Forest Service would request that a new ROW applicant consider alternative alignments outside GRSG habitat, co-locate the project within existing infrastructure, site the project outside the corridor but still within GRSG habitat subject to the GRSG screening criteria and RDFs, or in circumstances when the project is deemed to be financially or technically infeasible, not to pursue the project.

Land tenure actions would be allowed in GRSG habitat if they can demonstrate a net conservation gain to GRSG habitat. Allowing certain land tenure actions could create a more contiguous decision area and increase short- and long-term land management efficiency. Land exchanges or disposal to remove low quality habitat from BLM-administered land would also increase efficiency where those lands are isolated and difficult to manage.

Under the Proposed Plan, ROW authorizations in GRSG habitat would be required to apply RDFs to minimize impacts on GRSG and its habitat. Application of RDFs, such as co-locating within existing ROWs, could result in long-term impacts on the availability of lands suitable for co-located development.

Impacts from Adaptive Management

In PHMA, where a lands and realty activity has resulted in a hard trigger being reached, the corresponding adaptive management responses are identified in **Table 2-9. Table 5-41** below describes the effects on ROWs within the affected BSU.

Table 5-41
PHMA Adaptive Management Cumulative Effects

Program Area Activity	Corresponding Analysis
ROWs in Corridors	In BSUs where a ROW within the designated corridor is found to be the cause of the declining GRSG trend, new ROWs in the portion of the corridor within the BSU would incur added costs associated with retrofitting or relocating ROW infrastructure to minimize effects on GRSG.
Major ROWs outside Corridors	Same as Alternatives B, C, and F
Minor ROWs outside corridors	Same as Alternatives B, C, and F

In GHMA, where a lands and realty activity has resulted in a hard trigger being reached, the corresponding adaptive management responses are identified in **Table 2-10. Table 5-42** below describes the effects on ROWs within the affected BSU.

**Table 5-42
GHMA Adaptive Management Cumulative Effects**

Program Area Activity	Corresponding Analysis
ROWs in Corridors	In BSUs where a ROW within the designated corridor is found to be the cause of the declining GRSG trend, new ROWs in the portion of the corridor within the BSU would incur added costs associated with retrofitting or relocating ROW infrastructure to minimize effects on GRSG.
Major ROWs outside Corridors	Same as Alternatives B, C, and F
Minor ROWs outside corridors	Same as Alternatives B and D

5.13 RENEWABLE ENERGY RESOURCES

The Solar PEIS (BLM 2012h) excludes utility-scale solar energy development on all BLM-administered lands in the planning area. There is currently no utility-scale solar development within the planning area. With the exception of some special designation areas, the planning area is currently open to wind energy ROWs.

There are currently four pending wind energy development applications and five testing applications within the planning area (BLM 2015b).

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and would likely continue to affect wind and solar energy development are the construction and maintenance of existing and proposed roads and transmission corridors. The construction would likely have less of a cumulative effect than construction associated with electrical transmission line development by increasing the routing options and possibly reducing overall project construction or implementation costs. The primary indicator of impacts on renewable energy is whether an alternative restricts the availability of BLM-administered lands or National Forest System lands to a level below that of Alternative A.

Assuming the potential exists for renewable energy development in the planning area; impacts across alternatives are largely dependent on the number of acres the BLM and Forest Service would manage as ROW exclusion or avoidance for new energy development and the restrictions such management would impose. The level of cumulative impact on renewable energy development is dependent upon the resource potential within the sub-region. For example, wind energy development may be impacted more than solar development since there is a higher wind energy generation potential within the sub-region. Since ROW exclusion would prevent new renewable energy ROW development, the resulting impact on renewable energy development would be an inability to accommodate new renewable energy ROW infrastructure in the exclusion

areas. In avoidance areas, additional restrictions on development could eliminate the economic viability of the project due to the potential costs of mitigation measures. It should be noted that a Forest Plan Prescription Area on National Forest System land either restricts or prohibits certain uses and is considered the same as a BLM exclusion or avoidance.

In general, cumulative impacts on wind energy would be greatest under Alternatives B, C, D, and F, since these alternatives would implement management strategies that would place more restrictions on development compared to Alternative A. In contrast, management under Alternative A would place the fewest restrictions on the wind energy program and would, therefore, be expected to contribute the fewest cumulative impacts on wind energy. Management under Alternatives E and the Proposed Plan would also place restrictions on wind energy development (e.g., by managing areas as wind energy ROW avoidance) but to a lesser extent than under Alternatives B, C, D, and F. Management under Alternative E and the Proposed Plan would, therefore, be expected to cumulatively contribute to fewer impacts on wind energy development than Alternatives B, C, D, and F, but more impacts than Alternative A.

Table 5-43 applied to PHMA and GHMA.

Restrictions in Alternatives B and C would prevent ROWs from being located in PHMA, while Alternatives D and E would avoid siting ROWs in PHMA if possible, preserving management flexibility at the expense of localized GRSG habitat degradation. Management under Alternative A would not restrict the siting of ROWs, although, existing policy does recommend co-locating ROWs, where possible.

Table 5-43
Renewable Energy ROW Exclusion and Avoidance Acres by Alternative in the Planning Area (BLM-administered and National Forest System Lands)

	Alternative				
	A	B	C/D/F	E	Proposed Plan
Exclusion	1,884,300 Wind	10,120,700 Wind	16,526,600 Wind	1,456,300 Wind	10,759,400 Wind
	13,957,800 Solar	13,957,800 Solar	16,526,600 Solar	13,957,800 Solar	16,812,800 Solar
Avoidance	0 Wind	6,405,900 Wind	0 Wind	15,070,300 Wind	6,053,400 Wind
	1,938,700 Solar	1,964,200 Solar	0 Solar	1,938,700 Solar	0 Solar

Source: BLM and Forest Service GIS 2015

5.13.1 Alternative A

Under Alternative A, 1,884,300 acres would be managed as ROW exclusion or avoidance areas for wind energy development and 13,857,800 acres would be managed as solar ROW avoidance areas.

Management under this alternative would be the least restrictive to renewable energy ROWs, particularly wind, because the fewest acres would be managed as avoidance and exclusion areas. Pending and existing renewable energy ROWs would continue to be managed through the same process as directed by under Alternative A.

5.13.2 Alternative B

Under Alternative B, 10,120,700 acres of BLM-administered and National Forest System lands with wind potential would be managed as ROW exclusion areas and would not be open for renewable energy ROW applications while 6,405,900 acres would be managed as avoidance areas. For Solar ROW development 13,957,800 acres would be excluded for solar energy ROWs while 1,964,200 acres would be managed as solar ROW avoidance areas (National Forest System land only). Management under this alternative would have the most impact on renewable energy ROWs compared to Alternative A due to the number of acres managed as ROW avoidance and exclusion areas. Pending renewable energy ROWs within GRSG habitat could be rejected or withdrawn due to restrictions and heightened mitigation cost. Existing renewable energy ROWs would have to undergo new restrictions. For example, facilities would have to be co-located if they can be completed within any existing disturbance associated with ROWs.

5.13.3 Alternative C

Under Alternative C, 16,526,600 acres of PHMA would be excluded from wind and solar development ROW applications.

Management under this alternative would impact renewable energy ROWs more than Alternative A due to the number of acres managed as ROW exclusion. Pending renewable energy ROWs within GRSG habitat could be rejected or withdrawn due to the elimination of lands available for development. Potential future renewable energy development would be prohibited in PHMA, which would force development to occur outside these areas or on private lands. Due to the land ownership in the sub-region placing any type of utility scale renewable energy development on private lands would be limited.

5.13.4 Alternative D

Under Alternative D, the cumulative impacts on wind and solar development would be the same as Alternative C.

Existing renewable energy ROWs would not be subject to new restrictions until a renewal or an amendment is needed. The 150 MW Spring Valley Wind Project is the only approved and constructed wind energy ROW in the planning area. Because the Spring Valley Wind Project is currently constructed with an approved ROW, the requirements in the Proposed Plan would not apply to this project in the near-term. However, at the time the project ROW becomes subject to renewal, the BLM could require applicable GRSG conservation measures, including RDFs such as perch deterrents.

5.13.5 Alternative E

Under Alternative E, for California, the amount of lands managed as ROW exclusion areas would be the same as Alternative A. In Nevada only, 14,462,900 acres would be managed as ROW avoidance areas, which is more restrictive than Alternative A, but less restrictive than Alternatives B, C, D, F, and the Proposed Plan. Management under this alternative would impact renewable energy ROWs due to the number of acres managed as ROW avoidance. Pending renewable energy ROWs within GRSG habitat could be rejected or withdrawn due to restrictions and potential mitigation costs. New renewable ROWs would have to undergo new restrictions. For example, all renewable energy proposals would require state agency review.

Under Alternative E, in Nevada only, ROW authorizations in GRSG habitat would be required to apply RDFs to minimize impacts on GRSG and its habitat. Application of RDFs, such as consolidating ROWs within existing utility corridors and burying power lines, could result in long-term cumulative impacts on the availability of lands suitable for consolidated development that would support renewable energy development within and outside GRSG habitat.

Impacts on existing wind energy developments would be the same as Alternative D.

