Chapter 4
Environmental Consequences

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CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

4.1 CHANGES BETWEEN THE DRAFT EIS AND FINAL EIS

Changes to the environmental consequences between the Draft EIS and Final EIS are as follows:

- Analyses were updated as a result of reviewing additional literature, acreages were revised from updated data, and appendices are new or revised
- Updates were made, as appropriate, based on public comments received on the DEIS

4.2 INTRODUCTION

This chapter presents the direct and indirect impacts on the human and natural environment anticipated to occur from implementing the alternatives presented in **Chapter 2**, Proposed Action and Alternatives. **Chapter 5**, Cumulative Impacts, presents the impacts from past, present, and reasonably foreseeable future actions. The purpose of Chapter 4 is to describe to the decision maker and the public how the environment could change if any of the alternatives in **Chapter 2** were to be implemented. It is meant to aid in the decision of which RMPA, if any, to adopt.

Most sections in this document are titled "Impacts from XYZ." Impacts from should be interpreted as those from resource management described in Chapter 2 for the resource being discussed.

This chapter is organized by topic, similar to **Chapter 3**, Affected Environment. Each topic area includes the following:

- A method of analysis section that identifies indicators and assumptions

- An analysis of impacts for each of the six alternatives that has been broken down by alternative

Each resource section in this chapter discusses impacts on the resource in question from proposed management actions within each alternative. The proposed management actions within each alternative are presented in Chapter 2. Existing resource conditions within the planning area are described in **Chapter 3**.

Many management actions proposed in Chapter 2 are planning-level decisions that do not result in direct on-the-ground changes. However, by planning for land use on surface estate and federal mineral estate administered by the BLM over the life of the plan, the analysis focuses on impacts that could eventually result in on-the-ground changes. No implementation-level decisions are part of this RMPA.

Some BLM management actions may affect only certain resources and alternatives. This impact analysis identifies impacts that may benefit, enhance, or improve a resource as a result of management actions, as well as those impacts that have the potential to impair a resource. If an activity or action is not addressed in a given section, either no impacts are expected, or the impact is expected to be negligible, based on professional judgment.

Resource and resource uses that were not carried forward for detailed review and the reasons they were not carried through are included in **Table 4-1**, Resources and Resource Uses Not Carried Forward for Detailed Analysis.

The BLM manages public lands for multiple uses, in accordance with the FLPMA. Land use decisions are made to protect the resources, while allowing for different uses of those resources, such as livestock grazing and mineral development. These decisions can result in trade-offs, which are disclosed in this chapter's analysis. The projected impacts on land use activities and the associated environmental impacts of land uses are characterized and evaluated for each of the alternatives.

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

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

Table 4-1
Resources and Resource Uses Not Carried Forward for Detailed Analysis

Resource and Resource Use	Rationale for Not Analyzing Resource or Resource Use in Detail
Air Quality and Climate Change	Implementing management to protect Greater Sage-Grouse (GRSG) generally involves an increase in management intensity and the potential to increase criteria pollutants and greenhouse gas (GHG) emissions. Smoke from prescribed burning is the primary source of criteria pollutants from BLM management actions in the planning area. All areas within an Oregon Forest Protection District are required to comply with the directions in the Oregon Smoke Management Plan. This should limit the potential for additional adverse impacts on human health and visibility from prescribed burning, the primary source of criteria pollutants. Voluntarily adhering to the requirement of the smoke management plan outside of Forest Protection Districts would have the same impact; the BLM's voluntary compliance is very high. Thus, no additional adverse impacts on air quality are anticipated. Prescribed burning is also the primary source of GHG emissions from BLM management or authorized activities, although wildfires are often a more significant source than prescribed fires. It is not know if any of the alternatives would result in a significant change in prescribed burning, compared with Alternative A; this is due to the complexities of trade-offs between prescribed burning treatments inside versus outside GRSG habitat. Increased management intensity for restoring habitat would likely increase GHG emissions from internal combustion engines used to conduct treatment activities. However, the BLM lacks sufficient information to determine whether and to what degree GHG emissions would change under the different alternatives. Methods for estimating internal combustion engine emissions require knowledge of fuel type and engine type. The BLM does not have reliable estimates of fuel use, particularly for aircraft, heavy equipment, and small engines, such as chainsaws and pumps. GHG emissions from livestock grazing are very minor relative to other BLM activities. Absent an approved plan or nearly complete environment analysis concerning mineral extraction or construction in ROW grants, estimating GHG emissions from those activities would be speculative. The BLM lacks the information needed to estimate emissions from recreation on BLM-administered lands in the planning area.
Fish and Wildlife (Fisheries and Aquatic Wildlife)	Implementation of GRSG conservation measures would generally have a beneficial effect on wildlife species. Specific effects would depend on location, scale, and timing of projects. These elements of a project are identified during the design and planning of specific projects. Thus, any effect on wildlife would be identified at the project design and implementation phase.
Cultural and Tribal Resources	The RMPA decision does not authorize ground-disturbing activities, so there are no anticipated effects on cultural resources from identifying conservation actions for GRSG protection.

The baseline used for the impact analysis is the current condition or situation, as described in Chapter 3. Impacts on resources and resource uses are analyzed and discussed in detail, commensurate with resource issues and concerns

identified through the RMPA/EIS process. At times, impacts are described using ranges of potential impacts or in qualitative terms.

Throughout Chapter 4, the reader will find numerous locations and disciplines where travel management minimization criteria have been analyzed, including, but not limited to, travel management, recreation, vegetation, wildlife (including GRSG), and invasive plants. In addition, many of the BMPs and RDFs in **Appendix C** have been formulated to minimize impacts where they may occur.

4.2.1 Analytical Assumptions

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

The following general assumptions apply to all resource categories. Any resource-specific or resource use-specific assumptions are provided in the methods of analysis section for that resource or resource use.

- Sufficient funding and personnel would be available for implementing the final decision.
- Implementing actions from any of the RMPA alternatives would be in compliance with all valid existing rights, federal regulations, agency policies, and other requirements.
- Implementation-level actions necessary to execute the RMP-level decisions in this RMPA would be subject to further environmental review, including that under NEPA, as appropriate.
- Direct and indirect impacts of implementing the RMPA would primarily occur on the public lands administered by the BLM in the planning area.
- The BLM would carry out appropriate maintenance for the functional capability of all developments.
- The discussion of impacts is based on best available data. Knowledge of the planning area and decision area and professional judgment, based on observation and analysis of conditions and responses in similar areas, are used for environmental impacts where data are limited.
- Restrictions (such as siting, design, and mitigation measures) would apply, where appropriate, to surface-disturbing activities associated with land use authorizations and permits issued on BLM-administered lands and federal mineral estate. There are

approximately 15 million acres of BLM-administered lands in the decision area.

- GIS data have been used to develop acreage calculations and to generate the figures. Calculations depend on the quality and availability of data. Acreages and other numbers are approximate projections, for comparison and analysis only. Readers should not infer that they reflect exact measurements or precise calculations. In the absence of quantitative data, best professional judgment was used. Impacts were sometimes described using ranges of potential impacts, or they were described qualitatively, when appropriate.
- New information may lead to changes in delineated GRSG habitat. Habitat areas found to have been incorrectly mapped (e.g., nonhabitat inside PHMA or GHMA), or newly discovered leks and habitat areas that were missed in the most recent mapping efforts, may be identified. This adjustment would typically result in small changes to areas requiring the stipulations or management actions stated in this RMPA. Modifications to GRSG habitat would be updated in the existing data inventory through RMP maintenance.
- A reasonably foreseeable development (RFD) scenario serves as a basis for analyzing environmental impacts from future leasing and development of mineral resources within a decision area. A variety of factors (e.g., economic, social, and political) are beyond the control of the BLM and will influence the demand for mineral resources. Therefore, an RFD scenario is a best professional estimate of what may occur if public lands are leased. It is not intended to be a "maximum-development" scenario; however, it is biased toward the higher end of expected development and shows where the potential development might occur. Leasing and development of geothermal resources in the Oregon Sub-region are based on the RFD scenario in **Section 2.5**, Reasonably Foreseeable Development Scenario, of the Final Programmatic Environmental Impact Statement for Geothermal Leasing in the Western United States (BLM and Forest Service 2008). The RFD scenario was created for a different analysis and not this RMPA/EIS. Additional information on the Final Programmatic Environmental Impact Statement for Geothermal Leasing in the Western United States is provided on the BLM website at http://www.blm.gov/wo/st/en/prog/energy/geothermal/geothermal_nationwide/Documents/Final_PEIS.html. RFD scenarios or supporting mineral potential reports were not completed for locatable minerals, salable minerals, leasable minerals, or nonenergy leasable minerals.

4.2.2 General Method for Analyzing Impacts

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

Type of impact—Impacts are characterized as beneficial or adverse using the indicators described at the beginning of each resource impact section. The presentation of impacts for key planning issues is intended to provide the BLM decision maker and reader with an understanding of the multiple use trade-offs associated with each alternative.

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

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

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

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

For ease of reading, analysis shown under Alternative A may be referenced in other alternatives with such statements as "impacts are the same as, or similar to, Alternative A" or "impacts are the same as Alternative A, except for…," as applicable.

4.2.3 Incomplete or Unavailable Information

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

The best available information pertinent to the decisions to be made was used in developing the RMPA. The BLM has made a considerable effort to acquire and convert resource data, from the BLM and from outside sources, into digital format for use in the RMPA.

Under FLPMA, the inventory of public land resources is ongoing and continuously updated. However, certain information was unavailable for use in developing the RMPA because inventories either have not been conducted or are incomplete. Examples of the major types of data that are incomplete or unavailable are GIS data used for disturbance calculations on private lands, site-specific surveys of cultural and paleontological resources, updating all of the lands with wilderness characteristics inventories, and mineral RFD scenarios and mineral potential reports.

For these resources, estimates were made concerning the number, type, and significance of these resources based on previous surveys and existing knowledge. In addition, some impacts cannot be quantified, given the proposed management actions. Where this gap occurs, impacts are projected in qualitative terms or, in some instances, are described as unknown. Subsequent site-specific project-level analysis would provide the opportunity to collect and examine site-specific inventory data to determine appropriate application of RMP-level guidance. In addition, the BLM and other agencies in the planning area continue to update and refine information used to implement this plan.

4.2.4 Mitigation

This Chapter describes the environmental consequences associated with the impacts on GRSG and its habitat from activities carried out in conformance with this plan, in addition to BLM management actions. In undertaking BLM management actions, and consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM will require mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. In addition, to help implement this Proposed Plan, a WAFWA Management Zone Regional Mitigation Strategy (see **Appendix E**) will be developed within one year of the issuance of the Record of Decision. The Strategy will elaborate on the components identified in Chapter 2 (avoidance, minimization, compensation, additionality, timeliness, and durability), and will be considered by the BLM for BLM management actions and third party actions that result in habitat loss and degradation. The implementation of a Regional Mitigation Strategy will benefit GRSG, the public, and land-users by providing a reduction in threats, increased public transparency and confidence, and a predictable permit process for land-use authorization applicants.

4.3 GRSG AND GRSG HABITAT

This section discusses impacts on GRSG from proposed management actions within each alternative. Existing conditions concerning GRSG are described in **Section 3.3**.

4.3.1 Methods and Assumptions

Indicators

This analysis is organized by threats to GRSG as categorized in the USFWS's *12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered* (USFWS 2010a).

GRSG

Indicators of impacts on GRSG are as follows:

- Acres of sagebrush habitat
- Habitat degradation or restoration
- Habitat fragmentation or connectivity
- Population loss
- Direct disturbance to GRSG
- Understory of sagebrush

Assumptions

Three general categories of disturbance to habitats or disruption are the most influential on GRSG and their habitat: 1) disturbance and disruption from casual use; 2) disturbance and disruption from permitted activity; and 3) changes in habitat condition, such as from fire or invasive plants. The assumptions listed below are intended for large-scale planning-level analysis; project-level assumptions for NEPA may differ:

The analysis includes the following assumptions:

- GRSG habitat designations (e.g., PPH and PGH; **Table 4-2**, Acres of Designated GRSG Habitat Types by Alternative) are assumed to represent habitat adequate to maintain GRSG populations in the subregion. For Oregon, GRSG habitat designations were derived from modeling efforts based on 75 percent Breeding Bird Density and 75 percent lek connectivity models as well as known winter habitat, connectivity considerations, and other factors.
- This analysis uses PPH and PGH categories for Alternative A only to facilitate comparison across the other alternatives. There are currently no BLM-administered lands formally designated as PPH or PGH within the sub-regional planning area.

Table 4-2
Acres of Designated GRSG Habitat Types by Alternative

GRSG Habitat Type	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
PPH	4,547,043	0	0	0	0	0	4,547,005
PGH	5,662,632	0	0	0	0	0	5,660,150
Core Areas	0	0	0	0	4,547,043	0	0
Low Density	0	0	0	0	3,923,539	0	0
PHMA	0	4,547,043	4,547,043	4,547,043	0	4,547,043	1,929,580*
GHMA	0	5,662,632	5,662,632	5,662,632	0	5,662,632	5,628,628

*Includes SFA (Sagebrush Focal Areas)
Source: Oregon/Washington BLM 2013

- The Oregon sub-region RMPs being amended by this RMPA/EIS were not developed to directly manage PPH or PGH. This is because these habitat areas were not identified until after the RMPs were adopted. However, management actions and resource allocations in the RMPs can still affect PPH and PGH that happen to share the same area as a management action and resource allocation. In these instances, existing RMP management actions and resource allocations (which were adopted before the identification of PPH and PGH) influence these recently identified GRSG habitats and the species. Consequently, Alternative A identifies where resource allocations happen to coincide with PPH and PGH. Alternative A would neither result in the designation of PPH or PGH nor assign additional management actions to PPH or PGH.

- Habitat conditions and trends for each GRSG population area were determined by modeling vegetation dynamics such as wildfire, succession, insects and disease, habitat restoration projects (e.g., sagebrush seeding, grass seeding, and herbicide treatment of annual grass), prescribed fire, unmanaged grazing, conifer encroachment and treatment, mechanical sagebrush treatment, and fuels reduction projects using the Vegetation Dynamics Development Tool (VDDT) for Alternatives other than the Proposed Plan.

- Because GRSG are highly sensitive to habitat fragmentation, development, or changes in habitat conditions and require large, intact habitat to complete their annual life history, alternatives proposing to protect the most unfragmented GRSG habitat from disturbance are considered of greatest positive impact. These impacts can be described both qualitatively and quantitatively.

- Seasonal ranges of migratory and non-migratory GRSG are largely encompassed within GRSG habitat designations but are not sufficiently mapped to provide an assessment of precise direct impacts.

- Impacts on GRSG would accrue over a distance depending on the type of development:
  - Impacts from transmission lines constructed before 2002 are likely fully manifested (Hagen 2011). Co-locating new lines would have no additional impacts if the direct and indirect habitat disturbance were not to exceed the width of the existing, directly disturbed ROW and additional structures are not required.
  - Ground-disturbing activities could improve or degrade habitat or cause loss or gain of individuals, depending on the size of the area disturbed, the nature of the disturbance, the plant species affected, and the location of the disturbance; for example, juniper reduction treatments disturb the ground but typically improve habitat in either the short-term or long-term, depending on the phase of juniper treated.
  - A 4.25-mile (6.9-kilometer) avian predator foraging distance is assumed to adequately encompass possible direct and indirect effects (Boarman and Heinrich 1999; Leu et al. 2008; Coates et al. 2014; Howe et al. 2014) in instances where increased predation from infrastructure (e.g., power lines, wind turbines, communication towers, agricultural and urban development) is a threat. This effect varies based on presence of other landscape alterations (e.g., cover type fragmentation and conversion from sagebrush to nonnative grasses).
  - Energy extraction such as oil and gas, geothermal, and plan of operation mining influence GRSG to 11.8 miles (19 kilometers) based on direct impacts of field development, including associated infrastructure, noise, lighting, and traffic (Johnson et al. 2011; Naugle et al. 2011; Taylor et al. 2012).
  - Interstate highways influence GRSG to 4.7 miles (7.5 kilometers) and paved roads, primary and secondary routes up to 1.9 miles (3 kilometers) based on indirect effects measured through road density studies (Connelly et al. 2004; Holloran 2005; Lyon and Anderson 2003; Johnson et al. 2011). Typically a primary road is a state or county highway, a secondary road, or a smaller local road, including gravel roads, that has traffic. 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).

  - Site-specific disturbances such as small-scale mining and mineral material sites at 1.6 miles (2.5 kilometers) based on indirect influence distance from estimated spread of exotic plants (Bradley and Mustard 2006)

- BMPs, RDFs, COAs, and standard operating procedures would be implemented for infrastructure to reduce impacts on GRSG. These are subject to modification based on subsequent guidance and new science.

- Short-term impacts would accrue over a timeframe of up to 10 years. Long-term impacts would accrue over timeframes exceeding 10 years.

4.3.2 Nature and Type of Effects

Ten of the 20 Oregon PACs indicate a substantial population decline in the last 10 years (see **Appendix D**, Adaptive Management Strategy). Factors related to the decline in GRSG distribution and abundance include habitat loss and degradation, disease (e.g., West Nile virus) and predation, chemicals, inadequate regulatory mechanisms and changes in land use (USFWS 2010a). Habitat loss and fragmentation reduces the land area available to support GRSG. It also increases opportunities for other types of disturbance, such as human activity, predation, wildfire, and spread of invasive plant species.