5.13.6 Alternative F

Cumulative impacts under Alternative F would be the same as Alternative C with the exception that wind energy development projects would not be permitted to be sited within four miles of the perimeter of GRSG winter habitat, or within five miles of an active or pending lek. Management under Alternative F would result in the greatest limitation on renewable energy development compared to the other alternatives. The distance requirement in siting wind energy projects from active and pending leks could result in areas outside of PHMA and GHMA being excluded from wind energy development.

5.13.7 Proposed Plan

Under the Proposed Plan, PHMA would be managed as ROW exclusion for utility-scale commercial wind and solar energy facilities. GHMA would be managed as exclusion for solar energy and avoidance for wind energy. Only utility-scale commercial wind energy projects would be allowed in GHMA (6,053,400 acres).

Management under this alternative would have greater ROW avoidance acres for new wind energy development (6,053,400 acres) than under Alternative A. All wind and solar ROW applications in PHMA would be rejected and pending wind ROWs within GHMA could be rejected or withdrawn due to restrictions and mitigation cost.

Impacts on existing wind energy developments would be the same as Alternative D.

Impacts from Adaptive Management

In PHMA, where a renewable energy activity has resulted in a hard trigger being reached, the corresponding adaptive management responses are identified in **Table 2-9**. **Table 5-44** below describes the effects on LUAs within the affected BSU.

Table 5-44
Adaptive Management Cumulative Effects

Program Area Activity	Corresponding Analysis
Wind Energy ROWs	Same as Proposed Plan
Solar ROWs	Same as Proposed Plan

In GHMA, where a renewable energy activity has resulted in a hard trigger being reached, the corresponding adaptive management responses are identified in **Table 2-10**. **Table 5-45** below describes the effects on ROWs within the affected BSU.

Table 5-45
GHMA Adaptive Management Cumulative Effects

Program Area Activity	Corresponding Analysis
Wind Energy ROWs	Same as the Proposed Plan for PHMA
Solar ROWs	Same as Proposed Plan

5.14 MINERAL RESOURCES

5.14.1 Fluid Minerals

The cumulative impact analysis area for impacts from proposed management actions on fluid minerals includes all GRSG habitats within the planning area.

The past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and would likely continue to affect leasable minerals are: lease stipulations, lands and realty actions, socioeconomics, and existing and planned oil, gas and geothermal development projects within and directly outside the decision area. **Table 5-39** lists fluid minerals projects and lands and realty activities that would add to the cumulative effects.

Socioeconomic factors, such as, the price and demand of oil and gas would cumulatively impact oil and gas exploration and development. Oil and gas exploration and development is also indirectly impacted by global market price fluctuations and supply and demand of oil and gas. When the price and demand for oil is low, it becomes unprofitable to explore for oil in Nevada because of its remoteness and additional costs to mobilize equipment to the state. These socioeconomic factors can indirectly impact oil and gas exploration and development by reducing the amount of oil and gas activity occurring in Nevada.

Socioeconomic factors, such as, the demand for electricity and competing electricity generating technologies would cumulatively impact geothermal exploration and development.

Geothermal and oil and gas development can be indirectly cumulatively impacted by the lands and realty program from permitting requirements for new infrastructure development, such as ROW access for roadways, pipelines, and other related facilities. The nature and type of cumulative impacts depends on such variables as increased costs associated with fluid mineral development, which could prohibit development of a resource. Additionally, increased fluid mineral exploration and development could occur outside of GRSG habitat, which could cause additional unforeseen impacts on other resources. This would affect the fluid minerals RFD scenarios for each alternative based on the cumulative effects (see **Appendix P**). The following cumulative effects analysis for each of the alternatives examines relative differences in increasing and decreasing impacts on geothermal and oil and gas within PHMA and GHMA over the next 20 years.

Alternative A

Geothermal

The management actions under Alternative A would cumulatively impact geothermal leasing, exploration, and development through existing and future surface use restrictions (e.g., closures, NSO, CSU, and TL stipulations) within and outside GRSG habitat on a project by project basis.

Under Alternative A, 14,642,300 acres within GRSG habitat would continue to be open to new geothermal leasing, subject to current standard stipulations. New geothermal development in open areas would continue to be impacted by the restrictions in the lands and realty program.

Cumulative impacts on geothermal exploration and development from fluctuations would continue to occur as identified above.

As outlined in Chapter 4 and **Appendix P**, the RFD scenario was developed by analyzing geothermal exploration and development over the past 30 years in the planning area. Using this analysis, the trend was projected into the future, such that over the next 20 years, 94 new geothermal wells would be drilled and 12 new geothermal power plants would be constructed providing an additional 336 MWs of capacity. As long as the lands remain open to leasing and development with minimal constraints, operators would not be compelled to shift their exploration to private lands. Under Alternative A, any decrease in activity would be minimal, and would remain susceptible to resource demand, drilling costs and market prices.

Oil and Gas

The management actions under Alternative A could cumulatively impact oil and gas leasing, exploration, and development through existing and future surface use restrictions (e.g., closures and NSO, CSU, and TL stipulations) inside and outside GRSG habitat on a project by project basis.

In GRSG habitat under Alternative A, 14,642,300 acres would continue to be open to new oil and gas leasing, subject to current standard stipulations. New oil and gas development in open areas would continue to be impacted by restrictions in the lands and realty program (e.g., ROW exclusion areas).

Cumulative impacts on oil and gas exploration and development from fluctuations would continue to occur as identified above.

The RFD scenario projects that 100 new oil and gas wells (60 wells in the BLM Elko District and 40 wells outside of the Elko District) would be drilled over the next 20 years. As long as the lands remain open to leasing and development with minimal constraints, operators would not be compelled to shift their exploration to private lands. Under Alternative A, any decrease in activity would be minimal, and would remain susceptible to resource demand, drilling costs and market price fluctuations.

Alternative B*Geothermal*

As discussed in Chapter 4, the RFD scenario for Alternative B could reduce geothermal leasing, exploration, and development by 12.7 percent within GRSG habitat. Cumulatively, because of the added restrictions in GRSG habitat, more leasing and development would most likely occur outside of GRSG habitat. Existing leases within GRSG habitat would be managed with current lease stipulations; however additional COAs may be added to protect GRSG habitat.

The increased restrictions in PHMA would cumulatively cost operators more time and money to comply with RDFs, GRSG habitat objectives, seasonal buffers, and other criteria if siting projects in those areas.

When compared with Alternative A, the cumulative impacts from socioeconomic factors and restrictions on lands and realty actions under Alternative B would result in greater cumulative impacts on geothermal leasing, exploration, and development.

Oil and Gas

The management actions proposed under Alternative B would cumulatively impact oil and gas leasing and development similarly to geothermal. As discussed in Chapter 4, the RFD scenario for Alternative B identifies a reduction in oil and gas leasing, exploration, and development by 20 to 33 percent in the planning

area. Additional impacts from socioeconomic and restrictions on lands and realty would be the same as geothermal for Alternative B.

Alternative C

Geothermal

When compared with Alternative A, the management actions proposed under Alternative C would cumulatively reduce geothermal leasing and development through closing PHMA (under this alternative GHMA is included in PHMA). As discussed in Chapter 4, the RFD scenario for Alternative C identifies a reduction in geothermal leasing, exploration, and development by 21.1 percent.

Additional cumulative impacts from socioeconomic factors would be greater than Alternatives A and B for geothermal leasing, exploration, and development. There would not be any additional cumulative impacts from lands and realty on future leasing, exploration, and development within PHMA because these areas would be closed to both resources.

Cumulatively, due to added restrictions in GRSG habitat, more leasing and development could occur outside of GRSG habitat. However, excluding ROW development on approximately 17 million acres of GRSG habitat under this alternative would likely impact the ability for geothermal development to occur in non-habitat areas as well. Development outside GRSG habitat, including development on private lands, would be indirectly impacted over the long term in circumstances where there would be no opportunities to co-locate with existing electrical transmission infrastructure in GRSG habitat or where developing the intertie system entirely outside GRSG habitat would not be feasible or would be cost prohibitive. For example, a developer may have to site a transmission line around BLM-administered lands and National Forest System lands, which would increase time and money and possibly make the project cost prohibitive.

However, on existing leases, there would be greater cumulative impacts under Alternative C from restrictions on lands and realty, such as siting pipelines and transmission lines than under Alternatives A, B, D, E, and the Proposed Plan, and the same impacts as under Alternative F. For existing leases, additional COAs to protect GRSG habitat would cumulatively cost operators more time and money to explore and develop.

Oil and Gas

When compared with Alternative A, the management actions proposed under Alternative C would result in greater cumulative impacts on oil and gas leasing and development by closing PHMA (under this alternative GHMA is included in PHMA). As discussed in Chapter 4, the RFD scenario for Alternative C identifies a reduction in oil and gas leasing, exploration, and development by 28 to 67 percent.

For existing leases, additional COAs to protect GRS habitat would cumulatively cost operators more time and money to explore and develop.

Additional cumulative impacts from socioeconomic factors and lands and realty would be the same as described for geothermal under Alternative C.

Alternative D

Geothermal

When compared with Alternative A, the management actions proposed under Alternative D would result in greater cumulative impacts on geothermal leasing and development by managing PHMA and GHMA areas as NSO. As discussed in Chapter 4 and **Appendix P**, the RFD scenario for Alternative D could reduce future geothermal leasing, exploration, and development by 13.4 to 21.1 percent. Existing leases would be managed with current lease stipulations.

Lands and realty would have greater cumulative impacts than Alternative A on future geothermal leasing, exploration, and development because GRS habitat would be managed as ROW avoidance areas.

Existing leases would have the same cumulative impacts under Alternative D as under Alternative E, but less than Alternatives B, C, and F because GRS habitat would be managed as ROW avoidance areas, by affecting such things as siting pipelines and transmission lines. This would make geothermal development more costly and require more time to issue permits (e.g., to review proposed ROWs that would go through or around GRS habitat in order to gain access to the project site).

Lands and realty actions under Alternative D could also cumulatively impact development of geothermal projects on private lands within GRS habitat by limiting access and infrastructure siting (e.g., pipelines, transmission lines) on adjacent BLM-administered lands and National Forest System Lands. For example, a developer may have to site a transmission line around BLM-administered lands and National Forest System Lands, which would increase time and money and possibly make such a project cost prohibitive. However, there would be no cumulative impacts from lands and realty on private lands outside of GRS habitat.

For existing leases, additional COAs to protect GRS habitat would cumulatively cost operators more time and money to explore and develop. Therefore, Alternative D would have the same cumulative impacts from socioeconomic factors as Alternative E, but less than Alternatives B, C, and F.

Overall, more leasing and development could occur outside of GRS habitat.

The 3 percent disturbance cap in PHMA would also impact future geothermal development if activities on federal, state, private or other lands were to reach

the cap. Once the cap is reached, additional disturbance, including geothermal development, would not be allowed.

Oil and Gas

When compared with Alternative A, the management actions proposed under Alternative D would cumulatively impact oil and gas leasing and development by managing PHMA and GHMA as NSO. As discussed in Chapter 4, the RFD scenario for Alternative D could reduce oil and gas leasing, exploration, and development by 25 to 60 percent.

Additional cumulative impacts from socioeconomic factors would be the same as described above for geothermal under Alternative D.

However, cumulative impacts from lands and realty actions on existing and future oil and gas leases in GRSG habitat would be slightly greater than geothermal because there are considerably more existing leases and a demand for future leasing in GRSG habitat than geothermal.

Alternative E

Geothermal

When compared with Alternative A, the management actions proposed under Alternative E would result in greater cumulative impacts on geothermal leasing and development, but less than Alternatives B, C, and D. PHMA and GHMA areas would be managed with CSU and TL stipulations. As discussed in Chapter 4 and **Appendix P**, the RFD scenario for Alternative E could reduce future geothermal leasing, exploration, and development up to 21.1 percent. Existing leases would be managed with current lease stipulations.

Under Alternative E, in Nevada only, all surface-disturbing activities would be required to avoid, minimize, and mitigate impacts on GRSG and its habitat. Operators may experience longer delays and additional costs to get their projects approved. Mitigation requirements may discourage developers from developing leases, including those with moderate to high geothermal potential within GRSG habitat. Areas within core and priority GRSG habitat would be the most affected.

Cumulative impacts in California would be the same as Alternative A.

Under Alternative E, cumulative impacts from socioeconomic factors and lands and realty would be the same as Alternative D, but less than Alternatives B, C, and F for both existing leases and future geothermal leasing, exploration, and development, both within and outside of GRSG habitat.

Management actions under Alternative E would cumulatively impact development of geothermal projects on private lands similar to Alternative D.

Oil and Gas

When compared with Alternative A, the management actions proposed under Alternative E would result in greater cumulative impacts on oil and gas leasing and development, but less than Alternatives B, C, and D. PHMA and GHMA areas would be managed with CSU and TL stipulations. As discussed in Chapter 4 and **Appendix P**, the RFD scenario for Alternative E could reduce future oil and gas leasing, exploration, and development by 15 percent. Existing leases would be managed with current lease stipulations.

Under Alternative E, in Nevada only, all surface-disturbing activities would be required to avoid, minimize, and mitigate impacts on GRSG and its habitat. Operators may experience longer delays and additional costs to get their projects approved. Mitigation requirements may discourage developers from developing leases, including those with moderate to high geothermal potential within GRSG habitat. Areas within core and priority GRSG habitat would be the most affected.

Cumulative impacts in California would be the same as Alternative A.

Additional cumulative impacts from socioeconomic factors and lands and realty would be the same as described above for geothermal under Alternative E.

Alternative F*Geothermal*

Under Alternative F, the cumulative impacts on geothermal resources would be the same as under Alternative C.

Oil and Gas

Under Alternative F, the cumulative impacts on oil and gas resources would be the same as under Alternative C.

Proposed Plan*Geothermal*

When compared with Alternatives A and E, the management actions proposed under the Proposed Plan would result in greater cumulative impacts on geothermal leasing and development, but less than Alternatives B, C, D, and F. The Proposed Plan would result in greater cumulative impacts on geothermal leasing and development by managing PHMA with NSO restrictions with only one exception. SFAs would be managed as NSO without any waivers, exceptions, or modifications. GHMA would be open to leasing, exploration, and development, but would be subject to moderate constraints, such as TL and CSU stipulations, and would be required to avoid, minimize, and apply compensatory mitigation to GRSG habitat.

As discussed in Chapter 4 and **Appendix P**, the RFD scenario for the Proposed Plan could reduce future geothermal leasing, exploration, and

development by 15.7 to 23.7 percent. Existing leases would be managed with current lease stipulations.

Cumulative impacts from lands and realty actions under the Proposed Plan for existing and future geothermal leasing, exploration, and development outside of GRSG habitat and within GHMA would be the same as Alternative A. However, in PHMA (including SFA) there would be additional cumulative impacts because it would be managed as ROW avoidance areas. Overall, the cumulative impacts on geothermal leasing and development from lands and realty actions under the Proposed Plan would be greater than Alternative A, and less than Alternatives B, C, D, E, and F.

Additional cumulative impacts from socioeconomic factors could further cumulatively impact future geothermal leasing, exploration, and development by an additional 10 to 20 percent, because of the added restrictions in GRSG habitat. For existing leases, additional COAs to protect GRSG habitat would cumulatively cost operators more time and money to explore and develop. Overall, more leasing and development could occur outside of GRSG habitat.

The 3 percent disturbance cap would also impact future geothermal development if activities on federal, state, private or other lands were to reach the cap in PHMA. Once the 3 percent cap is reached, additional disturbance, including geothermal development, would not be allowed.

Oil and Gas

As discussed in Chapter 4 and **Appendix P**, the RFD scenario for the Proposed Plan could reduce future oil and gas leasing, exploration, and development by 18 to 25 percent.

The cumulative impacts for oil and gas would be the same as for geothermal under the Proposed Plan, except that PHMA would be managed as NSO with no waivers, exceptions, or modifications. Existing leases would be managed with current lease stipulations.

5.14.2 Locatable Minerals

The cumulative impact analysis area for impacts from proposed management actions on locatable minerals includes lands within the planning area.

The past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and would likely continue to affect locatable minerals are: lands and realty actions, socioeconomics, and existing and planned locatable mineral development. Given that the locatable minerals program is a non-discretionary program by the BLM and Forest Service, mineral exploration and development would be expected to continue to occur under all alternatives. **Table 5-39** lists all reasonable foreseeable actions for the planning area that would add to the cumulative impacts for locatable minerals.

BLM or Forest Service management that could result in cumulative impacts on locatable minerals include a reduction in the number of submitted lands and realty actions, e.g., ROW exclusion and avoidance areas in GRSG habitat for all alternatives except Alternative A, resulting in a decrease in the ability to develop exploration projects and economically feasible production of mineral resources. Lands recommended for withdrawal from mineral entry would restrict locatable mineral development and reduce the demand for associated lands and realty actions. Socioeconomic impacts would be associated with the price and demand for locatable minerals and the availability of markets for distribution and represents an impact on the potential discovery, development, and use of those resources by decreasing the availability of those mineral resources. The nature and type of cumulative impacts depends on such variables as market fluctuation in price and demand for minerals, available markets for distribution, and new technologies.

The following cumulative effects analysis for each of the alternatives examines relative differences in impacts on locatable minerals within the planning area for the life of the LUP (i.e., approximately 20 years). Locatable minerals do not have associated timeframes with authorizations because of the dependency on mineral resource size and market fluctuation in price and demand. Locatable mineral project durations are determined on a case-by-case basis, depending on the mineral resource reserve.

Alternative A

Under Alternative A, 2,846,600 acres of federal mineral estate would remain withdrawn from location in the planning area under the Mining Law of 1872. No additional acreage is recommended for withdrawal within the planning area under this alternative. Locatable mineral exploration and mining projects, including all associated lands and realty actions, have and would be implemented within the planning area (see **Table 5-39**). There would be no significant socioeconomic cumulative impacts on locatable minerals under this alternative since a large percentage of the planning area would be available to locatable mineral entry and development and no additional restrictions would be applied to mining operations. This alternative would have the least amount of restrictions on locatable mineral development within the planning area.