Loss and fragmentation of sagebrush habitats and inadequate regulatory mechanisms are the primary causes of the decline of GRSG, as cited as Factor A in the USFWS *12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered* (USFWS 2010a). Factors in declining populations from habitat fragmentation are reductions in lek persistence and attendance, population recruitment, yearling and adult annual survival, female nest site selection, nest initiation, and complete loss of leks and winter habitat (USFWS 2010a). Threats posed by conversion to agriculture, infrastructure, wildfire, invasive plants, conifer encroachment, energy development, predation, and unmanaged grazing by livestock, free-roaming wild horses, and burros are all associated with loss, fragmentation and degradation of habitat.

Following publication of the USFWS's 2010 determination of GRSG as an ESA candidate species, the USFWS was tasked with developing conservation objectives for GRSG. Consequently, it formed the Conservation Objectives Team (COT) of state and USFWS representatives to develop conservation objectives for each MZ (USFWS 2013a).

This impacts section focuses on the threats identified in the COT report for Oregon: fire, invasive plants, conifer encroachment, energy development and mining, livestock grazing, free-roaming horses and burros, recreation, infrastructure, conversion to agriculture, urbanization, sagebrush elimination,

and isolation. The COT report threats for Oregon differ from the USFWS listing because the COT analyzed conservation threats by MZ and population area analysis to highlight the substantial threats to GRSG populations in each region (USFWS 2013a). This analysis covers only those COT report threats relevant to the Oregon sub-region.

COT Report Threat—Fire

Wildfire has burned over 1.5 million acres of GRSG habitat in the past decade and is one of the largest threats to GRSG habitat in Oregon. As discussed in **Section 3.3**, the 2012 fire season was record-setting, with 1,014,661 acres burned in Oregon. Two major fires burned over 500,000 acres in Vale District, and an estimated 225,000 acres in the Burns and Vale Districts.

While wildfires likely played an important role historically in creating a mosaic of herbaceous plant-dominated areas (disturbed recently) and mature sagebrush (disturbed less recently), current land use patterns have restricted the ability to support natural wildfire regimes. In Oregon, nineteenth and early twentieth century grazing practices, the introduction and spread of invasive plant species, and the attempted exclusion of fire in much of the twentieth century have all contributed to increasingly large and severe wildfires.

Sagebrush ecosystems are adapted to a particular fire regime. Big sagebrush (*Artemisia tridentata*) does not resprout after a fire but is replenished by wind-dispersed seed from adjacent unburned stands or by seeds in the soil. Depending on the species and the size of a burn, sagebrush can reestablish itself within 5 years; however, a return to a full pre-burn community cover can take 15 to 100 years (Manier et al. 2013; Evers 2013). Wildland fire also increases opportunities for invasive annual grasses, such as cheatgrass and wind-dispersed invasive forbs, to expand (Brooks et al. 2004; Balch et al. 2012).

Slow rates of regrowth and recovery of sagebrush after disturbance, coupled with high rates of disturbance and conversion to introduced plant cover, are largely responsible for the accumulating displacement and degradation of the sagebrush ecosystem (Manier et al. 2013). Thus, preserving sagebrush against wildfire and limiting the use of prescribed burning is important to preserving GRSG habitat over both the short term and long term.

Controlled burning can treat fuel buildup and can assist in the recovery of sagebrush habitat in some vegetation types. Reseeding with native plants and long-term monitoring to ensure the production of GRSG cover and forage plants will assist vegetation recovery (NTT 2011).

Recreation can increase the potential for human-caused wildfire (Knick et al. 2011), although the number of human-caused fires in eastern Oregon is very low.

Impacts from Wildland Fire Management

Fire suppression may be used to maintain habitat for GRSG (NTT 2011). Fire suppression may preserve the condition of some vegetation communities, as well as habitat connectivity over the short term. This is particularly important in areas where fire frequency has increased as a result of annual grass invasion, or where landscapes are highly fragmented. Fire suppression may limit annual grass expansion, although evidence is lacking that it has thus far. In Oregon, spreading cheatgrass and other invasive plant species pose a considerable threat. Wildfire is one of the largest factors contributing to GRSG habitat loss in Oregon (Manier et al. 2013), and growing evidence suggests that fire suppression may be promoting larger and more severe fires by increasing fuel continuity, allowing for easier spread and more homogeneous burn patterns.

Prescribed burning may be prescribed to treat fuel buildup and can assist in the recovery of sagebrush habitat in some vegetation types, especially when conifer encroachment is also a threat. Prescribed burning can increase landscape heterogeneity, thereby reducing the risks of severe wildfire in large, homogeneous vegetation communities. However, it can also facilitate the spread or dominance of invasive plant species, including invasive annual grasses. GRSG biologists recommend avoiding the use of prescribed fire in areas with less than 12 inches average annual precipitation (e.g., Wyoming big sagebrush or other xeric sagebrush species; Connelly et al. 2000a; Hagen et al. 2007; Beck et al. 2009) and where the risk of increasing the abundance of invasive plants is significant.

Reseeding with native plants would encourage the production of GRSG cover and forage plants and would assist vegetation recovery (NTT 2011). Post-fire seeding success rates are low in the Warm-Dry Sagebrush Group. Here, the average annual precipitation is highly variable, generally less than 12 inches, particularly when only native plant species are used for reseeding. To some degree, the low success rate is due to the use of seed from climatically inappropriate sources. Provisional and empirical seed zones for most native rangeland plant species were established just in the past two to 3 years. Success rates are moderate to high in the Cool, Moist Sagebrush Group, where average annual precipitation exceeds 12 inches. While reseeding is not necessary after all prescribed burns, it is important to avoid prescribed burns in areas at high risk of invasive annual grass dominance. Furthermore, the COT report recommends avoiding prescribed burning in low elevation sagebrush communities and using it sparingly and with great caution in high elevation sagebrush communities. The specifics of where, when, and how to use prescribed fire in GRSG habitat should be addressed in site-specific project planning in order to best fit management actions with desired outcomes.

Indicators of potential impacts on GRSG from wildfire under the proposed alternatives are acres of sagebrush habitat, habitat fragmentation and population loss.

COT Report Threat—Invasive Plant Species

Nonnative invasive plants are one of the most important factors causing loss of sagebrush habitat in Oregon (Hagen 2011). An assortment of nonnative annuals and perennials are currently invading sagebrush ecosystems.

Invasive plants can alter plant community structure and composition, productivity, nutrient cycling, and hydrology and can competitively exclude native plant populations. In particular, invasive plants can reduce and eliminate vegetation that GRSG use for food and cover, resulting in habitat loss and fragmentation, and can also increase the risk of wildfire. The spread of invasive annual grasses such as cheatgrass (*Bromus tectorum*) has increased the frequency and intensity of fires (Balch et al. 2012). An assortment of invasive annuals and perennials and native conifers is currently invading sagebrush ecosystems.

Impacts from Vegetation Management

Landscapes with large, intact patches of sagebrush are preferred to avoid edge effects (degradation of habitat quality and disturbance to birds near habitat edges). Coates et al. (2014) found that common ravens selected edge-dominated areas, specifically edges between sagebrush and grasslands and nonnative cover types. In addition, GRSG require a diversity of herbaceous species and healthy native grasses, making management for high quality habitat important (Knick et al. 2011). The distribution of sagebrush is limited and the cost of habitat restoration is high; because of this, management plans that protect intact sagebrush and restore impacted areas strategically to enhance existing habitats—that is, increase connectivity of intact sagebrush—have the best chance of increasing high quality sagebrush cover (Connelly et al. 2004; Beck and Mitchell 2000, cited in Manier et al. 2013). Sagebrush-promoting vegetation treatments would increase the amount and quality of GRSG habitat.

Management and control of invasive plant species in GRSG habitat would decrease the spread of these species. Invasive plant species directly compete for water with native plants, and invasive annual grasses (e.g., cheatgrass and medusahead) increase the risk of adverse wildfire on sagebrush. To reduce the likelihood of invasive plant spread and the extent of current infestations, the BLM uses integrated invasive plant management techniques (BLM 1992b). To reduce invasive plant infestations, the BLM implements mechanical, chemical, and manual vegetation treatments and prescribed burning. Implementing BMPs may also help reduce the likelihood that invasive plants become established in GRSG habitat. These conservation efforts would reduce the impacts of invasive plants on sagebrush and would increase the availability of GRSG habitat. Use restrictions could also minimize the spread of invasive plants by limiting human activities that disturb soil and introduce seed.

Impacts from Wildland Fire Management

Fuels management actions, as described above, can also reduce invasive plants and create fire breaks. Current treatments and active vegetation management

typically focus on vegetation composition and structure for fuels management, habitat management, and productivity manipulation. All these techniques are used for improving the habitat and forage conditions for ungulates and other grazers, and for stabilizing surface soil in order to manipulate vegetation composition, increase productivity, or remove invasive plants (Knick et al. 2011). Distribution of these treatments can affect the distribution of GRSG and sagebrush habitats locally and across a region. Grazing reduces herbaceous cover and thus can reduce the spread of invasive grasses and limit fuel loads if applied annually before the grasses have cured (Connelly et al. 2004). More recent research has found that fall and winter grazing can also reduce the spread of invasive grasses, support bunchgrass growth, and lower fire risk on rangelands (Schmelzer 2009; Petersen 2012: GBEP 2014).

Indicators of potential impacts on GRSG from invasive plants under the proposed alternatives are acres of sagebrush habitat, understory of sagebrush, habitat degradation, and habitat fragmentation.

COT Report Threat—Conifer Expansion

The third most significant cause of loss of sagebrush habitat in Oregon is conifer expansion (Hagen 2011). Expansion of conifer woodlands, especially western juniper (*Juniperus occidentalis* var. *occidentalis*), while native to Oregon, threatens GRSG. This is because they do not provide suitable habitat, and mature trees displace shrubs, grasses, and forbs required for GRSG. Juniper expansion is also associated with increased bare ground and potential for erosion.

Trees also offer perch sites for raptors and ravens (Choates et al. 2014b), so woodland expansion would also represent expansion of predation threat, similar to perches on power lines and other structures (Manier et al. 2013). Miller et al. (2000) documented declines in sagebrush to approximately 20 percent of its maximum cover when conifers reached 50 percent canopy cover. In eastern Oregon, Baruch-Mordo et al. (2013) modeled GRSG demographics as a function of conifer stand characteristics and found that no leks remained active at conifer cover of greater than 4 percent within 0.6 mile of leks. This pattern corresponds with other studies that have demonstrated avoidance of conifer within 4 miles of active leks at very low level of encroachment (Doherty et al. 2008; Freese 2009; Atamian et al. 2010; Casazza et al. 2011).

Moreover, Baruch-Mordo et al. (2013) found that leks were more likely to be active where smaller trees were dispersed or where larger trees were clustered, although the authors noted that not all areas near leks had similar stand characteristics.

GRSG avoiding dispersed large trees near leks could be a response to avian predators, such as common ravens. Howe et al. (2014) found that ravens avoided larger woodland stands and selected lone trees or areas of one or two trees (although ravens were more likely to nest on or near transmission poles or other human-made towers). Ravens may avoid woodlands for nest sites

because of reduced prey visibility, as well as reduced ability to detect and defend against potential nest predators.

Impacts from Vegetation Management

To reduce the extent of conifer expansion, the BLM implements mechanical, chemical, manual vegetation treatments and prescribed burning. These conservation efforts are aimed at reducing the impacts of conifers on sagebrush and may increase the availability of GRSG habitat in the long term if treatment results are maintained.

Impacts from Wildland Fire Management

In addition, fuels management actions, as described above, can also reduce conifers and create fire breaks, though they may also contribute to habitat fragmentation.

COT Report Threat—Improper Livestock Grazing

Livestock grazing is the most widespread land use across the sagebrush habitat (Connelly et al. 2004). It affects soils, vegetation health, species composition, water, and nutrient availability over the short term and long term by consuming vegetation, redistributing nutrients and seeds, trampling soils and vegetation, and disrupting microbial systems (Connelly et al. 2004; NTT 2011).

Livestock grazing has been described as a diffuse form of biotic disturbance; unlike point sources of disturbance (e.g., a frequently used undeveloped campsite), livestock grazing exerts repeated pressure across the landscape over many years (Manier et al. 2013). Thus, the effects of grazing are not likely to be detected as disruptions but as differences in the processes and functioning of the sagebrush, riparian, and wetland systems (Manier et al. 2013). Grazing effects are not distributed evenly because historic practices, management plans and agreements, and animal behavior all lead to differential use of the range (Manier et al. 2013). Livestock often use riparian and wetland areas for water and shade. This can reduce riparian community conditions and hydrologic functionality at certain levels, which can reduce riparian community conditions. However, moderate levels of livestock use are generally considered compatible with maintaining perennial bunchgrass, with the level of sustainable use depending on a number of environmental factors (Hagen 2011). In addition, properly managed grazing could help restore functioning condition of riparian areas and could reduce litter and fine fuel loading, helping to reduce fire size and severity.

Impacts from Livestock Grazing and Range Management

Based on extensive research in many western states, Connelly et al. (2000) developed and Hagen et al. (2007) refined habitat criteria or indicators required by GRSG for specific seasonal needs (leks, breeding, summer, brood-rearing, and wintering). Livestock grazing is compatible with GRSG where these habitat indicators can be consistently maintained (Connelly et al. 2000; Crawford et al. 2004). Whether this is possible on any particular site depends on many factors

including the ecological site characteristics, grazing history of the site, precipitation zone, livestock involved, the grazing season, intensity, frequency and duration.

State and transition models provide a useful framework to consider these factors (Boyd et al. 2014; USFWS 2014b). Livestock grazing influences vegetation dominance over time due to chronic selective pressure that affects perennial plant condition, interspecific competition, and composition (Connelly et al. 2004).

The overall impact of livestock grazing on GRSG depends on site-specific management (Beck and Mitchell 2000; USFWS 2010a). Riparian areas and wet meadows used for brood rearing are especially sensitive to grazing by livestock (Beck and Mitchell 2000, Hockett 2002). Grazing practices can be used to reduce fuel load (Davies et al. 2010; Davies et al. 2011), to protect intact sagebrush habitat, and to increase habitat extent and continuity (Connelly et al. 2004).

Grazing can reduce the spread of invasive grasses, if applied annually before the grasses have dried out. Light grazing (21 to 40% of current years growth that has been used) to moderate grazing (41 to 60 percent of current year growth that has been used) does not appear to affect perennial grasses that are important for nest cover (Strand and Launchbaugh 2013). However, Reisner et al. (2013) found that unmanaged grazing can reduce density of native perennial bunchgrasses, thus facilitating cheatgrass invasion. Diamond et al. (2009) discuss how to target grazing to reduce fire risk when cheatgrass is present.

Grazing at inappropriate intensity, duration, season, or location may degrade sagebrush ecosystems over the long term, including changes in plant communities and soils. These impacts can lead to the following conditions:

- Loss of vegetation cover
- Reduced water infiltration rates and nutrient cycling
- Decreased plant litter on the soil surface
- Increased bare ground
- Decreased water quality
- Increased soil erosion, resulting in reduced overall habitat quality for GRSG (Knick et al. 2011; Manier et al. 2013)

Grass height is a strong predictor of GRSG nest survival, and increasing hiding cover can increase nest success, a demographic rate that explains a third of variation in population growth (Taylor et al. 2012; Doherty et al. 2014). DeLong et al. (1995) found lower predation rates on artificial nests at Hart Mountain, Oregon, were associated with tall grass cover and medium-height shrub cover. Similarly, a study at Hart Mountain and Jackass Creek showed that nests not

subject to predation were in areas of greater cover of residual grass, with medium-height shrubs, than were nests subject to predation (Gregg et al. 1994). Livestock grazing reduces grass height and can reduce GRSG nesting success (Beck and Mitchell 2000; Doherty et al. 2014).

Residual grass cover following grazing is essential to conceal GRSG nests from predators. Livestock may occasionally trample birds or nests or may disturb and temporarily displace lekking or nesting GRSG during movement or trailing (Coates 2007). They may directly compete with GRSG for available resources and indirectly reduce invertebrates that are important for GRSG.

Grazing infrastructure, such as water features and pipelines for livestock, can attract livestock to previously undisturbed habitat areas. This would artificially concentrate livestock impacts, such as heavy grazing and vegetation trampling (Braun 1998). As more reliable water developments are constructed, the individual effects of livestock at any one water source would be lessened as the congregation effects are spread to more areas. Specific levels of utilization at each water source would depend on several factors, including the number and distribution of water sources in a pasture, and livestock management practices.

GRSG may also use freshwater, although they do not require it because they can obtain their water needs from food. Research suggests that GRSG do not regularly use water developments even during relatively dry years but obtain required moisture from consuming succulent vegetation in the vicinity (Connelly et al. 2004). Information on the extent of habitat influenced by produced water and the net effects on GRSG populations is unknown (USFWS 2010a).

Standing water provided in livestock drinking troughs and stock ponds can serve as breeding grounds for mosquitoes that carry West Nile 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 was implicated in a die-off of at least 60 GRSG near Burns Junction and two other GRSG deaths near Crane and Jordan Valley in 2006 (Hagen 2011).