Table 5-46 shows the total acreage withdrawn, recommended for withdrawal, and open to locatable mineral entry for the entire planning area.

Land uses associated with lands and realty actions would continue under current policies and regulations. Under Alternative A, the majority of the planning area would remain open to surface-disturbing activities associated with lands and realty actions. Cumulative impacts on locatable minerals would be negligible under this alternative since no additional lands are recommended for withdrawal from locatable mineral entry within the planning area.

**Table 5-46
Locatable Minerals Withdrawals in Planning Area**

Alternative	Withdrawn from Locatable Mineral Entry	Recommended for Withdrawal from Locatable Mineral Entry	Open to Locatable Mineral Entry
Alternatives A, D and E	2,846,600	0	52,232,300
Alternatives B and F	2,846,600	9,342,600	42,889,700
Alternative C	2,846,600	16,005,000	36,227,300
Proposed Plan	2,846,600	2,731,600	49,500,700

Source: BLM and Forest Service GIS 2014

Alternative B

Under Alternative B, an additional 9,342,600 acres (17 percent) would be recommended for withdrawal in the planning area. If the Secretary issues a Public Land Order to formally withdraw these lands, subject to valid existing rights, the location of new mining claims under the Mining Law of 1872 would be forbidden. Exploration and mining would only be allowed on existing valid mining claims. This alternative would restrict locatable mineral development and could cause future proposed projects to be rejected, withdrawn, or closed.

Land uses associated with existing or approved lands and realty actions would continue under current policies and regulations. Impacts from land and realty management actions would be similar to those discussed above under general impacts. Cumulative impacts on locatable minerals would increase under this alternative since additional lands are recommended for withdrawal from locatable mineral entry within the planning area. Impacts would be greater than Alternative A, D, E, and the Proposed Plan, but less than Alternative C.

Socioeconomic cumulative impacts would be similar to those discussed above under general impacts. Under Alternative B, additional lands are recommended for withdrawal from locatable mineral entry, which removes the mineral resources in that area from being accessed and extracted under new mining claims. Existing mining claims in areas withdrawn from locatable mineral entry would have to undergo a validity exam to be approved for notices or plans of operations, which would increase up-front costs of locatable mineral development and could cause operators and workforce to explore mineral developments outside of the planning area. Cumulative impacts on locatable minerals would increase under this alternative since additional lands are recommended for withdrawal from locatable mineral entry and increased costs due to possible validity exams which may deter locatable mineral development within the planning area. Impacts would be greater than Alternative A, D, E, and the Proposed Plan, but less than Alternative C.

Alternative C

Under Alternative C, an additional 16,005,000 acres (29 percent) would be recommended for withdrawal from the planning area. If the lands recommended are formally withdrawn, the location of new mining claims would be forbidden. Exploration and mining would be restricted to existing valid mining claims. This alternative would restrict locatable mineral development and could cause future proposed projects to be rejected, withdrawn, or closed.

Land uses associated with lands and realty actions would continue under current policies and regulations. Impacts from land and realty management actions would be similar to those discussed above under general impacts.

Socioeconomic cumulative impacts would be similar to those discussed above under general impacts. The additional cost for validity exams for existing mining claims would also impact locatable minerals and could cause companies and workforce to explore mineral developments outside of the planning area. Cumulative impacts on locatable minerals would increase under this alternative since additional lands are recommended for withdrawal from locatable mineral entry and increased costs due to possible validity exams may deter locatable mineral development within the planning area. Alternative C is the most restrictive alternative for locatable minerals and could cause exploration and mining projects to be rejected, withdrawn, or closed. Alternative C has the greatest impact of all other alternatives to locatable minerals.

Alternative D

Under Alternative D, conservation, maintenance, and enhancement of PHMA while managing locatable mineral development is emphasized and no additional acreage is recommended for withdrawal. Alternative D has similar impacts on Alternative A. However, the impacts under this alternative would be more restrictive to locatable mineral development due to an emphasis on achieving a net conservation gain of GRSG habitat and by applying RDFs consistent with applicable law to plans of operations or providing for the enhancement of GRSG habitat through off-site mitigation. Claimants and operators would also be encouraged to consolidate exploration activities into plans of operations to reduce proliferation of discrete exploration notices under 43 CFR 3809.21(b).

Land uses associated with lands and realty actions would continue under current policies and regulations. Impacts from land and realty management actions would be similar to those discussed above under general impacts. Cumulative impacts on locatable minerals would increase under this alternative since additional costs for the conservation, maintenance, and enhancement of GRSG habitats may be cost prohibitive and could cause operators and workforce to develop locatable mineral projects outside of the planning area. Impacts would be greater than Alternative A, and similar to Alternative E. Impacts would be less than Alternative B, C, F and the Proposed Plan. This alternative is more

restrictive than Alternative A and could cause some of the cases to be withdrawn or closed.

The 3 percent cumulative disturbance cap would also impact future locatable mineral development. If activities on federal, state, private or other lands were to reach the disturbance cap in PHMA, then no additional disturbance, except new locatable mineral activity, would be allowed. Federal mineral estate would be required to incorporate mitigation measures to avoid further surface disturbance.

Alternative E

Alternative E proposes to reduce the affect to GRSG habitat (core, priority, and general habitat) by the application of avoid, minimize, and mitigate strategies with the addition of the Conservation Credit System managed by the State of Nevada. This alternative would have similar restrictions as Alternative A but would require consultation with the SETT to provide consistent evaluation, reconciliation, and guidance for project development to avoid, minimize or mitigate disturbances to GRSG habitats. Alternative E also includes the application of RDFs consistent with applicable law which are additional conservation measures for the protection of GRSG and its habitat. The RDFs consistent with applicable law would be applied to all GRSG habitat within the SGMA. Locatable mineral operators may experience increased costs and project permitting delays. The additional cost and time for consultation with the SETT and the Conservation Credit System would impact locatable minerals and could cause companies and workforce to explore mineral developments outside of the planning area.

Impacts from land and realty management actions would be similar to those discussed above under general impacts. Impacts would be greater than Alternative A, and similar to Alternative D. Impacts would be less than Alternative B, C, F and the Proposed Plan. This alternative is more restrictive than Alternative A and could cause some of the cases to be withdrawn or closed.

Alternative F

Management under Alternative F would result in cumulative impacts similar to Alternative B.

Proposed Plan

Under the Proposed Plan, an additional 2,797,400 acres (5 percent) designated as SFAs would be recommended for withdrawal within the planning area. The alternative includes a net conservation gain and a goal not to exceed a 3 percent disturbance for discretionary anthropogenic activities subject to valid existing rights. For Nevada, in specific instances, there can be an exceedance of the 3 percent disturbance cap if the project approval results in a net conservation gain for GRSG (see Action SSS-2). The three percent disturbance cap could constrain other resource uses from being developed if it resulted in reaching the

disturbance cap. The Proposed Plan includes the application of RDFs consistent with applicable law for locatable mineral development which are conservation measures for the protection of GRSG and its habitat. The RDFs for locatable mineral development would be applied to all GRSG habitat consistent with applicable law.

Impacts from land and realty management actions would be similar to those discussed above under general impacts. Management under the Proposed Plan would result in less cumulative impacts on the locatable minerals program than Alternatives B, C and F due to less acreage recommended for withdrawal and the lack of active mines within SFAs.

Socioeconomic cumulative impacts would be similar to those discussed above under general impacts. Existing mining claims in areas withdrawn from locatable mineral entry would have to undergo a validity exam, resulting in increased up-front costs of locatable mineral development and would delay the start of development on those claims. Cumulative impacts on locatable minerals would increase under this alternative since additional lands are recommended for withdrawal from locatable mineral entry and increased costs due to possible validity exams may deter locatable mineral development within the planning area. Impacts would be greater than Alternative A, D, and E due to the increased amount of recommended lands for withdrawal and the implementation of the Nevada Conservation Credit System under the Proposed Plan. Impacts would be less than Alternative B, C and F since the recommended withdrawal of lands in SFAs and the acreage recommended for withdrawal is less.

5.14.3 Mineral Materials

The cumulative impact analysis area for impacts from proposed management actions on salable minerals includes lands within the planning area.

The past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and would likely continue to affect salable minerals are: lands and realty actions and socioeconomics.

Cumulative impacts on salable minerals include a reduction in the number of submitted lands and realty actions, due to exclusions and avoidances for ROWs in sage grouse habitat for all alternatives except Alternative A, resulting in a decrease in the ability to develop economically feasible production of mineral resources. The nature and type of cumulative socioeconomic impacts depends on such variables as market fluctuation in demand for mineral resources, available markets for distribution, and conservation measures to protect GRSG habitat. Salable minerals are used for all forms of development and are often associated with the construction and maintenance of lands and realty actions. As discussed in Chapter 4, with the closure of acreage to conserve GRSG habitat, access roads to existing and new salable mineral projects would be lost,

rendering the project economically infeasible to develop. Given that the mineral materials program is a discretionary program by the BLM and Forest Service, mineral development would be expected to continue to occur under all alternatives.

The following cumulative effects analysis for each of the alternatives examines relative differences in impacts on salable minerals within the planning area for the life of the LUP (i.e., approximately 20 years). Salable minerals do not have associated timeframes with authorizations because of the dependency on market fluctuation and demand.

Alternative A

Under Alternative A, 6,201,500 acres (11 percent) of federal mineral materials would remain closed from development in the planning area. No additional acreage is recommended for withdrawal within the planning area under this alternative. Mineral material development, including all associated lands and realty actions, would be implemented within the planning area (see **Table 5-39**). There would be no significant socioeconomic cumulative impacts on mineral materials under this alternative since a large percentage of the planning area would be open to mineral material development and no additional restrictions would be applied to mining operations. This alternative would have the least restrictions on salable mineral development within the planning area.

Table 5-47 shows the total acreage closed, recommended for closure, and open to mineral material development.

Table 5-47
Mineral Materials Allocations (Acres) by Alternative

Alternative	Closed to Mineral Material Development	Recommended for Closure to Mineral Material Development	Open to Mineral Material Development
Alternatives A and E	6,201,500		48,877,400
Alternatives B and F	6,201,500	8,236,400	40,641,000
Alternative C and D	6,201,500	14,642,300	34,235,100
Proposed Plan	6,201,500	9,255,400	39,622,000

Source: BLM and Forest Service GIS 2014

Alternative B

Under Alternative B, an additional 8,236,400 acres (15 percent) would be recommended for closure to mineral materials development in the planning area. Under Alternative B, the 8,236,400 acres recommended for closure from salable minerals would restrict mineral development. Impacts from land and realty management actions would be similar to those discussed above under general impacts. Where lands recommended for closure from mineral material

development within the planning area would occur, impacts on salable minerals in the form of a reduction in the ability to develop mineral resources to provide material for existing and new community infrastructure, mining, and other industry development would increase. Cumulative impacts on salable minerals would increase under this alternative since additional lands are recommended for closure from salable mineral entry within the planning area. Impacts would be greater than Alternative A, and E, but less than Alternative C, D, F, and the Proposed Plan. This alternative would be more restrictive than Alternative A and E and could cause existing and new salable mineral projects to be withdrawn, rejected, or closed.

Alternative C

Under Alternative C, an additional 14,642,300 acres (27 percent) would be recommended for closure to mineral materials development. Under Alternative C, the 14,642,300 acres recommended for closure from salable minerals would restrict mineral development. Impacts from land and realty management actions would be similar to those discussed above under general impacts. Where lands recommended for closure from mineral material development within the planning area would occur, impacts on salable minerals in the form of a reduction in the ability to develop mineral resources to provide material for existing and new community infrastructure, mining, and other industry development would increase. Cumulative impacts on salable minerals would increase under this alternative since additional lands are recommended for closure from salable mineral entry within the planning area. Alternative C is the most restrictive alternative for salable minerals since all PHMA would be closed to mineral development. Closures in PHMA could cause mineral material development projects to be rejected, withdrawn, or closed. Alternative C has the greatest impact of all other alternatives to salable minerals.

Alternative D

Under Alternative D, an additional 14,642,300 acres (27 percent) would be recommended for closure to mineral materials development. The impacts on mineral material development would be the same as those described under Alternative C with the exception of reasonable access opportunities that would be provided to the Federal Highway Administration, NDOT, Caltrans, counties, and the public for existing mineral material pits in PHMA and GHMA.

The 3 percent disturbance cap would also impact future mineral material sales. If activities on federal, state, private or other lands were to reach the disturbance cap in PHMA, then no additional disturbance, including new or expansion of existing mineral material sites, would be allowed.

Impacts from land and realty management actions would be similar to those discussed above under general impacts. Where lands recommended for closure from mineral material development within the planning area would occur, impacts on salable minerals in the form of a reduction in the ability to develop

mineral resources to provide material for existing and new community infrastructure, mining, and other industry development would increase. This alternative emphasizes conservation, maintenance, or enhancement of PHMA while managing mineral material development. Loss of GRSG habitat through disturbance at current sites would be offset through mitigation. Cumulative impacts on salable minerals would increase under this alternative since additional lands are recommended for closure from salable mineral entry within the planning area, except for the opportunities listed above. Impacts would be greater than Alternative A, B, E, F, and the Proposed Plan, but less than Alternative C. This alternative would be more restrictive than all other alternatives, except Alternative C, and could cause existing and new salable mineral projects to be withdrawn, rejected, or closed.

Alternative E

Under Alternative E, 6,201,500 acres (11 percent) of federal mineral materials would remain closed from development in the planning area. No additional acreage is recommended for withdrawal within the planning area under this alternative. This alternative would have similar restrictions as Alternative A but would require consultation with the SETT to provide consistent evaluation, reconciliation, and guidance for project development to avoid, minimize or mitigate disturbances to GRSG habitats and be subject to the Nevada Conservation Credit System. Alternative E also includes the application of RDFs consistent with applicable law, which are additional conservation measures for the protection of GRSG. The RDFs would be applied to all GRSG habitat, including core, priority, and general within the SGMA consistent with applicable law. Terms and conditions would be incorporated into permits and adjusted as needed through monitoring and adaptive management to meet GRSG habitat objectives. Salable mineral operators may experience increased costs and project permitting delays to get their projects approved. The additional cost and time for consultation with the SETT and the Conservation Credit System would impact salable minerals and could cause companies and workforce to explore mineral developments outside of the planning area.

Impacts from land and realty management actions would be similar to those discussed above under general impacts. Impacts would be greater than Alternative A, and similar to Alternative D. Impacts would be less than Alternative B, C, F and the Proposed Plan. This alternative is more restrictive than Alternative A and could cause some of the mineral development projects to be withdrawn or closed.

Alternative F

Management under Alternative F would result in the same level and types of cumulative impacts as Alternative B.

Proposed Plan

Under the Proposed Plan, an additional 9,255,400 acres (17 percent) associated with SFAs would be recommended for closure to salable mineral development within the planning area. PHMA would be closed to salable mineral development. The Proposed Plan includes the application of RDFs consistent with applicable law which are additional conservation measures for the protection of GRSG. Terms and conditions would be incorporated into permits and adjusted as needed through monitoring and adaptive management to meet GRSG habitat objectives. This alternative would subject any anthropogenic disturbance within GRSG habitat to a net conservation gain of GRSG habitat and apply a 3 percent disturbance cap in PHMA. The 3 percent cumulative disturbance cap would also impact future mineral materials disposal if activities on federal, state, private or other lands where the disturbance cap is reached in PHMA. If reached, additional disturbance, including those associated with proposed new or expanded mineral materials sites, would not be allowed.

Impacts from land and realty management actions would be similar to those discussed above under general impacts. Socioeconomic cumulative impacts represent an impact on the potential discovery, development, and use of those resources by decreasing the availability of those mineral resources. Existing and proposed mineral material projects within areas closed from salable mineral development would be subject to additional costs associated with RDFs (consistent with applicable law) and disturbance caps in PHMA, resulting in increased up-front costs of salable mineral development and would delay the start of development. Cumulative impacts on salable minerals would increase under this alternative since additional lands are recommended for closure to salable minerals and lands and realty actions, which may deter mineral developments within the planning area. Impacts would be greater than Alternatives A, B, E, and F due to the increased amount of recommended lands for closure, the implementation of RDFs consistent with applicable law and the disturbance cap. Impacts would be less than Alternatives C and D since the recommended closure of lands is less and the lack of active existing minerals development within SFAs.

5.14.4 Solid (Nonenergy) Leasable Minerals

The cumulative impact analysis area for impacts from proposed management actions on nonenergy leasable minerals includes lands within the planning area.

The past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and would likely continue to affect nonenergy leasable minerals are: lands and realty actions and socioeconomics.

Cumulative impacts on nonenergy leasable minerals include a reduction in the number of submitted lands and realty actions, due to exclusions and avoidances for ROWs in GRSG habitat for all alternatives except Alternative A, resulting in a decrease in the ability to develop economically feasible production of mineral

resources. The nature and type of cumulative socioeconomic impacts depends on such variables as market fluctuation in demand for mineral resources, available markets for distribution, and conservation measures to protect GRSG habitat. As discussed in Chapter 4, with the closure of acreage to conserve GRSG habitat, access roads to existing and new nonenergy leasable mineral projects would be lost, rendering the project economically infeasible to develop. Given that the nonenergy leasable minerals program is a discretionary program by the BLM and Forest Service, mineral development would be expected to continue to occur under all alternatives.

The following cumulative effects analysis for each of the alternatives examines relative differences in impacts on nonenergy leasable minerals within the planning area for the life of the LUP (i.e., approximately 20 years). Nonenergy leasable minerals do not have associated timeframes with authorizations because of the dependency on market fluctuation in demand.

Alternative A

Under Alternative A, 6,201,500 acres (11 percent) of federal nonenergy leasable minerals would remain closed to leasing in the planning area. No additional acreage is recommended for withdrawal within the planning area under this alternative. Nonenergy leasable mineral development, including all associated lands and realty actions, have and would be implemented within the planning area (see **Table 5-39**). There would be no significant socioeconomic cumulative impacts on nonenergy leasable minerals under this alternative since a large percentage of the planning area would be open to leasing and development and no additional restrictions would be applied to operations. This alternative would have the least amount of restrictions on nonenergy leasable mineral development within the planning area.