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). West Nile virus persists through a mosquito-bird-mosquito infection cycle (McLean 2006). Although *C. tarsalis* is able to overwinter and individual mosquitos emerge as infected adults in the spring (Clark et al. 2006; Walker and Naugle 2011), the species depends on the availability of warm pools of water for larval development. Artificial water sources may facilitate the spread West Nile virus in GRSG habitats because these water developments support abundant populations of *C. tarsalis* longer than natural, ephemeral water sources; this thereby provides habitat for the vector responsible for most West Nile virus infections (Walker and Naugle 2011).

Habitat occupancy by GRSG is related to multiple variables (not a single habitat indicator) associated with both local vegetation characteristics and landscape characteristics (Doherty 2010; Leu and Hanser 2011; USFWS 2013). Freese (2009) found that most of his study area in Oregon did not meet habitat guidelines (based on a single indicator), but patches imbedded throughout the study area did meet them, and most areas satisfied many but not all of the guideline requirements (Connelly et al. 2000). Doherty (2010) found that both local- and landscape-scale habitat features influenced nesting habitat selection by GRSG individually, but multi-scale models were more predictive.

These findings highlight both the importance and the difficulty of assessing and managing habitat for species that select habitat at multiple scales and use resources within large heterogeneous landscapes.

Methods to assess and monitor GRSG seasonal habitats must be consistent and repeatable across the species range if they are to provide data that can be upgraded from site scale to landscape scale. The BLM's Assessment, Inventory, and Monitoring (AIM) Strategy defines a set of core indicators and methods that can be integrated across BLM field, district, and state office boundaries (MacKinnon et al. 2011). Additional GRSG habitat indicators from the GRSG Habitat Assessment Framework (Stiver et al. 2010, or as updated) can easily be added to the core indicators and methods, as pilot studies in Oregon have demonstrated.

Water developments, roads, and structural range improvements associated with livestock grazing throughout the planning area would remove vegetation over the long term and could introduce invasive plants to rangelands. Livestock tend to congregate around water developments, compacting soil and trampling nearby vegetation, including shoreline and riparian areas. This makes reestablishment of native vegetation difficult in the area surrounding water developments. However, water developments and fencing also facilitate movement, distribution, and concentration of livestock more evenly across the range, thereby potentially improving rangeland health.

Land health evaluations are used to assess rangeland condition and help to identify where a change in grazing management would be beneficial to rangeland health. Managing grazing systems to protect sagebrush and riparian ecosystems would enhance vegetation by allowing more plant growth and reducing trampling and introduction of exotic species. Conversely, concentrating livestock grazing in certain areas would increase surface-disturbing impacts in those areas.

The BLM uses a number of mechanisms to reduce impacts from grazing on GRSG, where necessary. At the planning level, the BLM can decide where areas would be open and closed to livestock grazing. Future negative impacts would be reduced or eliminated within areas closed to grazing, but some past impacts would likely persist for some time. Closing areas to grazing may increase other

harmful impacts, such as fine fuel buildup and increased fencing to exclude livestock (Cagney et al. 2010).

Other more localized changes in management could occur at the implementation level during the permit renewal process. This generally occurs every ten years but could occur before 10 years. Permits may be renewed with or without changes, depending on whether standards (43 CFR, Part 4180.2[c]) and LUP or AMP objectives are being achieved. For example, at the implementation level, the BLM can consider changes in grazing practices or systems to ensure allotments meet rangeland health standards (see **Appendix N**), or they can restrict new grazing infrastructure in GRSG habitat areas. These changes could reduce grazing intensity or change the season of use. In addition, changes in grazing management in riparian and wet meadows can reduce impacts in these important seasonal habitats, depending on the specific situation. As discussed above, it is possible for light to moderate grazing to occur without degrading GRSG habitat.

Fences, especially woven wire, represent potential movement barriers and collision risk to GRSG. They provide predator perches and predator travel corridors, making them a potential cause of death for GRSG (Braun 1998). Fences also contribute to habitat fragmentation (USFWS 2010a). Adjustments in grazing management practices that meet habitat suitability requirements would enhance habitat for GRSG (e.g., changes in season of use, duration, and adjustment in numbers).

Impacts from Wild Horse and Burro Management

While not as widespread as livestock grazing, wild horse and burro management is still a major land use across portions of the sagebrush biome. Wild horse and burro grazing has impacts similar to livestock grazing in their effect on soils, vegetation health, species composition, water, and nutrient availability. The causes are horses and burros consuming vegetation, redistributing nutrients and seeds, trampling soils and vegetation, and disrupting microbial systems (Connelly 2004), despite differences in grazing techniques and habits.

A horse consumes 20 to 65 percent more forage than a cow of equivalent body mass, due to physiological differences (Connelly et al. 2004). Horses and burros can reduce total vegetation cover, lower sagebrush canopy cover, increase fragmentation of shrub canopies, and lower species richness in GRSG habitat (Beever and Aldridge 2011). Additionally, because horses will use higher elevations and steeper slopes than cattle, wild horses graze areas of sagebrush that cattle do not typically use (Connelly et al. 2004). The effects of wild horses on habitats may also be more pronounced during periods of drought or vegetation stress (NTT 2011, p. 18). Unlike livestock, wild horses and burros graze yearlong and can have more impacts on vegetation cover than livestock.

Water must also be available year-round for wild horses and burros 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; this contributes to system degradation, which leads to protecting riparian areas with additional fencing and troughs in order to accommodate yearlong horse use. These types of range improvements would increase potential perch sites for avian predators and potentially less water naturally available. They also could limit water flow to riparian habitat.

The BLM \will continue to manage wild horses and burros to AML. Currently, wild horse and burro populations on the range exceed AML and these high population levels worsen the negative impacts on GRSG habitat described above. It is likely that the BLM will continue to manage wild horses and burros to AML under all projected alternatives.

The indicators of potential impacts on GRSG from livestock and wild horse and burro grazing under the proposed alternatives are as follows:

- Disturbance to birds
- Population loss
- Acres of sagebrush habitat
- Understory of sagebrush
- Habitat degradation and fragmentation

COT Report Threats—Energy Development and Mining

Energy development can lead to impacts such as direct habitat loss, fragmentation of important habitats by roads, pipelines, and power lines, noise, and other human disturbance. Energy development may also have indirect effects on GRSG behavior or demographics due to noise and other disturbances (Blickley et al. 2012a; Blickley et al. 2012b; Blickley and Patricelli 2012; Blickley and Patricelli 2010). The effects of energy development often add to the impacts from other sources and can result in GRSG population declines. These declines associated with energy development result from the abandonment of leks, decreased attendance at the leks that persist, lower nest initiation, poor nest success, decreased yearling survival, and important wintering habitat avoidance in areas where there is energy infrastructure (Holloran 2005; Aldridge and Boyce 2007; LeBeau 2014).

Energy development impacts GRSG and sagebrush habitats through direct disturbance and habitat loss from well pads, access construction, roads, power lines, and pipeline corridors. Its indirect effects are from noise, changes in water availability and human presence (Patricelli et al. 2013; Ambrose and Florian 2013). The interaction and intensity of effects could cumulatively or individually lead to habitat fragmentation in the long term (Connelly et al. 2004; Holloran 2005). Little coal, oil, or gas potential exists in the planning area, but wind and geothermal energy development potential is high (Manier et al. 2013).

Renewable energy facilities, including wind and geothermal power, typically require many of the same features for construction and operation as do nonrenewable energy resources. Therefore, impacts from direct habitat loss, habitat fragmentation through roads and power lines, noise, and increased human presence are generally similar to those discussed for nonrenewable energy development (USFWS 2010a). In a Wyoming study, LeBeau (2014) found that the risk of a nest or brood failing decreased as the distance increased from a wind turbine; female survival did not appear to be affected by the relative distance to roads and transmission lines, although the relationship was not substantial because of the 90 percent confidence intervals.

Surface and subsurface mining for such mineral resources as gold, uranium, copper, phosphate, diatomaceous earth and aggregate, results in direct loss of GRSG habitat, if it occurs in sagebrush habitats. The direct impact from surface mining is usually greater than it is from subsurface activity. In otherwise undisturbed sagebrush, habitat loss from both types of mining can be exacerbated by the storage of overburden (soil removed to reach subsurface resource). If infrastructure is necessary, additional direct loss of habitat could result from structures, staging areas, roads, and power lines.

GRSG could be directly affected from vehicle collision on access roads, and nests could be trampled by human traffic in the vicinity of roads. GRSG could be impacted indirectly from an increase in human presence, land use practices, ground shock, noise, dust, reduced air quality, degradation of water quality and quantity, and changes in vegetation and topography (Brown and Clayton 2004). All these impacts may be reduced by adherence to state and federal regulations as well as BMPs and COAs.

The presence of new structures on the landscape would also contribute to indirect effects from potential avoidance behavior by GRSG (Freese 2009). Industrial activity associated with the development of surface mines and infrastructure could result in noise and human activity that disrupt the habitat and life cycle of GRSG. The number of displaying GRSG on 2 leks within 1.25 miles of active mines in northern Colorado declined by approximately 94 percent over 5 years, following an increase in mining activity, though limited recovery occurred subsequently (Remington and Braun 1991; Braun 1998). Studies have consistently reported that breeding GRSG were negatively impacted at conventional well pad densities (1 pad per 80 acres). Declines in lek attendance by male GRSG and associated with these well densities ranged from 13 to 79 percent. A recent summary of studies investigating GRSG response to natural gas development showed impacts on leks from energy development were most severe when infrastructure occurred near leks. It also showed that impacts remained discernible to distances of up to four miles (Naugle et al. 2011). A 21 percent decline in GRSG population growth pre- and post-development in one study was primarily attributed to decreased nest success and adult female annual survival; the treatment effect was more noticeable

closer to gas field infrastructure. Annual survival of individuals reared near gas field infrastructure (yearling females and males) was significantly lower than control individuals not reared near infrastructure (Holloran 2005; Holloran et al. 2010).

Indicators of potential impacts on GRSG from energy development and mining under the proposed alternatives are disturbance to birds, population loss, acres of sagebrush habitat, habitat degradation, and habitat fragmentation.

COT Report Threat—Infrastructure

Impacts from Lands and Realty Management

Transmission lines and major power lines are widespread throughout GRSG range (Connelly et al. 2004). The species responds negatively to increased infrastructure in sagebrush habitats, including roads, power lines, and communication towers (Knick and Connelly 2011; Johnson et al. 2011). In areas where the vegetation is low and the terrain is relatively flat, power poles provide an attractive hunting and roosting perch and nesting sites for many species of raptors and corvids (Steenhof et al. 1993; Connelly et al. 2000; Howe et al. 2014; Choates et al. 2014).

The increased abundance of raptors and corvids in occupied GRSG habitats can increase predation. For example, within a year of construction of a 372.5-mile transmission line in southern Idaho and Oregon, raptors and common ravens began nesting on the supporting poles (Steenhof et al. 1993). Within 10 years of construction, 133 pairs of raptors and ravens were nesting along this stretch. Raven counts increased by approximately 200 percent along the Falcon-Gondor transmission line corridor in Nevada within 5 years of construction (Atamian et al. 2007). Raven counts along this line subsequently declined after 2007 but increased again within the last 4 years to near 2007 levels (Nonne et al. 2013).

Ravens contributed to lek disturbances in the areas surrounding the transmission line (Atamian et al. 2007); however, as a cause of decline in surrounding GRSG populations, it could not be separated from other potential impacts, such as West Nile virus. Nest success for this population was exceptionally low (Blomberg et al. 2010), suggesting a potential impact of ravens on GRSG nest survival, but pre-construction nest survival rates were not reported.

Following construction, GRSG avoidance of vertical structures, likely due to raptors perching on the structures, may exclude habitat via behavioral response. Braun (1998) found that use of otherwise suitable habitat by GRSG near power lines increased as distance from the power line increased for up to 660 yards; and based on that unpublished data, Braun reported that the presence of power lines may limit GRSG use within 0.6 mile in otherwise suitable habitat.

Golden eagle (*Aquila chrysaetos*) predation increased from 26 to 73 percent of the total predation after completion of a transmission line within 220 yards of an active GRSG lek in northeastern Utah (Ellis 1985). The lek was eventually abandoned, and Ellis (1985) concluded that the presence of the power line resulted in changes in GRSG dispersal patterns and caused the habitat to fragment.

Perch deterrents are often used to reduce the impact of avian predation. Prather and Messmer (2010) determined that the actual effectiveness of perch deterrents was limited by the structure of the power poles and the design and placement of deterrents. In contrast, Slater and Smith (2010) found raptor and raven perching was reduced on poles equipped with perch deterrents. Similarly, perch-deterrent devices installed one year after construction of an 18-mile power line significantly reduced raptor use in Wyoming (Oles 2007).

In addition, fences are often associated with power lines and communication towers. As discussed under grazing, fences also pose a hazard to GRSG from collision, provide perches for predators, and increase fragmentation risk. Stevens (2011, p. 108) in a study of GRSG and fence interactions in Idaho found several factors contributing to collision risk. Fences within 1.25 mile of leks, fence densities exceeding 0.6 mile per 0.4 square mile, and flat terrain posed greater risk.

Fencing in 13 GRSG Research Natural Areas (RNAs) will provide areas where natural successional processes will proceed for long-term monitoring and research of the plant communities important for GRSG. Some acreage next to the 15 RNAs would also be fenced in order to minimize fencing miles, to avoid disturbing leks, and to use existing pasture fences.

In the first study to examine the short-term impacts of wind energy infrastructure on GRSG, LeBeau (2012) found that GRSG did not avoid wind turbines during the nesting and brood-rearing periods. However, nest and brood survival decreased in habitats closer to wind turbines. GRSG avoided brood-rearing habitats within 3 miles of power lines; however, much of the habitat surrounding the transmission lines was mostly composed of a greater percent of bare ground, which is uncharacteristic of GRSG brood-rearing habitats. Moreover, the wind energy development was constructed only two years before this study, and habitat use patterns were likely related to high site fidelity inherent in GRSG (Fischer et al. 1993; Holloran and Anderson 2005). In the same study, LeBeau et al. (2014) noted the relationship between nest survival and distance to transmission lines was not substantial because of the large variation in the data. Female survival appeared not to be affected by wind turbines.

Higher densities of power lines within four miles of a lek negatively influence lek attendance (Walker et al. 2007). ROW exclusion areas would prohibit all development of ROWs; in ROW avoidance areas, ROWs would be considered

on a case-by-case basis. This flexibility may be advantageous where federal and private landownership areas are mixed and where exclusion areas may result in more widespread development on private lands. The 3 percent disturbance cap under certain action alternatives would protect GRSG habitat from excessive disturbance in ROW avoidance areas.

Travel management impacts are discussed under Recreation in this section.

Indicators of potential impacts on GRSG from infrastructure under the proposed alternatives are disturbance to birds, population loss, acres of sagebrush habitat, habitat degradation, and habitat fragmentation.

COT Report Threat—Recreation, Including Travel Management

Impacts from Recreation Management

Recreational use of GRSG habitat is benign in most situations; however, excessive use may disturb birds or nesting sites, degrade sagebrush habitat, or increase poaching (NTT 2011). Such activities as camping, bicycling, OHV use, and hunting utilize the network of BLM roads and trails that may impact sagebrush and GRSG. The disturbance is due to noise and dust, invasive plant spread, and wildlife behavior alteration (Knick et al. 2011). In addition, road and trail use may directly cause GRSG mortality via collisions with vehicles. The impacts of predation on GRSG can increase where habitat quality has been compromised by human activities, such as exurban and road development (e.g., Coates 2007; Bui 2009; Hagen 2011).

Closing or seasonally restricting roads used by recreationists in and around seasonal GRSG habitats may reduce the impacts on wildlife. Restricting permitted access to important habitat areas, based on seasonal use and coincident with GRSG activities, would also protect GRSG (Knick et al. 2011; NTT 2011).

Indicators of potential impacts on GRSG from recreation include acres of sagebrush habitat, disturbance to birds, and population loss.

Impacts from Travel Management

Ecological impacts of roads and motorized trails include mortality due to collisions, behavior modifications due to noise, activity and habitat loss, alteration of physical environment, leaching of nutrients, erosion, spread of invasive plants, increased use, and alteration by humans due to accessibility.

Road construction can divide and fragment vegetation over the long term, depending on the location of the road. Roads compact soil and allow the spread of wildfire and invasive plants (USFWS 2010a; Manier et al. 2013). Invasive plants can outcompete sagebrush and other vegetation essential for GRSG survival. Invasive plant species also increase wildfire frequencies, further contributing to loss of habitat (Balch et al. 2012).

However, road access is critical to facilitate fire suppression response, thereby preserving intact vegetation and preventing further fragmentation. Johnson et al. (2011) found that lek counts increased at greater distance from highways. However, Johnson et al. (2011) found the presence of secondary roads did not appear to influence lek trends. Literature suggests increased road length, traffic levels, and traffic activity during the early morning and within approximately 2 miles of leks all negatively influence male lek attendance (Holloran 2005; Forman and Alexander 1998).

Holloran (2005) found that rates of decline in GRSG male lek attendance in west Wyoming's Pinedale Anticline gas field increased as traffic volumes increased on main haul roads within 2 miles of leks. Holloran also found that attendance increased over a length of over 3 miles of main haul road within 2 miles of leks. Vehicle activity on haul roads during the daily strutting period had a greater influence on male lek attendance, compared to roads with no vehicle activity in the early morning. Traffic at even low volumes (1 to 20 axles per day) had a significant impact on male lek attendance. Much of the vehicles associated with the Pinedale Anticline gas field were multiple-axle tractor-trailers.