Table 5-48 shows the total acreage closed, recommended for closure, and open to nonenergy leasable minerals development.

Table 5-48
Nonenergy Leasable Mineral Allocations (Acres) by Alternative

Alternative	Closed to Nonenergy Leasable Minerals Leasing	Recommended for Closure to Nonenergy Leasable Mineral Leasing	Open to Nonenergy Leasable Mineral Leasing
Alternatives A and E	6,201,500	0	48,877,400
Alternatives B and F	6,201,500	8,236,400	40,641,000
Alternative C and D	6,201,500	14,642,300	34,235,100
Proposed Plan	6,201,500	9,255,400	39,622,000

Source: BLM and Forest Service GIS 2014

There are 41 pending prospect permits for nonenergy leasable minerals within the planning area. This alternative would have the least amount of restrictions on these pending cases.

Alternative B

Under Alternative B, an additional 8,236,400 acres (15 percent) would be recommended for closure to nonenergy leasable mineral leasing in the planning area. Under Alternative B, the 9,342,600 acres recommended for closure from nonenergy leasable minerals would restrict development. Impacts from land and realty management actions would be similar to those discussed above under general impacts. Where lands recommended for closure from leasing and development within the planning area would occur, impacts on nonenergy leasable minerals in the form of a reduction in the ability to develop mineral resources would increase. Cumulative impacts on nonenergy leasable minerals would increase under this alternative since additional lands are recommended for closure from leasing within the planning area. Impacts would be greater than Alternative A, and E, but less than Alternative C, D, F, and the Proposed Plan. This alternative would be more restrictive than Alternative A and E and could cause existing and new nonenergy leasable mineral projects to be withdrawn, rejected, or closed.

There are 41 pending prospect permits for nonenergy leasable minerals within the planning area. This alternative would place restrictions on 11 of these pending cases that could cause them to be withdrawn, rejected, or closed.

Alternative C

Under Alternative C, an additional 14,642,300 acres (27 percent) would be recommended for closure to nonenergy leasable mineral leasing within the planning area. Under Alternative C, the 14,642,300 acres recommended for closure from nonenergy leasable minerals would restrict mineral development. Impacts from land and realty management actions would be similar to those discussed above under general impacts. Where lands recommended for closure from nonenergy leasable mineral development within the planning area would occur, impacts on nonenergy leasable minerals in the form of a reduction in the ability to develop mineral resources would increase. Cumulative impacts on nonenergy leasable minerals would increase under this alternative since additional lands are recommended for closure from leasing and development within the planning area. Alternative C is the most restrictive alternative for nonenergy leasable minerals since all PHMA would be closed to mineral development, which could cause nonenergy leasable mineral projects to be rejected, withdrawn, or closed. Alternative C has the greatest impact of all other alternatives to nonenergy leasable minerals.

There are 41 pending prospect permits for nonenergy leasable minerals within the planning area. This alternative would place restrictions on 11 of these pending cases that could cause them to be withdrawn, rejected, or closed.

Alternative D

Under Alternative D, an additional 14,642,300 acres (27 percent) would be recommended for closure to nonenergy leasable mineral leasing. This alternative emphasizes conservation, maintenance, or enhancement of PHMA while managing mineral material development. Loss of GRSG habitat through disturbance at current sites would be offset through the avoid, minimize or mitigate process. Cumulative impacts on nonenergy leasable minerals would increase under this alternative since additional lands are recommended for closure from leasing and development within the planning area. The cumulative impacts on nonenergy leasable mineral development would be the same as those described under Alternative C which could cause existing and new salable mineral projects to be withdrawn, rejected, or closed.

The 3 percent disturbance cap would also impact future solid nonenergy leasable material development. If activities on federal, state, private or other lands were to reach the disturbance cap within PHMA, then no additional disturbance, including new or expansion of existing solid leasable sites would be allowed.

Alternative E

Under Alternative E, 6,201,500 acres (11 percent) of federal mineral materials would remain closed to nonenergy leasable mineral leasing in the planning area. No additional acreage is recommended for closure within the planning area under this alternative. This alternative would have similar restrictions as Alternative A but would require consultation with the SETT to provide consistent evaluation, reconciliation, and guidance for project development to avoid, minimize or mitigate disturbances to GRSG habitats and be subject to the Nevada Conservation Credit System. Alternative E also includes the application of RDFs consistent with applicable law which are additional conservation measures for the protection of GRSG. The RDFs would be applied to all GRSG habitat, including core, priority, and general within the SGMA (consistent with applicable law). Terms and conditions would be incorporated into permits and adjusted as needed through monitoring and adaptive management to meet GRSG habitat objectives. Nonenergy leasable mineral operators may experience increased costs and project permitting delays to get their projects approved. The additional cost and time for consultation with the SETT and the Conservation Credit System would impact nonenergy leasable minerals and could cause companies and workforce to explore mineral developments outside of the planning area.

Impacts from land and realty management actions would be similar to those discussed above under general impacts. Impacts would be greater than Alternative A, and similar to Alternative D. Impacts would be less than Alternative B, C, F and the Proposed Plan. This alternative is more restrictive than Alternative A and could cause some of the nonenergy leasable mineral

projects to be withdrawn or closed. There are 41 pending prospect permits for nonenergy leasable minerals within the planning area.

Alternative F

Management under Alternative F would result in cumulative impacts similar to Alternative B.

Proposed Plan

Under the Proposed Plan, an additional 9,255,400 acres (17 percent) associated with SFAs would be recommended for closure to nonenergy leasable mineral leasing within the planning area. Expansion of existing leases would be considered in PHMA outside of SFAs. The Proposed Plan includes the application of RDFs consistent with applicable law which are additional conservation measures for the protection of GRSG. Terms and conditions would be incorporated into permits and adjusted as needed through monitoring and adaptive management to meet GRSG habitat objectives. This alternative would subject anthropogenic disturbances within GRSG habitat to a net conservation gain of GRSG habitat and apply a 3 percent disturbance cap in PHMA.

The 3 percent disturbance cap would also impact future solid nonenergy leasable mineral development if activities on federal, state, private or other lands where the disturbance cap is reached within PHMA. Additional disturbances, including solid nonenergy mineral development would not be allowed.

Impacts from land and realty management actions would be similar to those discussed above under general impacts. Socioeconomic cumulative impacts represent an impact on the potential discovery, development, and use of those resources by decreasing the availability of those mineral resources. Existing and proposed mineral material projects within areas closed to nonenergy leasable mineral leasing and development would be subject to additional costs associated with RDFs (consistent with applicable law) and disturbance caps in PHMA, resulting in increased up-front costs of nonenergy leasable mineral projects and would delay the start of development. Cumulative impacts on nonenergy leasable minerals would increase under this alternative since additional lands are recommended for closure to nonenergy leasable mineral leasing and lands and realty actions, which may deter mineral developments within the planning area. Impacts would be greater than Alternatives A, B, E, and F due to the increased amount of recommended lands for closure and the implementation of RDFs consistent with applicable law and disturbance caps. Impacts would be less than Alternatives C and D since the recommended closure of lands is less and lack of active existing minerals development within SFAs.

There are 41 pending prospect permits for nonenergy leasable minerals within the planning area. This alternative would place restrictions on 11 of these pending cases that could cause them to be withdrawn, rejected, or closed.

5.15 SPECIAL DESIGNATIONS – AREAS OF CRITICAL ENVIRONMENTAL CONCERN

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and would likely continue to affect ACECs are management decisions which are specific to restoring GRSG habitat, as opposed to management decisions which would maintain existing habitat.

Alternatives Analysis

Under alternatives B, D, E and F, GRSG management actions would potentially enhance the management in 22 to 29 existing ACECs, depending on the alternative. This would be beneficial to those ACECs Relevance and Importance values.

Alternatives C and F would increase the amount of acreage currently under ACEC management through the addition of 18 ACECs (9,573,300 acres) in Alternative C and 9 ACECs (848,400 acres) in Alternative F. The management decisions in these two alternatives would not decrease the amount of protection currently provided by existing ACEC management, but in some cases would provide beneficial and supportive measures in the long term to existing ACECs which contain GRSG habitat.

Reasonably foreseeable trends that would result in cumulative impacts on some existing ACECs would include moderate- to large-scale changes in vegetative cover, e.g., from pinyon and/or juniper woodland to sagebrush steppe. This may allow for potential wildfire impacts from invasive plant species which can provide fine fuels to propel large scale fires through ACECs with vegetative and/or cultural Relevance and Importance values. Most existing ACECs are currently managed as exclusion or avoidance to ROWs and are managed as NSO or closed to leasing. These resources would not influence potential changes to vegetative cover.

5.16 WATER RESOURCES

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and would likely continue to affect water resources are fluid, locatable and salable mineral development, lands and realty actions, livestock grazing, wild horse and burro management, travel and transportation, fire, range improvements, vegetation management, drought and climate change.

Mineral development (fluid, locatable and salable) would continue to impact water resources in the planning area. These activities could impact water resources through an increase in the presence of petroleum-using vehicles and equipment and soil disturbance which increases the likelihood of chemical spills, leaching, erosion, and contamination of waterways. Mineral Impacts on groundwater aquifers due to leasable development can result in reduction of reservoir pressures in geothermal development or aquifer contamination due to poor well construction in oil and gas development. Locatable mineral

development can result in dewatering which would cause lowering water tables and could impact connected surface waters. Vegetation management is important for soil stability as vegetation anchors soils in place and prevents excessive erosion and runoff into waterways. Vegetation management includes fuels reduction through prescribed fires, chemical and mechanical treatments, and seeding. Active vegetation management should contribute to the stabilization and protection of soils in these areas from erosion and subsequent runoff contributing to higher pollutant and sediment loads to waterways.

Existing, proposed, and foreseeable ROW development in the planning area would also result in cumulative impacts on water resources through human-made runoff of soils and chemicals into waterways. Short-term impacts from construction would be greater than long-term impacts if sites are well mitigated. The development allowed under these authorizations would result in surface-disturbance, which would generally contribute to a decrease in water quality through compaction, erosion, and sediment runoff into waterways as well as an increase in the potential for chemical contamination.

Wildland fire impacts on water resources are typically dependent on the size and severity of the fire. Fire removes vegetation cover and exposes soils to erosion, increasing the potential for sediments to be transported into waterways. Additionally, high severity fires can cause hydrophobic soils, causing more water to runoff and reducing infiltration, increasing erosion and flooding rates to waterways. These impacts can be short-term or long-term depending on the severity of the fire and restoration of the area. Fire suppression activities can result in increased soil disturbance, making more soil available to erosion; however, these impacts are typically short-term and less severe than impacts of a high severity wildfires.

Grazing by livestock and wild horses and burros can affect water resources through the trampling of soils and vegetation along and within natural water features and through the formation of fecal coliform and nutrients in waterways. Livestock grazing is associated with range management, which involves constructing infrastructure in order to support livestock grazing. Proposed rangeland improvement projects are on-going and the most common ones include water developments and fencing. These types of actions could cumulatively impact waters through compaction and erosion of soils during construction (short-term impact) and through modification of water sources and riparian habitats and subsequent runoff into waterways, which can have both short-term and long-term impacts depending on project specifics.

Drought affects the health of rangeland, riparian areas, and forests, making them more susceptible to the invasion of weeds and wildfire. Fire can impact water resources in the short term through the removal of vegetation resulting in instability of soils and increased erosion and sediment into waterways. Long-term effects of fire are considered beneficial as the landscape can be returned to

a healthier state with proper seeding and management, which would indirectly reduce the risk of fire and reduce erosion of soils into waterways. Climate change would also pose a long-term threat of cumulative impacts on water resources. Cumulative impacts from climate change on GRSG habitat and consequently water resources, could include overall reduction of water availability throughout the planning area, vegetation regime changes (e.g., from sagebrush to grasslands), increased wildfire potential due to drought, changes in precipitation timing and severity; increasing pressures on rural water resources for urban development and increased sedimentation and erosion into waterways (Connelly et al. 2004).

5.16.1 Alternatives Analysis

Alternative A

Under Alternative A, the BLM and Forest Service would continue to allow ROWs, mineral development, and grazing, based on existing management plans, throughout the planning area with the result of continued cumulative impacts on water resources similar to those currently occurring.

Alternative B

Alternative B would include limitations on surface-disturbing activities, such as ROW development and mineral development which could reduce the potential for long-term cumulative impacts on water resources. Livestock grazing would be limited in PHMA unless it enhances GRSG habitat which would allow for treatments and management improvements that would decrease erosion potential and impacts on water quality in the long term. Fire management activities identified RDFs consistent with applicable law for suppression and fuel treatments. Overall reduction in wildfire potential could reduce impacts on water resources.

Alternative C

When considered in conjunction with other non-BLM/Forest Service actions and compared with the other alternatives, management under Alternative C would result in the least amount of cumulative impacts on water resources due to proposed management prescriptions that include the designation of PHMA as ROW exclusion, removal of livestock grazing in GRSG habitat, and closure or application of lease stipulations to mineral development in PHMA. Impacts from wildland fire would be the same as Alternative A, but the overall net effect from could be beneficial to water resources in the long term.

Alternative D

Alternative D would include limitations on surface-disturbing activities, such as ROW development and mineral development which could reduce the potential for long-term cumulative impacts on water resources. It also includes several actions for livestock grazing management which would improve water quality within the planning area. Fire management identified RDFs consistent with

applicable law for suppression and fuel treatments. Overall reduction in wildfire potential could reduce impacts on water resources.

Alternative E

Alternative E outlines a strategy for managing GRSG habitat. This strategy includes the requirement of a net conservation gain and the requirement to avoid, minimize and mitigate impacts by project activities. All actions throughout the planning area would provide an overall benefit to water resources within core, priority and general GRSG habitat. The Nevada Conservation Credit System should provide for more limited surface disturbance and the ability to restore impacted lands, which could result in reduced impacts on water quality and quantity in GRSG habitat.

Alternative F

Alternative F would include limitations on surface-disturbing activities, such as a 3 percent cap on ROW and renewable energy development, a 25 percent reduction in AMLs for wild horse and burro and livestock grazing management in PHMA, fewer travel and transportation activities and mineral development, reducing the potential for long-term cumulative impacts on water resources.

Proposed Plan

The Proposed Plan would include limitations on surface-disturbing activities, such as ROW development and mineral development which could reduce the potential for long-term cumulative impacts on water resources. It also includes several actions for livestock grazing management which would improve water quality within the planning area. The Proposed Plan would be similar to Alternative D.

5.17 TRIBAL INTERESTS (INCLUDING NATIVE AMERICAN RELIGIOUS CONCERNS)

The cumulative impact analysis area used to analyze cumulative impacts on tribal interests consists of PHMA and GHMA.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect tribal interests are similar to those described above in Chapter 4. These include proposed mine expansions for locatable minerals, transmission lines, fuels reduction projects, habitat restoration projects, renewable energy projects, and WHB Management. These projects could decrease the opportunities for tribes to continue valued traditional cultural practices depending upon whether they cause GRSG populations to stabilize, increase, or decrease in the future. Implementing the goals and strategies described in the proposed alternative to these future projects; however, would be expected to increase tribal opportunities to continue specific traditional practices such as observing lekking behavior. Nevertheless, fuels reduction projects that remove or thin pinyon and/or juniper trees could decrease tribal opportunities to use these resources in their traditional cultural practices.

5.17.1 Alternatives Analysis

All of the action alternatives propose some degree of management goals and objectives to help maintain the future survival of GRSG populations and habitats in the planning area. Implementing these protective measures could increase tribal opportunities to continue valued traditional cultural practices such as observing lekking behavior because GRSG would continue to be present into the future. Alternatives that limit earth disturbance within or near GRSG habitat, or that result in a net conservation gain of GRSG habitat, would be expected to benefit tribal traditional practices into the future. In addition, site-specific habitat restoration projects would be subjected to NEPA analysis and additional tribal consultation to take into account tribal concerns.

5.18 CLIMATE CHANGE

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have contributed greenhouse gases to the atmosphere include mineral development, wildfire, and fuel combustion. There can also be more short-term contributions to greenhouse gas emissions from lands and realty management and renewable energy development, due to initial construction activities.

Mineral development has occurred, is occurring, and will continue to occur on both federal and nonfederal mineral estate lands within the planning area. Mineral development results in short-term and long-term emissions of GHGs during fuel combustion in vehicles, drill rigs, and construction equipment. Closing and withdrawing more areas to mineral development would result in and overall decrease to GHG emissions associated with these actions on BLM-administered lands. While GHG emissions would likely be reduced, restricting mineral development on federally administered lands could shift development to non-federal lands. or would require longer travel times to and from mining areas either negating potential reductions in GHG emissions or increasing GHG emissions.

Fires, particularly uncontrolled fires, can emit large quantities of GHGs into the atmosphere, including carbon dioxide, methane, and nitrous oxide (EPA 2012h, pp. 7-21 - 7-22). Fires also remove vegetation that act as carbon sinks.

Climate change may also impact local vegetation communities and distributions. The redistribution and changes to vegetation communities could result in additional carbon released into the atmosphere or result in more carbon taken up in a sink. As climates alter, some vegetation communities may not be able to adapt as quickly resulting in redistributions of communities. Additionally, surface-disturbing activities could exacerbate this effect, opening up areas to more adaptable invasive species and making reestablishment by native communities more difficult.

5.18.1 Alternatives Analysis

Alternative A

Cumulative impacts under Alternative A would be the same as those resulting from current management activities and there would be no change to GHG emissions.

Alternative B

Under Alternative B, cumulative impacts on climate change would result in overall reductions in GHG emissions. Conservation of PHMA and GHMA and closing areas of high potential to fluid mineral leasing and development would reduce anthropogenic disturbances and potential for GHG emissions.