Closing and reclaiming unused, minimally used, or unnecessary roads in and around GRSG habitat would reduce disturbance there and would increase GRSG habitat when the roads are reclaimed (NTT 2011). The more areas that restrict motorized vehicle use, the less likelihood there would be for impacts on vegetation from surface disturbance, such as the following:

- Reduced acreage and condition of vegetation
- Increased likelihood for invasive plants
- Reduced number and size of special status plant populations and habitat quality and distribution

COT Report Threats—Sagebrush Removal, Agricultural Conversion and Urbanization, and Isolation

Over time, sagebrush habitats have been lost to agriculture and urban development, and past vegetation management strategies. Habitat loss also decreases the connectivity between GRSG wintering and brooding habitats, increasing population isolation and susceptibility to stochastic events, such as disease or drought (Caudill, Messmer, Bibles and Guttery 2013; Freese 2009; Waker; Doherty, Naugle, Walker, and Graham 2008). This then increases the probability for the loss of genetic diversity and extirpation of the population (Knick and Hanser 2011).

In addition to reducing the land area available to support GRSG, habitat loss and fragmentation also increases opportunities for other disturbances, such as vehicle traffic, predation, wildfire, and invasive plant spread. Agricultural development, landscape fragmentation, and human populations have the potential to increase predation pressure on all life stages of GRSG. Under these

conditions, birds can be forced to nest in less suitable or marginal habitats; this increases travel time through habitats where they are vulnerable to predation and increases the diversity and density of predators (Ritchie et al. 1994; Schroeder and Baydack 2001; Connelly et al. 2004; Coates et al. 2014).

Raven abundance has increased as much as 1500 percent in some areas of western North America since the 1960s (Coates and Delehanty 2010 and references therein; Coates et al. 2014). It is linked with increases in human activity, which provides supplemental sources of food, water, and nest sites (Bui et al. 2010). Structures in the environment increase the effect of raven predation, particularly in low canopy cover areas, by providing ravens with perches (Braun 1998; Coates 2007; Bui et al. 2010; Howe et al. 2014). Coates and Delahanty (2010) estimated an increase in one raven per 6-mile transect survey was associated with a 7.4 percent increase in the odds of GRSG nest failure.

While habitat conversion for agriculture is not directly tied to BLM management, land tenure decisions, such as acquisitions and disposals, can indirectly affect the acreage available for agriculture and urbanization. For example, if the BLM were to dispose of a land parcel characterized as sagebrush-steppe, the land could be converted to farmland or subdivided into home sites at the third party's discretion. Sagebrush habitat may be zoned as "Zone 1" and thus would be retained in BLM management. These lands would not be converted for agriculture or urbanization.

Exurban development (dispersed homes on small acreages) removes sagebrush and converts rangeland to urban use. Exurban development results in direct habitat loss and habitat fragmentation and the introduction of invasive plant species. Urban and exurban activities also increase the presence of predator subsidies, such as trash, landfills, and bird feeders (Coates and Delahanty 2010). This allows the numbers of GRSG predators (e.g., common ravens, red fox, skunks, and raccoons) to increase, which can have disproportionate impacts on GRSG.

Additionally, pets and hobby livestock may have negative impacts on GRSG through direct predation or disturbance, such as dogs chasing birds, or can result in habitat loss and the introduction of invasive annual grasses. Infrastructure associated with exurban development, such as power lines and roads, also results in habitat loss and fragmentation, provides perches for avian predators such as ravens, and possibly disturbs GRSG (USFWS 2013a).

Habitat can also be degraded by sagebrush growing beyond the habitat needs of GRSG. Sagebrush growth over 25 percent in warm-dry and over 30 percent in cool-moist sagebrush habitat is less favorable for GRSG. This is because it lacks the diversity of vegetation to support the species.

Indicators of potential impacts on GRSG from the conversion of habitat for agriculture or urbanization include acres of sagebrush habitat, connectivity of habitat patches, and population loss.

Impacts from Land Tenure Decisions
Land tenure adjustments made in GRSG habitat could reduce the habitat available to sustain GRSG populations. Land exchanges designed to decrease fragmentation of habitat would help GRSG populations (NTT 2011).

Impacts from Special Designations Management
While an ACEC may be designated specifically to benefit GRSG, most ACECs and other special designations (e.g., Wilderness and WSAs) are not. While GRSGs are not a relevant or important value in most special designations, and thus management is not tailored to protect them, restrictions on resource uses and management activities may confer some protection by limiting habitat fragmentation and loss from development.

Indicators of potential impacts on GRSG from conversion to agriculture and associated threats under the proposed alternatives are population loss, acres of sagebrush habitat, habitat degradation, and habitat fragmentation.

4.3.3 Impacts on GRSG from Management Actions Common to All Alternatives

Impacts from Vegetation Management
Under all alternatives, the BLM would continue to follow the policies of the Integrated Vegetation Management Handbook (H-1740-2) for vegetation management. These policies would control the spread of invasive plants, would limit conifer expansion, would restore sagebrush, and would provide other improvements for vegetation management in sagebrush habitat. Federal laws, subsequent NEPA, and District Integrated Invasive Plant Management Plans provide the framework and direction for appropriate invasive plant management activities.

Impacts from Lands and Realty
Under all alternatives BLM IM 2013-142 (Regional Mitigation) would mitigate for lost habitat from development of ROWs or transmission line features.

Impacts from Wild Horse and Burro Management
The BLM manages wild horses and burros to AML, but existing populations exceed AML. The principal factor affecting gather priorities is short- and long-term holding facilities that are at or near capacity, significantly reducing the numbers of excess wild horses and burros that can be removed from HMAs. This situation would continue in the foreseeable future under all alternatives.

Impacts from Invasive Plants
Under all alternatives, effective control of invasive annual grasses remains problematic due to the following:

- Extent of invasion
- Sizes of areas that would need to be successfully treated
- Changes in soil structure, chemistry, and biota, resulting from prolonged dominance by invasive annual grasses and high inter-annual variability in precipitation amount and timing that reduce the ability of native species to establish successfully

Successful treatment rates for annual grasses remains low, especially in warm-dry and shallow-dry sagebrush.

Impacts from Livestock Grazing
An umbrella programmatic Candidate Conservation Agreement (CCA) with the USFWS, the Oregon Cattlemen's Association, and the BLM now covers all GRSG habitat in Oregon on public lands. A BLM livestock grazing permittee enrolls an allotment under the Programmatic CCA by signing an individual allotment CCA with the BLM and USFWS. The CCA requires the permittee to implement conservation measures that will reduce or eliminate identified threats to GRSG. A similar programmatic agreement, called Candidate Conservation Agreement with Assurances (CCAA), covers most GRSG habitat in private and state lands in eastern Oregon (USFWS 2014b).

There are no other impacts common to all alternatives.

4.3.4 Alternative A

While GRSG may be protected under existing provisions of some LUPs, Alternative A relies on management guidance that does not reflect the most up-to-date science regarding GRSG. Some of the older LUPs lack a landscape-level approach to land planning.

There is no consistently applied GRSG vegetation management across all land use plans, though Oregon Standards for Rangeland Health incorporate objectives for maintaining, improving, or restoring vegetation communities, particularly sagebrush and riparian and wetland habitats. Standards apply across all programs, though guidelines have been developed only for livestock grazing. As a result, since 1997 there has been regulatory direction to preserve and improve vegetation communities for special status species habitat, including GRSG habitat (Standard 5). Thus, there is general direction to preserve and improve vegetation communities; however, such disturbances as road construction and mineral and ROW development would continue; this could result in impacts on GRSG, such as habitat loss, fragmentation, or degradation, as described in *Nature and Type of Effects*.

COT Report Threat—Fire

Impacts from Wildland Fire and Fuels Management

Under existing management, the BLM can use prescribed fires in support of resource management objectives, such as restoring grassland or shrubland, reducing conifer encroachment, and increasing age-class or structural diversity. Older LUPs are often less specific but are generally consistent in allowing the use of prescribed fire to meet land management objectives. These include enhancing or maintaining healthy sagebrush ecosystems, though they often lack clear descriptions of desired conditions to guide use of prescribed fire. The guidance in newer plans is generally more specific with regard to desired conditions. No LUPs restrict how prescribed fires can be conducted other than that untargeted vegetation should be protected during prescribed fires.

Under Alternative A, typical practices associated with both prescribed fires and wildfires include the following:

- Treatments to limit the expansion of invasive plants in the burned area
- Seeding desirable species
- Resting domestic livestock grazing to promote recovery or development of the desired plant community

Rest periods following wildfire or prescribed fire are determined on a site-specific basis. Limiting wildfire size is a primary objective for wildfire responses in high-value areas, such as designated important habitat, commercial forests, and wildland-urban interface. In recent years, various directives and other policies have included sagebrush and GRSG habitat as a high-value resource.

Continuation of this management approach would protect sagebrush acreage. However, since the existing direction does not specifically target GRSG habitat as a priority in fuels treatment, fuels buildup may continue to occur in priority habitat, potentially contributing to habitat loss and fragmentation from wildfire.

COT Report Threat—Invasive Plant Species

Impacts from Vegetation Management

Under Alternative A, current vegetation management would continue. Grazing methods, land treatments, and other improvements would be designed and monitored to accomplish objectives, including wildlife habitat needs. Current management programs designed to reduce invasive plants also benefit GRSG habitat, although most invasive plant treatments likely would continue to target invasive forbs over invasive annual grasses due to lower costs and higher success rates, allowing more acres to be treated for a given funding level.

Vegetation dynamics development tool (VDDT) modeling was completed to describe vegetation changes across all the alternatives for the short term (10 years) and the long term (50 years). **Table 4-3**, Projected Percentage of GRSG Habitat in Preferred Condition in the Oregon Sub-region After 10 Years, and **Table 4-4**, Projected Percentage of GRSG Habitat in Preferred Condition in the Oregon Sub-region After 50 Years, display these comparisons.

While the Baker population was not modeled, the trends for Baker population are expected to be very similar to those modeled, likely sharing more similarities with trends in subpopulation 902 (subpopulation closest to Baker).

Modeled results for Alternative A indicate habitat trends would be negative through year 50 for subpopulations 902 and 903 but would be up slightly by year 10 and generally stable through year 50 for subpopulations 904 and 906. For population P04, habitat trends would be upward through year 50. Overall, habitat trend would be slightly upward through year 10 and would decline back to current levels by year 50. No population would reach the target of 70 percent of the area, with sagebrush cover of 10 to 30 percent, in 10 or 50 years. The continued expansion of invasive annual grasses at a rate greater than the expected treatment success rate was the primary factor in the failure to attain the habitat goal.

COT Report Threat—Conifer Expansion

Impacts from Vegetation Management

Under Alternative A, current vegetation management would continue. Older LUPs are not explicit about removing juniper to promote GRSG habitat, but all promote healthy sagebrush ecosystems. Newer plans include retaining trees and stands as they were before Euro-American contact and provide approximate descriptors (e.g., trees older than 120 years in the Andrews and Steens RMPs). No plans necessarily target any one particular phase of juniper encroachment as phases had not been identified and described at the time the plans were prepared; however, costs and treatment success rates result in targeting primarily early phases of encroachment. Newer plans include general objective of reducing juniper encroachment but do not specify treatment rates. The Southeast Oregon RMP focuses treatment on GRSG habitat. Mechanical treatment is preferred to prescribed fire in areas where the risk of further annual grass expansion is high. It limits treatment to no more than 124,500 acres over the life of the plan, including juniper killed by wildfire. The Andrews RMP and Steens RMP both focus treatments on juniper less than 120 years old in sagebrush habitats. The Lakeview RMP focuses treatment near GRSG leks. The Upper Deschutes RMP does not focus on juniper treatments specifically but does focus treatments on shrub-steppe communities.

Table 4-3
Projected Percentage of GRSG Habitat in Preferred Condition in the Oregon Sub-region After 10 Years

Name of Population	Analysis Area[1]	Total Acres[2]	Current Habitat[3] (Percent of Area)	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Northern Great Basin	902	3.219	43	42	43	42	42	43	43
	904	5.600	56	62	63	61	62	63	63
Western Great Basin	903	5.330	56	54	56	55	52	54	56
	906	1.136	30	35	36	35	36	36	35
Central Oregon	P04	2.905	44	46	47	46	45	47	47
	All	18.190	50	52	53	52	51	53	53

[1] Subpopulations 902 and 904 in Northern Great Basin population; subpopulations 903 and 906 in Western Great Basin population; subpopulation P04 is Central Oregon population; Baker population not modeled due to small area and BLM-managed lands (Connelly et al. 2004).
[2] Millions of acres, includes lands in adjoining states that are part of the subpopulation
[3] Habitat defined as sagebrush cover 10-30 percent with predominantly native species understory without juniper

Table 4-4
Projected Percentage of GRSG Habitat in Preferred Condition in the Oregon Sub-region After 50 Years

Name of Population	Analysis Area[1]	Total Acres[2]	Current Habitat[3] (Percent of Area)	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Northern Great Basin	902	3.219	43	40	42	37	45	41	42
	904	5.600	56	62	65	59	65	65	66
Western Great Basin	903	5.330	56	45	52	45	48	48	52
	906	1.136	30	35	38	33	43	38	37
Central Oregon	P04	2.905	44	50	54	48	57	53	54
	All	18.190	50	50	54	48	54	52	54

[1] Subpopulation 902 and 904 in Northern Great Basin population; subpopulations 903 and 906 in Western Great Basin population; subpopulation P04 is Central Oregon population; Baker population not modeled due to small area and BLM-managed lands (Connelly et al. 2004).
[2] Millions of acres, includes lands in adjoining states that are part of the subpopulation
[3] Habitat defined as sagebrush cover 10-30 percent with predominantly native species understory without juniper

Grazing methods, land treatments, and other improvements under Alternative A would be designed and monitored to accomplish objectives, including wildlife habitat needs. Conifer removal projects would continue using mechanical means as well as prescribed burns. These approaches would continue, subject to budget limitations, to have success in reducing juniper extent and cover.

Assuming that all mechanical treatments are for juniper, the current treatment rate is 17,183 acres per year. If all these treatments had occurred within four miles of leks, the rate would be approximately 2 percent per year. The actual treatment rate is likely one percent or less, well under the estimated encroachment rate of 4.5 percent per year.

Treatments have not necessarily been focused on locations most likely to benefit GRSG, and treatment prescriptions may not provide the greatest benefit to GRSG. A vegetation treatment prescription is a documented set of actions to take in order to achieve a specific vegetation management objective. Treatment near leks has been controversial and, therefore, limited. In the absence of more specific direction, under Alternative A there is a low probability that sufficient treatment would occur near leks to maintain or restore habitat quality.

COT Report Threat—Grazing and Free-Roaming Wild Horses and Burros

Impacts from Range Management

As shown in **Table 2-10**, within PPH, 4,470799 acres are open to grazing, while 46,187 acres are closed. Within PGH, 5,511,327 acres are open to grazing, with 123,715 acres closed.

Livestock grazing would continue to be managed through existing grazing management plans unless monitoring and new information or assessments indicate a change is necessary in existing management. Methods and guidelines from the existing RMPs would be used to achieve land health standards, maintain ecological conditions, and enhance wildlife habitat during implementation of grazing regimens. Monitoring would be used to track the effectiveness of grazing management practices and integrated ranch planning used to plan allotments as single units.

For livestock grazing allotments, land health assessments and other management evaluations would support rangeland health standards, which would provide for the health of rangeland vegetation that also supports GRSG and other wildlife. Standards for Rangeland Health and Guidelines for Grazing Management require periodic assessments of range conditions and adjustments to grazing practices to improve ecosystem function. Although the standards do not address specific GRSG habitat needs, in meeting Standard 5, native plant communities and animal habitats would be distributed across the landscape, with a density and frequency of species suitable to ensure reproductive capability and sustainability. Plant populations and communities would exhibit a range of age classes necessary to sustain recruitment and mortality fluctuations.

Grazing management guidelines vary in specificity in older land management plans; however, Standards for Rangeland Health and Guidelines for Grazing Management apply. Allowable grazing utilization levels can be adjusted as needed to correct unacceptable utilization levels or patterns of use. Newer plans often have some guidance related to drought, but IM 2013-094 provides detailed procedures for adjusting grazing during drought that apply to all LUPs. Permit modifications to improve GRSG habitat suitability would enhance understory vegetation.

Range improvements under Alternative A would be designed to meet both wildlife and range objectives for livestock grazing. Fences would be built or modified to permit passage of wildlife and to decrease GRSG risk of collision with fences. These modifications would reduce the risk of loss or disturbance of GRSG.

Where land health standards are not being met, and livestock grazing or wild horse and burro use is determined to be a factor, livestock or wild horse and burro management will be modified to make progress towards achieving desired conditions and suitable habitat conditions for GRSG. Riparian habitats would be managed to achieve or make significant progress towards achieving proper functioning condition, to maintain desired plant community for wildlife habitat, to improve watershed conditions, and to protect riparian acreage from excessive livestock use. Restricting livestock use, moving horses to another area, or changing timing and intensity of grazing in riparian areas would enhance riparian habitat for wildlife, including GRSG. These approaches would reduce the risk of habitat degradation or fragmentation from grazing.

Impacts from Wild Horse and Burro Management

Wild horse and burro management involves many of the same impacts on GRSG habitat as livestock management. Range improvements would be designed to meet both wildlife and range objectives for wild horses and burros and livestock; however, it also provides yearlong water access for wild horses and burros. If land health standards are not being met, the BLM would take appropriate action within HMAs to achieve objectives. If actions taken are not moving toward achieving objectives, adjustments in AML could be applied.

Riparian area protection for wild horses and burros requires fencing, which can conflict with GRSG protection. The wild horse and burro management handbook outlines how management has to conform to thriving natural ecological balance. The BLM manages wild horses and burros to AML; however, existing populations exceed AML, and the BLM is unable to gather wild horses due to the inability to accommodate the expense of maintaining the animals off the range. This situation would continue in the foreseeable future under all alternatives.

COT Report Threat—Energy Development and Mining

Impacts from Leasable Fluid Minerals Management

Energy development and mineral exploration and extraction directly disturb GRSG and their habitat, as described under **Section 4.3.2**, *Nature and Type of Effects*. Under Alternative A, fluid mineral leasing and development, including oil, gas and geothermal, would continue on previously leased lands, though not all leased areas will ultimately be developed. **Table 2-11** shows GRSG habitat open and closed to fluid mineral leasing in GRSG habitat by alternative, for full estate and split-estate lands. **Table 4-5** shows the percent of each population affected by closure under current management. Under some alternatives, areas would be open to leasing but stipulations would be applied to new leases. Less than 10 percent of each population within PHMA and less than 1 percent of each population within GHMA would be affected by closure to fluid mineral leasing under Alternative A. The greatest protections would occur in the Western Great Basin and Central Oregon populations within PHMA. Development in PPH and PGH would continue to cause impacts on GRSG as described under **Section 4.3.2**.

Table 4-5
Percent of Populations Affected by Closure to Fluid Mineral Leasing—Alternative A

Population	Percent of Population Affected (based on acres of habitat affected)	
	PGH	PPH
Baker	0	0
Central	1.82	0.32
Northern Great Basin	13.20	13.66
Western Great Basin	32.05	25.68

Note to all population tables: GRSG Core Areas (PHMA) protect 90 percent of the GRSG population, representing over 550 lek sites in the Oregon sub-region across all landownerships (ODFW 2012b; p. 84, Table 21). Approximately 67 percent of PHMA and 68 percent of GHMA occur on BLM-administered lands (see Chapter 3, Table 3-1). Thus, the BLM extrapolates that 74 percent of the population (67 percent of 90 percent) would be affected by RMP allocations covering all of PHMA, and approximately 7 percent of the population (68 percent of 10 percent) would be affected by RMP allocations covering GHMA. Management applying to both PHMA and GHMA would affect approximately 81 percent of the population. Under this assumption, the BLM identified the percent of the GRSG population on BLM-administered lands in Oregon affected by the various BLM management allocations (closures, recommended withdrawals, etc.) in the tables.

Under existing regulations, permit stipulations such as NSO, CSU, or TL, on existing leases can be imposed only to the extent consistent with the rights of a mining claimant. Areas where TL stipulations are applied would be temporarily closed to exploration and development, surface-disturbing activities, and intensive human activity during identified timeframes. Some operations would be allowed at all times (e.g., vehicle travel and maintenance); however, construction, drilling, completions, and other operations considered to be intensive would not be allowed during the restricted timeframe.

Impacts from Mineral Materials (Salables), Nonenergy Leasable Minerals Management and Locatable Mineral Entry

Table 2-11shows acreage open and closed to nonenergy leasable mineral leasing in GRSG habitat by alternative; **Table 2-11** also shows acreage currently open and closed to salable mineral development by alternative.

Table 4-5, Percent of Populations Affected By Closure to Fluid Mineral Leasing—Alternative A, and **Table 4-6**, Percent of Populations Affected By Closure to Salable Minerals—Alternative A, below show the percent of each population affected by closure and withdrawal under current management. Less than 10 percent of Baker and Central populations within GHMA and less than one percent of these populations within PHMA would be affected by closure to fluid mineral or salable mineral development under Alternative A. The greatest protections would occur in the Northern Great Basin and Western Great Basin populations in PHMA and GHMA.

Table 4-6
Percent of Populations Affected By Closure to Salable Minerals—Alternative A

Population	Percent of Population Affected (based on acres of habitat affected)	
	PGH	PPH
Baker	0	0
Central	1.89	0.31
Northern Great Basin	13.49	13.47
Western Great Basin	31.30	25.18

For locatable minerals, mitigation measures would continue to apply to the proposed plans of operation, as the law allows. Approximately 1,016,278 acres (four percent) of the total federal mineral estate are withdrawn from locatable mining claims; new mineral exploration or mining would be precluded on these lands under all alternatives. Less than 1 percent of all populations would be affected by withdrawal from locatable mineral entry. **Table 2-11**shows acreage recommended for withdrawal in GRSG habitat by alternative. The BLM would review plans of operation in withdrawn areas and would consider purchasing claims where activities threaten GRSG or their habitat. **Table 4-7**, Percent of Populations Affected by Withdrawal from Locatable Mineral Entry—Alternative A, shows the percent of each population affected by closure and withdrawal under current management.

Overall, under current management, GRSG could continue to be threatened by habitat loss, fragmentation, and degradation and disturbance as a result of energy development in habitat areas.

Table 4-7
Percent of Populations Currently Affected By Withdrawal from Locatable Mineral Entry—Alternative A

Population	Percent of Population Affected (based on acres of habitat affected)	
	PGH	PPH
Baker	0	0
Central	0.89	0.00
Northern Great Basin	8.04	4.97
Western Great Basin	41.17	31.79

COT Report Threat—Infrastructure

Impacts from Lands and Realty

Under Alternative A, ROWs for utilities, pipelines, and other human purposes, including wind farms, are considered on a case-by-case basis outside of exclusion areas. ROW consideration includes an analysis of impacts on leks and other wildlife habitat, regardless of the planning designation on the area. To place a ROW in an avoidance area, a deeper analysis must be done to ensure compatibility with the reason for the avoidance area designation. To place a ROW in an exclusion area, a LUPA would have to be completed, requiring much more intensive analysis. The BLM's current management approach is to co-locate ROWs when possible, and existing infrastructure corridors were established in the most optimal location, considering wilderness, WSAs, and other factors. Existing ROW corridors also monitor and treat invasive plants under current management. Road policies are discussed below under Recreation.

There are currently 857,564 acres of exclusion areas within the planning area and 3,445,685 acres of avoidance areas. The collocation approach provides limited protection for GRSG habitat from ROW construction, which is a cause of fragmentation, degradation and disturbance to GRSG. **Table 2-10**, shows ROW avoidance and exclusion areas under each alternative, and **Table 4-8**, Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas-Alternative A, below shows the percent of each population impacted. The Northern Great Basin and Western Great Basin populations have the greatest proportions within ROW avoidance and exclusion areas under Alternative A, with 10 to 14 percent of the populations affected. Current management already sites ROWs to minimize impacts on wildlife habitat, providing limited protection to GRSG from disturbance, habitat loss, and fragmentation.

Table 4-8
Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas-Alternative A

Population	Percent of Population Affected (based on acres of habitat affected)	
	Exclusion	Avoidance
Baker	<0.01	<0.01
Northern Great Basin	14	10
Western Great Basin	12	12
Central Oregon	2	7

COT Report Threat—Recreation

Impacts from Recreation Management and Travel Management

Alternative A includes no specific recreation plan related to GRSG or their habitat. Recreation is one use of BLM roads. Under Alternative A, the BLM would continue to permit limited yearlong use for off-road vehicles, including aircraft landing, on the lands that it administers, which is a cause of disturbance to GRSG and degradation to their habitat. Currently, 6,811,890 acres are open to off-road motorized travel, 2,669,145 acres in PPH and 2,940,051 in PGH. Recreational use of wildlife habitat, especially OHV use, disturbs GRSG, potentially resulting in nest abandonment, and contributing to fragmentation of habitat. **Table 4-9**, BLM-Administered Acres of PHMA and GHMA and Percent of GRSG Affected by Travel Management Designations under Alternative A, shows the percent of the GRSG population within the decision area affected by travel management designations under current management. Nearly half of the GRSG population occurs in areas open to OHV use, with less than 2 percent in areas currently closed to OHV use.

Table 4-9
BLM-Administered Acres of PHMA and GHMA and Percent of GRSG Affected by Travel Management Designations under Alternative A

Allocation	PHMA (acres)	GHMA (acres)	Percent Population Affected
Closed	48,450	143,637	1.7
Limited	1,828,999	2,576,796	33
Open	2,669,145	2,940,051	48

Under Alternative A, road and trail development is minimized in crucial big game or upland bird habitat; roads would be closed to OHV traffic where substantial resource impacts occur, including harm to wildlife or habitat. These policies would help limit disturbance of GRSG habitat during the nesting season.

COT Report Threats—Sagebrush Removal, Agricultural Conversion, and Urban Development

Impacts from Land Tenure Decisions

Land tenure adjustments would be subject to current disposal, exchange, and acquisition criteria. These include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations or natural communities of high interest. This would likely include retaining or protecting areas with GRSG, which would maintain occupied habitats. Thus, management under existing land tenure criteria would retain GRSG habitat and other lands with high value to wildlife.

Sagebrush removal, a threat listed in the COT report, is equivalent to loss of habitat, which is one of the indicators for GRSG. Loss of sagebrush habitat is discussed as a possible outcome from many of the threats (fire, invasive plants, conifer expansion, grazing, energy development and mining, and infrastructure); management approaches to remedy these threats will also reduce sagebrush removal

Impacts from ACECs

No new ACECs to benefit GRSG would be designated under Alternative A. In PPH, 200,399 acres of existing ACECs would remain, along with 251,233 acres in PGH. While GRSG is not a relevant or important value in these ACECs, and thus management is not tailored to protect GRSG, some incidental protection may be conferred by restrictions on resource uses in existing ACECs.

Summary

Alternative A (current management) provides protection for GRSG through existing LUPs, which do not specifically protect GRSG habitat but protect important wildlife habitat and range quality. Newer land use plans would provide more specific protection to sagebrush than older plans, allowing for differing interpretations over time and creating uncertainty whether desired outcomes would be achieved. Alternative A has similar goals and objectives in many RMPs but puts few restrictions on energy or infrastructure development in habitat areas. Alternative A also maintains existing programs for land health assessment, control of invasive plants, and consideration of wildlife habitat.

4.3.5 Alternative B

Under Alternative B, the BLM would manage lands to conserve, enhance, and restore GRSG habitat. Restrictions on resource uses such as ROW and mineral development would reduce habitat loss and degradation for GRSG, and to minimize loss of habitat connectivity and disturbance to populations. PHMA and GHMA would be designated (**Table 4-2**) and the BLM would implement numerous conservation measures, as described under the resource headings below, to reduce impacts from human activities in PHMA, including a maximum 3 percent disturbance cap to human activities, not including fire, in PHMA.

The National Technical Team (2011) recommended managing priority GRSG habitats such that discrete human disturbances cover less than 3 percent of the total GRSG habitat, regardless of ownership. The purpose of the disturbance cap is to steer development to areas where it will have the least impact on GRSG, be it public or private land. The cap would be administered cooperatively with counties and the State of Oregon.

GRSG have low tolerance to human disturbance, such as roads, oil and gas developments, and urban development, especially during the breeding season (Leu and Hanser 2011). Knick et al. (2013) reported 99 percent of leks (N = 3184) known to be active between 1998 and 2007 were in landscapes with less than 3 percent development, and all lands surrounding leks were less than 14 percent developed.

COT Report Threat—Fire

Impacts from Wildland Fire Management

Fire and fuels management actions proposed under Alternative B would protect mature sagebrush acreage from loss and GRSG from the disturbance associated with wildfire and prescribed burning. The management approach, however, could also lead to fuel buildup, which can result in more damaging fires over the long term. Fuels treatment would be designed and implemented with an emphasis on promoting sagebrush, after threats to life and property, reducing fire intensity for increased public and firefighter safety, protection of values at risk and promoting healthier, more resilient sagebrush landscapes. Sagebrush canopy would not be reduced below 15 percent unless fuels management objectives required it, and seasonal restrictions would be applied to fuels management. Rest periods would be required and invasive plants controlled with native seeds used for treatment wherever possible. Grazing livestock would be considered as an option to reduce fuel load. Grazing can be used to reduce fine fuel loading of grasses and forbs; however, heavy grazing can lead to changes in composition favoring non-palatable invasive plant species, which can in time lead to additional fuel management problems.

Priorities for fire suppression in Alternative B are not explicit but are consistent with the intent of the Federal Wildland Fire Management Policy. Desired conditions for sagebrush are not stated clearly enough in the alternative to provide sufficient guidance for use of fire or other fuel treatments. Alternative B strongly discourages use of prescribed fire in the Warm-Dry Sagebrush group, which can lead to a homogenous fuel bed where large expanses of high sagebrush density exist. Such homogeneous fuel beds typically produce highly damaging fires.

The alternative relies on fuel breaks to manage wildfire risks in Warm-Dry Sagebrush Group, but fuel breaks are generally ineffective on the 2 percent of wildfires that severely degrade or destroy most GRSG habitat (Louisa Evers,

personal communication). VDDT vegetation modeling (**Tables 4-3** and **4-4**) showed no effect on habitat trends from reducing the probability of fire by 50 percent in the Warm-Dry Sagebrush Group in Alternatives B, D, E, and F to account for fuel breaks.

COT Report Threat—Invasive Plant Species

Impacts from Vegetation Management

Current management programs (Alternative A) are already designed to reduce invasive plants, which benefits GRSG habitat. Invasive plant control would be the same under Alternative B as Alternative A. The Standards for Rangeland Health and Guidelines for Grazing Management would still apply. In areas with older LUPs, there is higher uncertainty that desired outcomes would be achieved, since desired standards and targets for invasive plant reduction were often not specified in these plans.

Habitat restoration and vegetation management actions under Alternative B would prioritize restoration to reduce GRSG habitat loss, degradation, and fragmentation. The restoration and management of vegetation actions under Alternative B would require the following:

- Using native seeds in most circumstances
- Designing post-restoration management to ensure the long-term persistence of restoration
- Considering changes in climate
- Monitoring and controlling invasive plant species

Native seeds and post-restoration monitoring may already be occurring under current management, but Alternative B would make consideration of these factors mandatory in GRSG habitat. However, the restoration levels for crested wheatgrass seedings and livestock utilization levels are not specified, increasing the uncertainty of achieving desired outcomes.

Alternative B habitat trends from VDDT vegetation modeling (**Tables 4-3** and **4-4**) are generally stable through year 10 then begin slow decline through year 50 for sub-populations 902 and 903. For sub-populations 904, 906 and P04, habitat trends are slowly upward through year 50 with P04 showing the greatest increase by year 50 (more than 10 percent). Overall habitat trend is upward through year 50 with greatest increase in the first 10 years. Reducing the probability of fire by 50 percent in the Warm-Dry Sagebrush Group in Alternatives B, D, E, and F to account for fuel breaks had no effect on habitat trends.

This alternative has no specific objective for treating invasive plant species. It requires the use of integrated vegetation management and ecologically based

invasive plant management principles. The effects would likely be similar to Alternative A.

COT Report Threat—Conifer Expansion

Impacts from Vegetation Management

Current management programs (Alternative A) are already designed to reduce conifer spread, which benefits GRSG habitat. Habitat restoration and vegetation management under Alternative B also would prioritize restoration to benefit GRSG habitat but includes no specific objective for treating juniper. As a result, the restoration and management of vegetation actions would enhance GRSG habitat under Alternative B by requiring the following (which may already be occurring under current management):

- Using native seeds in most circumstances
- Designing post-restoration management to ensure the long-term persistence of restoration
- Monitoring and controlling invasive plant species.

Alternative B prioritizes areas with higher probability of success that would benefit GRSG, seasonal habitats thought to be limiting, and PHMA. Treatments would be focused more on locations and prescriptions likely to be designed to benefit GRSG. However, since no treatment rate is specified, it is not clear if the treatment rate would exceed the encroachment rate. Other that providing a clearer focus on GRSG habitat, the effects of Alternative B would be very similar to Alternative A.

COT Report Threat—Grazing and Free-Roaming Wild Horses and Burros

Impacts from Livestock Grazing and Range Management

Under Alternative B, acreage open for livestock grazing and available AUMs are the same as under Alternative A. Impacts on GRSG habitat from grazing, as described under **Section 4.3.2**, would continue under Alternative B. However, AMPs, and land health assessments in PHMA would be used to incorporate GRSG management objectives into grazing permit renewals for livestock or wild horses.

Because livestock grazing utilization levels are not specified under this alternative, management would default to existing plans. Standards for Rangeland Health and Guidelines for Grazing Management would continue to apply. Allowable utilization can be adjusted as needed to correct unacceptable utilization levels or patterns of use. Grazing infrastructure, such as water features and pipelines for livestock, would be concentrated away from wildlife habitat areas to minimize vegetation trampling. Standing water for livestock would not be placed in GRSG habitat to minimize spread of West Nile virus.

Fences in PHMA areas identified as detrimental to GRSG would be removed, modified, or marked to reduce collisions and mortality to birds.

Because guidance for livestock grazing management during drought is very general, priorities for assessments are not provided, no additional assessment other than what would occur under existing direction is described or required, and desired conditions are not clearly defined, this alternative is unlikely to improve livestock grazing management over Alternative A.