Alternative C

Alternative C is the most restrictive of all of the alternatives and generally constrains all resource use. Restoration activities, such as vegetation management treatments, would be more passive in nature, which may or may not be successful with altering climates. This could result in an overall reduction in GHG emissions within the planning area.

Alternative D

Alternative D generally constrains resource use and requires NSO stipulations in PHMA for currently unleased areas and conservation measures for reducing land disturbance on leased areas. This could result in a decrease of GHG emissions overall within the planning area. This alternative also restricts the amount of vegetation that can be burned in a prescribed burn, or that can be allowed to burn in an unplanned natural ignition and implement fuels treatments which maintain sagebrush canopy cover and existing sagebrush ecosystems. Additionally, post-fire treatments would be designed and implemented with an emphasis on restoring existing sagebrush ecosystems damaged by fire and control invasive species.

Alternative E

Alternative E outlines a strategy for managing GRS habitat. This strategy includes the requirement of a net conservation gain and the requirement to avoid, minimize and mitigate impacts by project activities. Although this strategy may help reduce impacts on GRS habitat, it will not necessarily result in fewer GHG emissions due to activities such as mineral development and realty actions. The planned Conservation Credit System should provide for more limited surface disturbance and ability to restore impacted lands, which could result in reduced impacts on climate change in GRS habitat.

Alternative F

Alternative F would include limitations on surface-disturbing activities, such as a 3 percent cap on ROW and renewable energy development, a 25 percent reduction in AMLs for wild horse and burro and livestock grazing management

in GRSG habitat, fewer mineral development. This could result in an overall decrease of GHG emissions within the planning area.

Proposed Plan

The Proposed Plan would include limitations on surface-disturbing activities, such as ROW development and mineral development which could reduce the potential for long-term cumulative impacts on climate change. It also includes several actions for vegetation management which could reduce invasive weed populations and improve vegetation resiliency to climate change within the planning area. The Proposed Plan would be similar to Alternative D.

5.19 SOCIAL AND ECONOMIC IMPACTS (INCLUDING ENVIRONMENTAL JUSTICE)

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect social and economic conditions are chiefly mining and mineral exploration and development, lands and realty, travel and transportation management, renewable energy development, recreation, and livestock grazing, including most of those reasonably foreseeable projects listed in **Table 5-39**.

The cumulative impact analysis area used to analyze potential impacts on social and economic conditions consists of the counties identified as the socioeconomic study area.

Changes to social and economic conditions result when individuals, businesses, governments, and other organizations initiate actions. Millions of decisions will be made by thousands of residents of the counties in the socioeconomic study area, and others, over the next several decades, which will affect trends in employment, income, housing, and property. Projections published by the Research and Analysis Bureau of the Nevada Department of Employment, Training, and Rehabilitation, and the Employment Development Department of California, account for these individual decisions in the aggregate, and provide a baseline for comparing effects of alternatives in the future. The projections represent a regional forecast taking a wide range of actions into account – management actions by the BLM and Forest Service as well as many other government entities, private citizens, and businesses. As a result, they incorporate the past, present, and reasonably foreseeable future projects that will form the basis of future economic and social trends in the cumulative impact analysis area. Current and future trends in the cumulative impact analysis area include population growth, changes in mining activity, including gold, silver, copper and other locatable and salable minerals as well as exploration for hydrocarbons; renewable energy development, especially geothermal and wind energy; changing recreational demands; livestock grazing; ROWs and other activities, as noted in **Section 4.21**, Socioeconomics and Environmental Justice.

Some of the predicted employment and income effects of the actions considered in this Final EIS were able to be quantified, and where possible, BLM and Forest Service used IMPLAN, a regional economic model, to calculate

indirect and induced impacts of these actions. **Table 5-49** shows projected employment for approximately 2020, as forecast by Nevada and California state agencies. Because Alternative A represents current management plans, employment would correspond most closely to the existing forecasts. By contrast, employment under Alternatives B through F and the Proposed Plan would be expected to change from the projections, with the best estimate for those changes being the quantities shown in **Chapter 4**, Environmental Consequences. Thus, **Table 5-49** shows the estimated change in employment for these alternatives, based on modifying the projected future employment by the estimated changes for the socioeconomic study area (from IMPLAN). The Nevada and California state agencies do not provide projections for labor income or output.

Table 5-49
Projected Employment by Alternative for Socioeconomic Study Area

Item	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Proposed Plan
Employment (2010) ¹	287,953	287,953	287,953	287,953	287,953	287,953	287,953
Average annual change in future employment related to grazing ²	N/A	0	-2,388	0	0	-1,272	0
Average annual change in future employment related to geothermal development ³	N/A	-66	-111	-90	55	-111	-98
Average annual change in future employment related to oil development ³	N/A	-72	-138	-122	-39	-138	-128
Average annual change in future employment related to wind energy development ³	N/A	-267	-267	-267	-267	-267	-267
Overall change in 2018-2020 employment	N/A	-405	-2,904	-479	-94	-1,788	-493
Projected 2018-2020 employment ⁴	316,672	316,267	313,768	316,193	316,578	314,884	316,179
% change, 2010 to 2018-2020	9.97%	9.83%	8.97%	9.81%	9.94%	9.35%	9.80%
Percentage point difference relative to Alt. A	0	-0.14	-1.01	-0.17	-0.03	-0.62	-0.17

Source: Nevada Department of Employment, Training, and Rehabilitation (2013a, 2013b, 2013c), and Employment Development Department of California (2013) (projected employment data), modified by estimates from IMPLAN reported in **Section 4.20**, Socioeconomics and Environmental Justice. Changes related to specific sectors include direct, indirect, and induced effects from IMPLAN; see **Appendix T**, Detailed Employment and Earnings Data, for a detailed description of this model.

¹ The source of 2010 employment data used in this table differs from that used in **Section 3.22**, Socioeconomics and Environmental Justice, so there may be differences between the estimates shown.

² The values for livestock grazing represent the midpoint of the low and high scenarios described in **Section 4.20**, Socioeconomics and Environmental Justice.

³ The values for geothermal, wind energy, and oil and gas reflect employment during both construction and operations.

⁴ Due to inconsistent projection years in the underlying data, projected 2018-2020 employment is calculated from 2020 projections for Churchill and Washoe Counties, and 2018 projections for the remaining counties. Where the underlying data sources do not provide county-level employment projections, they were imputed based on the county shares of current employment.

Changes in employment, especially in Alternatives C and F, would have a measurable although relatively small effect on future employment, according to this analysis. Employment changes related to livestock grazing – including sectors that support and are supported by grazing – account for the majority of this effect in both Alternative C and Alternative F. Employment changes from geothermal, wind energy development, and oil and gas related industries would also play a role. Based on 2010 employment data by industry presented in **Section 3.22**, the differences in livestock grazing related employment among alternatives would represent an important share of farming sector employment. The differences in mining employment by alternative (only geothermal and oil and gas) would represent a very small share of mining related employment¹. In Alternatives A, B, D, E, and the Proposed Plan employment would increase by 9.8 percent to 10 percent. These reductions would not likely be noticeable given the size of the study area and the uncertainty associated with a long-term forecast. In Alternatives C and F, employment would be projected to increase by somewhat less: 8.9 percent in Alternative C, and 9.3 percent in Alternative F. Although these reductions would be noticeable, they would also be relatively modest given the size of the study area and the uncertainty inherent in long-term forecasting.

Of the effects documented in **Section 4.20**, Socioeconomics and Environmental Justice, the impact that most exacerbates current economic challenges is the potential for several of the management alternatives to result in increased costs for livestock grazing operators. Long-term trends including changing market conditions, consolidation supported by economies of scale, demographic change, and environmental concerns have resulted in increasingly challenging economic conditions for ranch operators, especially smaller operators.

Alternatives C and F would have adverse cumulative social and economic impacts related to grazing, due to the AUM reductions proposed in these alternatives and the already challenging conditions for operators of ranches and grazing operations. Alternatives B, D, E, and the Proposed Plan would also entail some changes to management of grazing lands, but in the long run it is expected that changes to vegetation treatments would sustain rangeland health and would ultimately not adversely impact counties and communities.

In terms of geographic regions, the cumulative effects on livestock grazing operators would occur in several counties, but would be most substantial in Lassen, Humboldt, Lander, Elko and White Pine Counties and possibly northern portions of Nye County.

¹ The exact shares are not shown because of differences in the 2010 source of employment data in **Table 5-49** and **Section 3.22**.

The other effect identified in **Section 4.20**, Socioeconomics and Environmental Justice that could lead to a cumulatively considerable contribution to impacts would be potential fiscal effects, especially in the smaller counties that are also more dependent on economic activities on public lands. Because specific impacts on local government tax revenues could not be quantified, the nature of the potential cumulative effect is not possible to characterize beyond the analysis in **Section 4.20**, Socioeconomics and Environmental Justice. That analysis notes specific counties in which local tax revenues could be most affected by the management alternatives.

Other effects, including potential changes in recreation patterns and changes in economic activity related to wind energy and transmission lines, would not be expected to contribute to cumulative effects. From a cumulative effects standpoint the economic and social impacts of these changes would be relatively minor, as documented in **Section 4.20**, Socioeconomics and Environmental Justice, and would not particularly alter existing trends in the study area.

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