Impacts from Wild Horse and Burro Management

Impacts are similar to those under Alternative A, although incorporating GRSG habitat objectives in HMAPs and focusing land health assessments in HMAs would increase the potential that habitat issues are discovered sooner. The information obtained from HAF assessments would likely be used to make adjustments in management if they were needed to improve habitat conditions. Over time, this approach would improve sagebrush habitat quality and reduce habitat loss for GRSG caused by wild horse and burro grazing.

COT Report Threat—Energy Development and Mining

Under Alternative B, disturbance to GRSG from energy development and mining activities would be maximally avoided by closing all PHMA to unleased fluid minerals, nonenergy leasable minerals, and salable minerals. For locatable minerals, the BLM would recommend withdrawal of all PHMA from mineral entry. RDFs would avoid or minimize impacts in PHMA, to the extent the law allows.

By closing all PHMA to mineral development, it is possible that mineral activity would occur on private lands where impacts would result and would not need to be mitigated. Also, if the activity is transferred onto private lands, the BLM would have no control over reclamation requirements.

Impacts from Leasable Fluid Minerals Management

Geophysical exploration would be allowed within PHMA but only for obtaining information on fluid mineral resources, including geothermal, in adjacent areas outside of PHMA. Impacts on GRSG and their habitat would continue as a result of existing fluid mineral leases; however, RDFs and conservation measures would be applied to existing leases as COAs. In comparison to Alternative A, these measures would further reduce the impacts discussed under **Section 4.3.2**. **Table 4-10**, Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative B, shows the percentage of each population affected by closure to fluid mineral leasing under Alternative B. Approximately one-third of the Northern Great Basin and Western Great Basin PHMA would be protected by closure to fluid mineral leasing, while less than 10 percent of the Baker and Central Oregon populations would be affected in PHMA.

Table 4-10
Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative B

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0.00	2.41
Central	0.88	6.37
Northern Great Basin	6.39	32.35
Western Great Basin	15.53	29.63

Impacts from Mineral Materials (Salables), Nonenergy Leasable Minerals Management and Locatable Mineral Entry

The policies proposed under Alternative B for mineral materials, nonenergy leasables, and locatable minerals are designed to protect sagebrush habitat from further degradation and fragmentation from these threats. In existing lease areas, surface facilities would be located outside PHMA or would be collocated in existing disturbed areas to the extent possible. In GHMA, surface disturbances would be minimized during activity level planning.

Table 4-11, Percent of the Populations Affected by Closures to Salable Minerals—Alternative B, shows the percentage of each population affected by closure to salable minerals under Alternative B. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be protected by closure to salable minerals, while less than 10 percent of the Baker and Central Oregon populations would be protected.

Table 4-11
Percent of the Populations Affected by Closures to Salable Minerals—Alternative B

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0.00	2.38
Central	0.93	6.29
Northern Great Basin	6.67	31.93
Western Great Basin	15.46	29.25

In areas that cannot be completely closed to leasable mineral development or withdrawn from locatable mineral entry, the BLM would impose a NSO buffer for leasable minerals around leks and/or a 3 percent surface disturbance threshold in PHMA to the extent allowed by law. Once the 3 percent disturbance cap is met, no new surface disturbance would be allowed in PHMA until restoration has occurred.

For locatable minerals, areas in PHMA would be recommended for withdrawal from mineral entry based on risk to GRSG habitat. Existing claims would be subject to validity examination or buyout. Validity examinations or buyouts are expensive and time-consuming operations; if claims are found to be valid, the result could be loss of BLM land use controls. Buyouts of claims would require a mineral appraisal, another resource-intensive task.

Table 4-12, Percent of the Populations Affected by Recommended Withdrawals from Locatable Mineral Entry—Alternative B, shows the percentage of each population impacted by recommended withdrawal of locatable mineral entry under Alternative B. Approximately one-third of the Western Great Basin population would be protected by recommended withdrawal of locatable mineral entry, while less than ten percent of the Northern Great Basin, and less than one percent of Baker and Central Oregon populations would be affected.

Table 4-12
Percent of the Populations Affected by Recommended Withdrawals from Locatable Mineral Entry—Alternative B

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0	0
Central	0.89	0.00
Northern Great Basin	8.04	4.97
Western Great Basin	41.17	31.79

COT Report Threat—Infrastructure

Impacts from Lands and Realty Management
As shown in **Table 2-10**, PHMA would be managed as ROW exclusion areas (4,547,043 acres); GHMA would be managed as ROW avoidance areas (5,662,632 acres). ROW exclusion areas would protect GRSG habitat and reduce habitat fragmentation on BLM-administered lands as described under **Section 4.3.2**. ROW avoidance areas would also protect GRSG habitat but to a lesser degree than ROW exclusion areas.

The percentage of each population impacted by ROW exclusion or avoidance areas (including for wind) are shown in **Table 4-13**, Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas—Alternative B.

Table 4-13
Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas—Alternative B

Population	Percent of Population Affected (based on acres of habitat affected)	
	Exclusion	Avoidance
Baker	<2	<1
Northern Great Basin	35	2
Western Great Basin	31	3
Central Oregon	6	2

Approximately one-third of the Northern Great Basin and Western Great Basin populations would be protected by ROW exclusion areas, while less than 10 percent of the Baker and Central Oregon populations would be affected. Less than 5 percent of all populations would be protected by ROW avoidance areas.

By not allowing ROWs on BLM-administered land within PHMA, all infrastructure in GRSG habitat areas would be forced onto private lands. This could cause increased fragmentation to private lands and may result in more widespread loss of GRSG habitat to infrastructure.

Alternative B also calls for relocation of designated infrastructure corridors outside habitat areas; however, this re-location is unlikely to be feasible because corridors were established in optimal locations and alternative locations are not available. Existing transmission corridors should be consolidated, and those in PHMA which cannot be re-located would be buried where feasible. New infrastructure would be avoided in key connectivity corridors. These corridors have been identified in Core Areas, but not outside such areas.

COT Report Threat—Recreation

Impacts from Recreation Management
SRPs would be issued in habitat areas only where the effects of recreation use were neutral or beneficial to GRSG habitat. OHVs would be limited to existing routes in PHMA.

Impacts from Travel Management
The BLM would continue to limit motorized vehicles to existing roads and trails until travel management planning evaluates roads for permanent or seasonal closure. Route construction in PHMA would be limited to realignments or built to minimum standards necessary, and redundant roads would be rehabilitated. **Table 4-14**, BLM-Administered Acres of PHMA and GHMA and Percent of Oregon Populations within Travel Management Designations under Alternative B, shows the percentage of GRSG populations within the decision area affected by travel management designations under Alternative B. While acres closed to

OHV use would not change, designating PHMA as limited to OHV use would protect over 75 percent of GRSG within the decision area. Less than 5 percent of GRSG would occur in closed or open areas.

Table 4-14
BLM-Administered Acres of PHMA and GHMA and Percent of Oregon Populations within Travel Management Designations under Alternative B

Allocation	PHMA (acres)	GHMA	Percent Population Affected
Closed (existing)	48,450	143,637	1.7
Limited	4,498,590	2,576,796	76
Open	0	2,938,846	3.5

During breeding season, recreation permits would not be issued in the vicinity of leks to promote nesting success. These policies would protect GRSG by limiting disturbance of its habitat from activities associated with recreation traffic. This could improve population stability and recruitment by increasing the availability of suitable habitat. However, impacts from dispersed recreation, such as hiking, biking, or horseback riding, would continue to disturb vegetation and GRSG in areas where they occur.

COT Report Threat—Sagebrush Removal, Agricultural Expansion, and Urban Development

Impacts from Land Tenure Decisions

No lands in PHMA would be available for disposal under Alternative B. As discussed above, current disposal, exchange, and acquisition criteria include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations or natural communities of high interest. Thus, sagebrush habitat under Alternative B would not be removed and would be protected from habitat conversion for agriculture or other uses. **Table 4-15**, Percent of the Populations Affected by Unavailability to Land Disposal (Zone 1)—Alternative B, shows the percentage of each population affected by unavailability to land disposal under Alternative B. Approximately one-third of the Northern Great Basin and Western Great Basin sub-populations would be protected by unavailability to land disposal, while less than 10 percent of the Baker and Central Oregon populations would be affected.

Impacts from ACECs

No additional ACECs would be designated under Alternative B; impacts on GRSG would be the same as under Alternative A.

Table 4-15
Percent of the Populations Affected by Unavailability to Land Disposal (Zone 1)—Alternative B

Population	Percent of Population Affected (based on acres of habitat affected)
Baker	>2
Northern Great Basin	35
Western Great Basin	31
Central Oregon	6

Summary

Alternative B follows the National Technical Team (NTT) recommendation for protection of GRSG habitat. It provides a greater level of protection for GRSG than Alternative A, by designating PHMA and GHMA in habitat areas and by restricting development of ROWs, use of OHVs, and mineral leasing in PHMA. Alternative B also requires a greater focus on protecting sagebrush habitats than provided under existing land use plans and applies a maximum 3 percent disturbance cap in PHMA. However, Alternative B provisions are not all feasible, and management approaches are not explicit, resulting in higher uncertainty that desired outcomes would be achieved over time.

4.3.6 Alternative C

Under Alternative C, the BLM would manage lands to conserve, enhance, and restore GRSG habitat. However, some actions under Alternative C would be counterproductive to conserving GRSG habitat. Management actions would be applied to all occupied GRSG habitats, both PHMA and GHMA (**Table 4-2**) and would apply a zero percent limit to surface disturbance in occupied habitat. Management would focus on removing livestock grazing from occupied habitats and passive approaches to restoration.

COT Report Threat—Fire

Impacts from Wildland Fire Management

The approach for fire suppression and emergency stabilization projects is essentially the same as that described under Alternative B. Alternative C does not clearly state desired conditions for sagebrush, nor is it explicit regarding fire suppression priorities. Like Alternative B, it relies on fuel breaks to manage wildfire risks in the Warm-Dry Sagebrush Group, which may be ineffective.

Additional policies would be included under this alternative to ensure availability of native seed. These restrictions would minimize impacts described under **Section 4.3.2** for the sagebrush ecosystem in these areas. Fire suppression in sagebrush areas would be less effective since fine fuels would increase in the absence of livestock grazing.

COT Report Threat—Invasive Plant Species

Impacts from Vegetation Management

This alternative has no specific objective for treating invasive plant species. It requires the use of integrated vegetation management and ecologically based invasive plant management principles. Impacts from habitat restoration and vegetation management approaches would be similar to those described under Alternative A. However, Alternative C has an increased focus on restoration and it applies to a larger area (PHMA and GHMA), thus providing restoration and habitat enhancement for GRSG in a larger area over the long term.

Eliminating grazing in habitat areas under Alternative C would increase the likelihood of undesired levels of bunchgrass mortality following fire, and thereby facilitating invasive plant species expansion (Davies et al. 2009; Davies et al. 2014). Only mowing of existing fuel breaks would be allowed, with no creation of new fuel breaks. Mowed fuel breaks are often the least effective type of fuel break, and can become dominated by invasive plant species, as repeated mowing adversely affects vigor of native bunchgrass populations (Davies et al. 2012). Generally, mowed fuel breaks are less effective than bare ground. Fuel moisture and weather conditions at the time of the fire have a great impact on the effectiveness of any given fuel break.

In addition, juniper treatments using herbicide or prescribed fire would not be permitted, sustaining current encroachment rates and increasing likelihood of annual grass spread around trees and the likelihood of annual grass dominance following fire. Restrictions on herbicide use would decrease the effectiveness of invasive plant species control efforts and likely increase current expansion rates.

Alternative C habitat trends from VDDT vegetation modeling (**Tables 4-3** and **4-4**) are downward through year 50 for sub-populations 902 and 903. Habitat trends are upward through year 10 and then downward through year 50 for sub-populations 904 and 906. Habitat trends are upward through year 50 for sub-population P04 with the highest rate of change in the first 10 years. Overall, the habitat trend is upward through year 10 then downward through year 50, likely due to a 0.1 percent annual expansion in invasive grasses. The initial habitat improvement that occurs in some subpopulations is likely due to some recovery from fire and ingrowth from earlier structure stages into the preferred structure stage; however, after year 10, the inability to use some treatment methods results in continual degradation of habitat.

Overall, Alternative C may be the least effective of all the alternatives in controlling invasive plant species, and could contribute to population loss, loss of habitat, and habitat degradation and fragmentation.

COT Report Threat—Conifer Expansion

Impacts from Vegetation Management
Impacts from habitat restoration and vegetation management approaches are similar to those described under Alternative A, but with an increased focus on restoration applied to a larger area (PHMA and GHMA).

Alternative C has no specific objective for treating juniper. It specifies the use of ecological site descriptions to identify desired vegetation community, which could be used to identify where juniper is uncharacteristic and an encroaching species. Treatments would be focused more on locations likely to benefit GRSG and prescriptions likely to be designed to benefit GRSG. The use of ecological site descriptions to identify desired plant community composition provides an additional method for identifying encroachment areas.

Since no treatment rate is specified, the current treatment rate would likely continue. Treatment near leks has been controversial and, therefore, is limited. There is low probability sufficient treatment would occur near leks to maintain or restore habitat quality. Since the current treatment rate is well under the estimated encroachment rate, habitat would continue to be lost. Much of the loss would be in the cool-moist sagebrush group, which is the most widely used for late brood-rearing, with some loss in the warm-dry sagebrush group at the ecotone with cool-moist sagebrush.

COT Report Threat—Grazing and Free-Roaming Wild Horses and Burros

Impacts from Range Management
Under Alternative C, 11,762,357 acres would be closed to livestock grazing within PHMA and GHMA (**Table 2-10**). Removal of permitted grazing uses in habitat would likely improve GRSG habitat by reducing impacts such as loss of herbaceous nesting cover, described under **Section 4.3.2**. Removal of grazing would also limit livestock damage to sensitive riparian areas used by GRSG and other wildlife, and reduce the need for standing water for livestock, which can contribute to the spread of West Nile Virus (Walker and Naugle 2011), though some water sources would likely be maintained for wild horse and burro populations.

However, because livestock grazing would not be permitted in occupied GRSG habitat, fuel buildup in bunchgrass habitat would be more likely, 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 and lessee invasive plant control partnerships could further contribute to an increase in the spread of invasive annual grasses.

In the long term, the removal of livestock grazing permits on federal land may cause private ranches to be stocked more heavily to compensate for the loss of forage. Private rangelands could be converted to seeded pastures or ranches to

nonagricultural, uses such as recreation or development. All would result in loss or fragmentation of GRSG habitat. Lands retained in BLM management would not be converted to agriculture.

Additional fencing to separate grazing from non-grazing lands would increase the adverse effects of fencing on GRSG, such as raptor predation, potential GRSG and fence collisions, and habitat fragmentation discussed in **Section 4.3.2**.

Impacts from Wild Horse and Burro Management

Impacts from wild horse and burro management would be similar to Alternative A. Alternative C would close occupied habitat to grazing but would not address the fate of range improvements. Some range improvements that would otherwise be removed or not maintained in the absence of livestock grazing to benefit GRSG would have to be maintained to prevent a negative impact on wild horse and burro populations. Thus, beneficial impacts on GRSG would be limited from removing range improvements, such as reduced West Nile virus risk and less damage to vegetation.

Overall, the approach under Alternative C would be ineffective in reducing impacts on GRSG from wild horse and burro grazing and, in the long term, may decrease acres of sagebrush habitat and increase fragmentation and degradation, due to increased likelihood of destructive fires, and increased fencing, and potential loss of adjacent private rangeland.

COT Report Threat—Energy Development and Mining

Impacts from Leasable Fluid Minerals Management

Under Alternative C, closures to fluid mineral leasing and restrictive stipulations for oil, gas and geothermal development would be the same as under Alternative B. As described under Alternative B, RDFs and conservation measures would be applied as COAs to existing leases, and RDFs in PHMA would avoid or minimize impacts to the extent allowable by law. Alternative C would avoid leasing in occupied habitat (PHMA and GHMA) by closing it to new mineral leases or exploration permits. Existing leases would continue to impact GRSG and their habitat; however, RDFs and conservation measures would enhance protection of GRSG populations by minimizing the disturbances associated with approved fluid mineral development, discussed in **Section 4.3.2**, to the extent the law allows. **Table 4-16**, Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative C, shows the percentage of each population affected by closures to fluid mineral leasing under Alternative C. Approximately 20 percent of the Northern Great Basin and Western Great Basin populations would be within areas closed to fluid mineral leasing in PHMA and GHMA, with approximately 10 percent of the Central Oregon population and 1 percent of the Baker population protected by these measures.

Table 4-16
Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative C

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0.45	1.49
Central	12.41	3.93
Northern Great Basin	19.08	19.96
Western Great Basin	20.42	18.28

Impacts from Mineral Materials (Salables), Nonenergy Leasable Minerals Management and Locatable Mineral Entry

Impacts are as described under Alternative B. **Table 4-17**, Percent of the Populations Affected by Closures to Salable Minerals—Alternative C, shows the percentage of each population affected by closure to salable mineral development under Alternative C. Approximately 20 percent of the Northern Great Basin and Western Great Basin populations would be within areas closed to salable mineral development, with approximately 10 percent of the Central Oregon population and 1 percent of the Baker population protected by these measures.

Table 4-17
Percent of the Populations Affected by Closures to Salable Minerals—Alternative C

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0.45	1.48
Central	12.35	3.91
Northern Great Basin	19.00	19.87
Western Great Basin	20.33	18.20

Table 4-18, Percent of the Populations Affected by Recommended Withdrawals from Locatable Mineral Entry—Alternative C, shows the percentage of each population affected by recommended withdrawal from locatable mineral entry under Alternative C. Approximately one-third of the Western Great Basin populations would be within areas recommended for withdrawal from locatable mineral entry, with approximately 10 percent of the Northern Great Basin and less than 1 percent of the Central Oregon population and the Baker population protected by these measures in PHMA and GHMA.

Table 4-18
Percent of the Populations Affected by Recommended Withdrawals from Locatable Mineral Entry—Alternative C

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0	0
Central	0.89	0.00
Northern Great Basin	8.04	4.97
Western Great Basin	41.17	31.79

Under Alternative C, mineral development impacts would be avoided over largest amount of habitat by closing PHMA and GHMA to new fluid mineral and salable mineral materials leasing, and recommending withdrawal of all occupied habitat from locatable mineral entry. These approaches would minimize habitat loss, fragmentation and degradation and disturbance to GRSG from energy development and mining on BLM-administered land (discussed in **Section 4.3.2**), but could have the indirect effect of pushing energy development activity to adjacent private lands, where BLM land use controls cannot be implemented.

COT Report Threat—Infrastructure

Impacts from Lands and Realty Management
Under Alternative C, both PHMA and GHMA would be managed as ROW exclusion areas (10,682,124 acres), (**Table 2-10).** Establishing ROW exclusion areas would reduce fragmentation on BLM-administered land and would protect GRSG habitat, as described under **Section 4.3.2**. Under Alternative C, all corridors and tower-type ROWs are prohibited in GRSG habitat.

Re-locating infrastructure corridors outside habitat areas may not be feasible as these corridors were already established in areas intended to minimize impacts on wildlife, wilderness and WSAs. In addition, establishing ROW exclusion areas could result in pushing ROW impacts onto adjacent private lands. Given the absence of land use controls and management, this alternative could increase GRSG habitat fragmentation overall. **Table 4-19**, Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas—Alternative C, below shows the percent of each GRSG population affected by ROW exclusion and avoidance, including for wind power, under Alternative C. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within ROW exclusion areas, with over 10 percent of the Central Oregon population and 1 percent of the Baker population protected by these measures.

Table 4-19
Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas under Alternative C

Population	Percent of Population Affected (based on acres of habitat affected)	
	Exclusion	Avoidance
Baker	1	0
Northern Great Basin	33	0
Western Great Basin	34	0
Central Oregon	13	0

COT Report Threat—Recreation

Impacts from Recreation Management
Alternative C includes no specific recreation plan related to GRSG or their habitat; thus, disturbance and habitat degradation associated with recreational use would continue, though most recreational uses in GRSG habitat are considered benign.

Impacts from Travel Management
Under Alternative C, roads in occupied habitat would be closed or limited in order to minimize collision risk and limit habitat fragmentation. This approach is the most protective of GRSG of all alternatives. **Table 4-20**, BLM-Administered Acres of PHMA and GHMA and Percent of Oregon Populations within Travel Management Designations under Alternative C, below shows the percent of GRSG within the decision area affected by travel management designations under Alternative C. While acres closed to OHV use would not change, most (80 percent) of GRSG would be in areas limited to existing routes under this alternative.

Table 4-20
BLM-Administered Acres of PHMA and GHMA and Percent of Oregon Populations within Travel Management Designations under Alternative C

Allocation	PHMA (acres)	GHMA (acres)	Percent Population Affected
Closed (existing)	48,450	143,637	1.7
Limited	4,498,590	5,518,995	80
Open	0	0	0

COT Report Threat—Sagebrush Removal, Agricultural Expansion, and Urban Development

Impacts from Land Tenure Decisions

No lands in PHMA or GHMA would be available for disposal under Alternative C. As discussed above, current disposal, exchange, and acquisition criteria already include retaining lands with threatened or endangered species, high quality riparian habitat, plant and animal populations or natural communities of high interest. Private land may be acquired to enhance the conservation value of existing lands for GRSG and reduce habitat fragmentation. Although it is uncertain how much private land could be acquired under Alternative C, this management approach could increase the BLM acreage of enhanced sagebrush, compared with Alternatives A, B, and D, but could also contribute to GRSG habitat losses on private lands, as a result of eliminating grazing on BLM-administered lands. **Table 4-21**, Percent of the Populations Affected by Unavailability to Land Disposals—Alternative C, below shows the percentage of each population impacted by unavailability to land disposal under Alternative C. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within areas unavailable to land disposals, with over 10 percent of the Central Oregon population and 1 percent of the Baker population protected by these measures.

Table 4-21
Percent of the Populations Affected by Unavailability to Land Disposals—Alternative C

Population	Percent of Population Affected (based on acres of habitat affected)
Baker	1
Northern Great Basin	33
Western Great Basin	34
Central Oregon	13

Impacts from ACECs

ACECs to protect GRSG would be designated as sagebrush reserves in PHMA, consisting of blocks of BLM-administered land that exceed 4,000 acres, covering a total of 4,546,622 acres. In ACECs where GRSG is a relevant and important value, management prescriptions would be tailored to the threats to GRSG in the specific location and would be more likely to protect intact GRSG habitats or populations than under Alternative A.

Summary

Alternative C would protect the largest amount of GRSG habitat from energy development and infrastructure on BLM-administered land. Alternative C includes a zero percent surface disturbance limit in PHMA. It would also establish new ACECs to protect GRSG. Under Alternative C, livestock grazing

would be removed from occupied habitats. This action would reduce impacts on GRSG from grazing on BLM-administered lands; however, it would entail other management changes, such as increased fencing and reduced invasive plant control efforts, leading to fine-fuel buildup that may contribute to more damaging wildfires. In addition, Alternative C relies on passive restoration for invasive plant and conifer invasion, which is less effective in maintaining GRSG habitat. Because these represent the largest threats to GRSG in Oregon, Alternative C provisions may be counterproductive for GRSG habitat, and represent a less effective conservation approach than currently provided under Alternative A.

4.3.7 Alternative D

Under Alternative D, the BLM would manage lands to conserve, enhance, and restore GRSG habitat. Management and impacts would be similar to Alternative B, though Alternative D would incorporate more flexibility with the use of active management tools and adaptive management applied to resource uses to account for sub-regional conditions. PHMA and GHMA would be designated (**Table 4-2**). The BLM would require a cap of 3 percent disturbance in PHMA, from human disturbances not including wildfire, and would implement numerous conservation measures to reduce impacts from human activities in PHMA. This would reduce the likelihood for habitat loss, degradation, or fragmentation.

COT Report Threat—Fire

Impacts from Wildland Fire Management

Alternative D would manage wildland fire similarly to Alternatives B and C. Fire suppression would be prioritized in GRSG habitat, as described under Alternative B, though priorities for suppression of unwanted wildfires would differ somewhat. Alternative D also establishes objectives that would provide a quantifiable indication of progress, and includes fuel breaks as part of the overall approach of managing fuel continuity across landscapes. VDDT vegetation modeling (**Tables 4-3** and **4-4**) showed no effect on habitat trends from reducing the probability of fire by 50 percent in the Warm-Dry Sagebrush Group in Alternatives B, D, E, and F to account for fuel breaks.

Alternative D provides more explicit guidance for fire suppression policies. This provision would be more protective for areas governed by older plans than Alternative A. Alternative D also provides clearer desired conditions for sagebrush to guide use of fire and other fuel treatments than older plans in Alternative A and the other action alternatives, but it lacks clear desired conditions for juniper and crested wheatgrass seedings to guide use of fire and other fuel treatments. Alternative D allows use of both planned and unplanned ignitions as appropriate to meet habitat objectives in all sagebrush types.

Additional management flexibility and guidance would be incorporated to tailor management for specific vegetation communities. Fuels treatment would be

designed and implemented with seasonal restrictions on treatments within winter range, as described under Alternative C. Fire suppression in sagebrush areas would protect mature sagebrush acreage and GRSG from the disturbance associated with wildfire. Alternative D provides more specific direction for post-burn restoration activities such as seeding of perennial grasses, forbs and shrubs and may improve recovery rates of habitat compared with Alternatives A, B, and C.

COT Report Threat—Invasive Plant Species

Impacts from Vegetation Management

Impacts from habitat restoration and vegetation management on GRSG under Alternative D would be similar to Alternative B. Management would also prioritize restoration projects and would use the most current science when implementing restoration projects. Alternative D provides additional guidance for invasive annual grass treatments and measures to incorporate invasive plant prevention during wildfire response.

The guidance in Alternative D is more specific than in older LUPs and the other action alternatives, reducing likelihood of differing interpretations across administrative units and over time. However, because grazing utilization levels are not specified, management guidance from existing LUPs would continue to apply, which may be insufficiently protective of GRSG, though Standards for Rangeland Health and Guidelines for Grazing Management would still apply.

The habitat trend under Alternative D from VDDT vegetation modeling (**Tables 4-3** and **4-4**) is downward through year 10, then upward through year 50 for sub-population 902. Habitat trend is downward through year 50 for sub-population 903, and upward through year 50 for sub-populations 904, 906, and P04, with a 13 percent increase by year 50 in both 906 and P04. Overall, the habitat trend is upward through year 50 at a relatively steady rate.

The objective is to treat 30 percent of GRSG habitat within 10 years for a variety of purposes, including to control invasive plant species. It establishes priority areas for treatment, lists allowable control methods, and requires actions during land management activities and wildfire response intended to reduce the risk of additional spread and new invasions. It requires the use of integrated vegetation management and ecologically based invasive plant management principles.

If 30 percent of annual grass areas with at least 25 percent annual grass cover within four miles of leks were successfully treated, the annual treatment rate would be approximately 8,920 acres per year for 10 years. The current annual grass expansion rate is not known, so it is also not known if this treatment rate would slow or reverse the expansion of invasive annual grasses close to leks.

Overall, the risk of invasive plant spread is similar across Alternatives B, D, E, and F, and would contribute to reducing threats of habitat loss, fragmentation and degradation from invasive plants, though the current management (Alternative A) approach to addressing these threats is similar.

COT Report Threat—Conifer Expansion

Impacts from Vegetation Management

Habitat restoration and vegetation management under Alternative D has essentially the same provisions as Alternative B though Alternative D provides specific guidance and the clearest priorities for juniper treatment to reduce disturbance to GRSG and loss of sagebrush or sagebrush understory vegetation. This guidance would improve the likelihood for successful sagebrush restoration and GRSG habitat enhancement over the long term, compared with current management or the other action alternatives.

The objective is to treat 30 percent of GRSG habitat within 10 years for a variety of purposes, including to reduce juniper encroachment. This alternative leaves decision to BLM Districts to determine how to apportion the objective between juniper reduction, invasive plant species control, and other treatments to benefit GRSG habitat. It establishes priorities for juniper treatment, based on encroachment phase, habitat category (PHMA and GHMA), and the abundance of invasive plant species in the understory. It guides post-treatment seeding, allowable post-treatment juniper condition, and timing of prescribed burning during jackpot burning.[1]

Treatments would be focused more on locations likely to benefit GRSG with prescriptions designed to benefit them. Since no treatment rate specific to juniper is established, it is not clear if the treatment rate would exceed the encroachment rate. Treating 30 percent of juniper within 4 miles of leks would treat approximately 24,150 acres per year for 10 years. The annual treatment rate would be roughly 3 percent, which is less than the estimated encroachment rate of 4.5 percent per year.

COT Report Threat—Grazing and Free-Roaming Wild Horses and Burros

Impacts from Range Management

Under Alternative D, as shown in **Table 2-10**, there would be a small decrease acreage open for livestock grazing (4,408,539 acres open in PHMA, 63,785 less than Alternative A, and 5,514,479 acres in GHMA, 22,070 less than Alternative A). Guidance concerning livestock grazing management with respect to GRSG habitat is more specific than in Alternative B, reducing the probability of varying interpretations and increasing the probability of more standard approaches to

[1]Burning scattered pockets of juniper fuels

livestock grazing management to support GRSG habitat quality and reduce degradation and loss of understory vegetation.

In addition, the BLM would prioritize allotments for processing of livestock grazing permits and leases and would prioritize land health assessments based on the type of allotment and time since last assessment. This would increase the probability that problem areas would be identified and corrections applied, and slightly increase the likelihood that livestock grazing management would be adjusted to address GRSG habitat concerns over Alternative B.

Range management structures and water sources would be avoided in GRSG habitat where possible, and range management structures and water features would be designed to minimize West Nile virus and other harmful impacts on GRSG, as under Alternative B. As a result, livestock grazing management under Alternative D would enhance GRSG habitat quality and reduce disturbance to GRSG more than under Alternative A, and potentially more than the other action alternatives.

Impacts from Wild Horse and Burro Management

Alternative D impacts from wild horse and burros management are similar to those described for Alternative B. Alternative D also provides guidance for prioritizing land health evaluations, which would improve the efficiency and response time to improve GRSG habitat conditions.

COT Report Threat—Energy Development and Mining

Impacts from Leasable Fluid Minerals Management

Under Alternative D, acres closed to fluid mineral leasing in PHMA and GHMA would be similar to Alternative A (see **Table 2-11**). However, acreage subject to stipulations, such as NSO, would apply within 4 miles of a lek, an increase in protection relative to Alternative A. In addition, operational constraints would be applied to existing leases for oil, gas, or geothermal energy. RDFs would avoid or minimize impacts in PHMA to the extent the law allows. A 3 percent disturbance cap would apply in PHMA. **Table 4-22**, Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative D, below shows the percentage of each GRSG population affected by closures to fluid minerals under Alternative D. Approximately one-third of the Western Great Basin population would be within areas closed to fluid mineral leasing, with approximately 10 percent of the Northern Great Basin and one percent of the Central Oregon protected by these measures in PHMA and GHMA. None of the Baker population would be protected because the majority of the GRSG habitat is not on BLM-administered land.

Table 4-22
Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative D

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0	0
Central	1.82	0.32
Northern Great Basin	13.20	13.66
Western Great Basin	32.05	25.68

These provisions would reduce the impacts of fluid mineral leasing and development on GRSG habitat loss, degradation, or fragmentation more than Alternative A, but less than Alternatives B or C.

Impacts from Mineral Materials (Salables), Nonenergy Leasable Minerals Management and Locatable Mineral Entry

Under Alternative D, lands would be available to nonenergy leasable minerals subject to NSO stipulation. BMPs and restoration would be required on existing leases. PHMA would be closed to new salable mineral material site development. This would reduce impacts on GRSG habitat associated with nonenergy leasable and salable mineral development, though it could result in higher costs or air quality impacts from increased transport of materials. In addition, restrictions on salable mineral development on BLM-administered land could push development onto private lands, which are not subject to the 3 percent disturbance cap or other land use controls.

Table 4-23, Percent of the Populations Affected by Closures to Salable Minerals—Alternative D, below shows the percentage of each GRSG population affected by closures to salable minerals under Alternative D. Approximately 30 percent of PHMA in the Northern and Western Great Basin populations would be within areas closed to salable mineral development, along with 15 percent of Western Great Basin GHMA, less than 10 percent of the Northern Great Basin GHMA, and smaller percentages of Central Oregon and Baker populations PHMA and GHMA protected by these measures.

Table 4-23
Percent of the Populations Affected by Closures to Salable Minerals—Alternative D

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0.00	2.38
Central	0.93	6.29
Northern Great Basin	6.67	31.93
Western Great Basin	15.46	29.25

Alternative D includes no recommendation to withdraw GRSG habitat beyond existing withdrawals and recommended withdrawals; thus, locatable minerals development would be managed as described under Alternative A. The percent of populations affected by withdrawal from locatable mineral entry would also be the same as under Alternative A. Prospecting for nonenergy leasable minerals would be permitted after appropriate environmental review. However, this alternative would seek to minimize habitat loss and other impacts from locatable mineral development in PHMA by limiting surface disturbance to 3 percent.

Impacts from recommended withdrawals would be the same as Alternative A.

COT Report Threat—Infrastructure

Impacts from Lands and Realty Management

PHMA would be managed as ROW avoidance areas (4,289,889 acres); no new ROW exclusion areas would be established for utilities, including wind power (**Table 2-10**). Exclusion areas already in place would remain in effect in PHMA, but all other areas in PHMA would be designated as avoidance areas (see **Table 2-10**). ROWs would be allowed in avoidance areas if the disturbance would be either under the 3 percent disturbance cap or would cause no measurable disturbance. ROW authorization would include evaluating and implementing effective mitigation to offset the resulting loss of GRSG habitat. The threat of avian predators on GRSG would be reduced through the RDF requiring perch deterrents on all power lines.

In GHMA, the actions described under Alternative D would consider ROW authorization on a case-by-case basis with assessments to determine impacts on GRSG habitat and connectivity, and prioritize location outside PHMA when possible.

This approach would circumvent potential impacts of ROW exclusion areas, such as habitat fragmentation and increased predation, in areas with mixed public/private landownership, where exclusion areas would result in re-locating ROWs onto adjacent private lands lacking BLM land use controls. If ROWs were avoided in sensitive GRSG habitat, Alternative D would protect GRSG habitat from loss and fragmentation by avoiding ROW construction; at the same time, it would retain the management flexibility to locate ROWs in less sensitive areas in order to preserve connectivity of PHMA. **Table 4-24**, Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas—Alternative D, shows the percentage of each GRSG population affected by ROW exclusion and avoidance, including wind power, under Alternative D. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within ROW avoidance areas, with less than 10 percent of the Central Oregon and Baker populations protected by these measures.

COT Report Threat—Recreation

Impacts from Recreation Management and Travel Management
Impacts from recreation management and travel planning under Alternative D are the same as Alternative B.

Table 4-24
Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas—Alternative D

Population	Percent of Population Affected (based on acres of habitat affected)	
	Exclusion	Avoidance
Baker	0	>2
Northern Great Basin	0	35
Western Great Basin	0	31
Central Oregon	0	6

COT Report Threat—Sagebrush Removal, Agricultural Expansion, and Urban Development

Impacts from Land Tenure Decisions
No lands in PHMA would be available for disposal under Alternative D unless involved in a land exchange that results in a more contiguous, better land area for GRSG habitat. Impacts from land tenure decisions are the same as Alternative B. **Table 4-25**, Percent of the Populations Affected by Unavailability to Land Disposals—Alternative D, shows the percentage of each GRSG population affected by unavailability to land disposal under Alternative D. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within areas unavailable to land disposals, with less than 10 percent of the Central Oregon and Baker populations protected by these measures.

Table 4-25
Percent of the Populations Affected by Unavailability to Land Disposals—Alternative D

Population	Percent of Population Affected (based on acres of habitat affected)
Baker	>2
Northern Great Basin	35
Western Great Basin	31
Central Oregon	6

Impacts from ACECs

No additional ACECs would be designated under Alternative D; impacts on GRSG would be the same as under Alternative A.

Summary

Alternative D uses flexibility in application of development restrictions in GRSG habitat, using ROW avoidance but not exclusion areas, up to an allowable disturbance cap of 3 percent maximum human disturbance, not including fire. Less GRSG habitat would be protected from mineral development than under Alternatives B or C, but Alternative D does place lands under stipulations restricting use. In addition, Alternative D includes a 3 percent disturbance cap in PHMA, which would limit the amount of disturbance allowed in GRSG habitat. Allowable disturbance under the cap would require mitigation, to avoid, minimize, and apply compensatory mitigation for habitat loss. Alternative D provides a more specific approach than in LUPs and compared with the other action alternatives, reducing the likelihood of differing interpretations across administrative units over time. The flexibility in Alternative D allows management to adapt to regional conditions and would provide a high level of protection for GRSG habitat.

4.3.8 Alternative E

Under Alternative E, the BLM would manage to maintain, conserve, enhance, and restore GRSG habitat. Core area habitat and low density habitat would be designated (**Table 4-2**). Low density is a subset of GHMA that would be designated in other alternatives. In both core area and low density areas, the BLM would incorporate management flexibility to permit high value infrastructure with appropriate mitigation and BMPs tailored for the sub-region. A zero percent limit on human disturbance would apply in core area habitat. This alternative would also assist resource managers in achieving the population and habitat objectives of the ODFW State Plan.

COT Report Threat—Fire

Impacts from Wildland Fire Management

Alternative E manages fire suppression using habitat designations of Core Area and Low Density habitats rather than PHMA or GHMA; Low Density habitat covers fewer acres than GHMA, thus providing protection to less GRSG habitat. Impacts from wildland fire management under Alternative E are similar to Alternative D, but differ in two aspects: Alternative E does not allow use of unplanned wildfires in Core Area habitat to meet habitat management objectives and it strongly discourages use of prescribed fire in the Warm-Dry Sagebrush Group. Limits on use of fire, either planned or unplanned, in the Warm-Dry Sagebrush Group are likely to be counterproductive where large expanses of high sagebrush density exist, because homogeneous fuel beds typically produce highly damaging burn patterns and promote annual grass invasion. Limits on use of natural unplanned ignitions in Cool-Moist Sagebrush Group would reduce the

probability of restoring fire as an ecosystem process and obstruct opportunities to use unplanned ignitions to control juniper.

These provisions could result in less effective fire management and more severe impacts on GRSG habitat from wildland fire compared with Alternative D, though all alternatives are relatively similar in their approach to fire management.

COT Report Threat—Invasive Plant Species

Impacts from Vegetation Management

Alternative E emphasizes controlling invasive plant species and using the habitat monitoring techniques in the ODFW plan. Invasive plant species will be managed through the following:

- Systematic detection surveys
- Priorities for invasive plant control
- Establishing invasive plant protection areas
- Providing guidance for detection, control and containment, prevention, and restoration

The approach under Alternative E is similar to Alternative B and also lacks specific guidance regarding target invasive plant control levels and crested wheatgrass restoration, increasing uncertainty that desired outcomes would be achieved. However, Standards for Rangeland Health and Guidelines for Grazing Management would still apply and would provide protection to GRSG habitat from degradation.

The habitat trend under Alternative E from VDDT vegetation modeling (**Tables 4-3** and **4-4**) is upward through year 10 then downward through year 50 for sub-population 902. The habitat trend is downward through year 50 for sub-population 903, and upward through year 50 for sub-populations 904, 906, and P04. Overall, the habitat trend is upward through year 10, then slowly downward through year 50. Reducing the probability of fire by 50 percent in the Warm-Dry Sagebrush Group in Alternatives B, D, E, and F to account for fuel breaks had no effect on habitat trends.

The goals of invasive plant management are to establish and maintain healthy, functioning sagebrush community with increased invasion resistance and to minimize the impacts of invasive plant species on GRSG habitat. This alternative calls for the following measures:

- Requires systematic surveys to detect and control new infestations
- Prioritizes areas with at least 20 percent composition of native understory species for control efforts

- Recommends establishing invasive plant prevention areas where infestations are currently limited
- Recommends using Invasive Plant Prevention Guidelines from the Center for Invasive Plant Management
- Recommends containing large infestations and provides a list of potential control measures
- Requires aggressive treatment of invasive plant species that threaten GRSG habitat and the use of BMPs to prevent reinvasion

Most recommended actions are already BLM policy and standard practice. Systematic surveys would increase the detection rate of new infestations. Developing restoration plans is no guarantee that funding would be provided to implement any plans. Aggressive treatment rates are not specified, and current treatment rates are based on provided funding.

The effective control of invasive annual grasses remains problematic due to the current extent of invasion and the size of areas that would need to be successfully treated. It would also be hampered by changes in soil structure, chemistry, and biota from prolonged dominance by invasive annual grasses that reduce the ability of native species to become established. Successful treatment rates for annual grasses would likely remain low, especially in warm-dry and shallow-dry sagebrush.

Alternative E lacks the comprehensive approach to vegetation management that is presented in the other action alternatives. Overall, it is uncertain whether the risk of invasive plant spread under this alternative would differ from Alternative A, B, D, or F.

COT Report Threat—Conifer Expansion

Impacts from Vegetation Management

Under Alternative E, there is no specific objective for treating juniper, and this alternative allows retaining up to 30 percent of GRSG range in juniper and other vegetation types. It promotes no net loss of sagebrush habitat by BLM resource area or district.

Juniper removal should promote a return of native plants. It recommends the use of encroachment phase to identify target treatment areas. It also provides direction on post-treatment seeding, allowable post-treatment juniper condition, and the timing of prescribed burning when jackpot burning in spring. It limits the size of burn blocks when broadcast burning juniper when sagebrush is present in the understory.

Soils are often not frozen in March and April, which would likely prevent jackpot burning of cut juniper. Burning when soils are frozen reduces the heat

pulse into the soil and increases the probability that dormant plants and seeds will not be killed by the burn. In addition, frozen ground is less susceptible to compaction from vehicles that may be driven out to a project site. Limiting the size of broadcast burn blocks would limit the use of landscape scale treatments, increasing costs and reducing treatment rates. Burn block size limits could result in prolonged disturbance of GRSG breeding in order to sufficiently reduce the degree of juniper encroachment near leks. There would be unknown consequences on success rate of GRSG breeding if treatment were concentrated around particular core areas. Treatments would be focused more on locations likely to benefit GRSG, with prescriptions designed to benefit GRSG.

Since no treatment rate is specified, the current treatment rate would likely continue. If treatment activities are more distributed across the landscape to minimize disturbance during breeding, then the rate of treatment may not be sufficient for it to maintain quality habitat over time near leks. Treatments would be focused more on locations likely to benefit GRSG, with prescriptions designed to benefit GRSG. The current treatment rate is less than the estimated rate of encroachment.

Alternative E places more restrictions on the use of fire to treat juniper, with the intent of preserving as much sagebrush habitat as possible. Alternative E limits broadcast burning of juniper stands to 160 acres, which increases costs, reduces the number of acres that can be treated with available funds, and is less likely to reduce the rate of juniper expansion, because of the logistical challenge of limiting broadcast burning of stands to 160 acres. Overall, however, Alternative E would have approximately the same GRSG habitat improvements as Alternatives B, D, and F, all of which would improve GRSG protection compared with Alternative A.

COT Report Threat—Grazing and Free-Roaming Wild Horses and Burros

Impacts from Range Management

Alternative E manages livestock grazing acreage in ways similar to Alternative A ,using the terminology of Core and Low Density habitat rather than PHMA or GHMA. The same AUMs and acreage would be available for livestock grazing under Alternative E as under Alternative A. Guidance for grazing management provisions is more general under Alternative E than under Alternative D, but more specific than under Alternative B.

Fencing located near GRSG nesting areas and posing collision risk to GRSG would be marked, but not removed or modified. Structural range improvements would be located or relocated to maintain or enhance GRSG habitat quality. In addition, natural water sources that have been modified for livestock watering would be rehabilitated and off-site livestock watering facilities would be developed. Structural improvements would not be permitted within 1.2 miles of

leks in order to minimize impacts on GRSG from West Nile virus, and limit habitat degradation from concentrated numbers of livestock or wild horses in watering areas.

Impacts from Wild Horses and Burro Management
Impacts from wild horse and burro management are similar to under Alternative A. If range improvements such as water sources are retained in GRSG habitat to benefit wild horses and burros, this would reduce beneficial impacts on GRSG.

The expected outcomes for GRSG habitat from grazing management would be very similar to Alternative D, although no priorities are established for conducting assessments, slightly decreasing the likelihood that livestock grazing management would be adapted as needed in allotments with very old or no assessments available.

COT Report Threat—Energy and Mining

Impacts from Leasable Fluid Minerals Management
Alternative E recommends no development in Core Areas if there is GRSG habitat and with evidence of occupancy, but does not explicitly close areas to leasing or apply stipulations. However, ODFW strategy states that loss of core habitat is not mitigable; as a result, it would be closed to mining. Alternative E also recommends avoidance of mineral development in Low Density/GHMA areas. **Table 4-26**, Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative E, below shows the percentage of each GRSG population affected by closures to fluid mineral leasing under Alternative E. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within areas closed to fluid mineral leasing in Core Areas, with approximately 10 percent of Low Density habitat protected. For the Central Oregon and Baker populations less than ten percent of habitat would be protected by these measures in Core Areas and Low Density habitat.

Table 4-26
Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative E

Population	Percent of Population Affected (based on acres of habitat affected)	
	Low Density	Core Area
Baker	0.00	2.41
Central	0.44	6.37
Northern Great Basin	4.33	32.35
Western Great Basin	13.47	29.63

Impacts from Mineral Materials (Salables), Nonenergy Leasable Minerals Management and Locatable Mineral Entry

Impacts on GRSG from mineral materials and nonenergy leasable minerals management under Alternative E are the same as those described for Alternative B.

Alternative E contains no explicit recommendation to withdraw GRSG habitat from locatable mineral entry. However, ODFW strategy states that loss of core habitat is not mitigable; as a result, it would be closed to mining. The approach under Alternative E would be less effective because development of locatable minerals is a non-discretionary action; withdrawing lands from entry is the only way to achieve no development. As such, Alternative E would be more protective of GRSG habitat than current management but less effective than the other action alternatives. **Table 4-27**, Percent of the Populations Affected by Closures to Salable Minerals—Alternative E, shows the percentage of each GRSG sub-population affected by closures to salable mineral development under Alternative E. Approximately one-third of the Northern Great Basin and Western Great Basin sub-populations would be within areas closed to salable mineral development, with less than 10 percent of the Central Oregon and Baker sub-populations protected by these measures.

Table 4-27
Percent of the Populations Affected by Closures to Salable Minerals—Alternative E

Population	Percent of Population Affected (based on acres of habitat affected)	
	Low Density	Core Area
Baker	0.00	2.38
Central	0.43	6.29
Northern Great Basin	4.48	31.93
Western Great Basin	13.36	29.25

Table 4-28, Percent of the Populations Affected by Recommended Withdrawals from Locatable Mineral Entry—Alternative E, below shows the percentage of each GRSG population affected by recommended withdrawals from locatable mineral entry under Alternative E. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within areas recommended for withdrawal from locatable mineral entry, with less than 10 percent of the Central Oregon and Baker populations protected by these measures.

Table 4-28
Percent of the Populations Affected by Recommended Withdrawals from Locatable Mineral Entry—Alternative E

Population	Percent of Population Affected (based on acres of habitat affected)	
	Low Density	Core Area
Baker	0	0
Central	0.12	0.00
Northern Great Basin	3.45	4.97
Western Great Basin	34.31	31.79

COT Report Threat—Infrastructure

Impacts from Lands and Realty Management

Impacts on GRSG habitat from lands and realty management under Alternative E are the same as those described for Alternative B. **Table 4-29**, Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas—Alternative E, shows the percentage of each GRSG population affected by ROW exclusion and avoidance areas, including for wind, under Alternative E. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within ROW exclusion areas, with less than 10 percent of the Central Oregon and Baker populations protected by these measures.

Table 4-29
Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas—Alternative E

Population	Percent of Population Affected (based on acres of habitat affected)	
	Exclusion	Avoidance
Baker	>2	0
Northern Great Basin	35	0
Western Great Basin	31	0
Central Oregon	6	0

COT Report Threat—Recreation

Impacts from Recreation Management and Travel Management

Alternative E includes no specific recreation plan related to GRSG or their habitat. However, cross-country motorized travel would be seasonally prohibited and limited to existing routes in Core Area and Low Density habitat. Thus, this alternative would reduce impacts of recreation and travel on GRSG relative to Alternatives A, B, D, and F. **Table 4-30**, BLM-Administered Acres of PHMA and GHMA Core and Low Density Habitat and Percent of Oregon Populations within Travel Management Designations under Alternative E, shows the percentage of GRSG within the decision area affected by travel management

designations under Alternative E. While acres closed to OHV use would not change, over half of GRSG occur in either limited areas (28 percent of GRSG) or open areas (25 percent of GRSG) under this alternative.

Table 4-30
BLM-Administered Acres of PHMA and GHMA Core and Low Density Habitat and Percent of Oregon Populations within Travel Management Designations under Alternative E

Allocation	Core Habitat	Low Density	Percent Population Affected
Closed (existing)	48,450	70,566	0.8
Limited	4,498,590*	1,710,392	28
Open	0	1, 610,288	25

*with seasonal buffers

COT Report Threat—Sagebrush Removal, Agricultural Expansion, and Urban Development

Impacts from Land Tenure Decisions

No lands in Core Area habitat would be available for disposal under Alternative E. Impacts from land tenure decisions are the same as Alternative B. **Table 4-31**, Percent of the Populations Affected by Unavailability to Land Disposals—Alternative E, shows the percentage of each GRSG population affected by unavailability to land disposal under Alternative E. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within areas unavailable to land disposals, with less than 10 percent of the Central Oregon and Baker populations protected by these measures.

Table 4-31
Percent of the Populations Affected by Unavailability to Land Disposals—Alternative E

Population	Percent of Population Affected (based on acres of habitat affected)
Baker	>2
Northern Great Basin	35
Western Great Basin	31
Central Oregon	6

Impacts from ACECs

No additional ACECs would be designated under Alternative E; impacts on GRSG would be the same as under Alternative A.

Summary

Alternative E uses habitat designations of Low Density instead of GHMA, and Core Area rather than PHMA. Management of Core Area habitat would be similar to PHMA; Low Density would cover fewer acres than GHMA and thus would provide less protection than Alternative B. Alternative E includes a zero percent maximum surface disturbance limit for human disturbance in Core Area habitat. Impacts from Alternative E are similar to Alternatives B, D, and F, for control of invasive plants and conifers, recreation, infrastructure, land tenure, and fire management. Grazing impacts would be similar to Alternative A, with the same acreage open to grazing, but restrictions on structural range improvements and fence marking would benefit GRSG. Alternative E has weaker restrictions on mineral leasing on BLM-administered land than other action alternatives. Overall, Alternative E is more protective of GRSG and their habitat than Alternatives A or C, but less protective than the other action alternatives. Alternative E places strict limits on the ability to treat juniper; thus is also likely to fail to treat juniper at its rate of expansion. This would reduce GRSG habitat availability, although at a slower rate than under Alternative C.

4.3.9 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. PHMA and GHMA would be designated (**Table 4-2**). A maximum 3 percent disturbance cap would be applied to human disturbances in PHMA, similar to Alternatives B and D, but under Alternative F the cap would also include acreage impacted from fire under the 3 percent limit.

COT Report Threat—Fire

Impacts from Wildland Fire Management

Under Alternative F, impacts from wildland fire management are the same as those described for Alternative B.

COT Report Threat—Invasive Plant Species

Impacts from Vegetation Management

This alternative has no specific objective for treating invasive plant species. It requires the use of integrated vegetation management and ecologically based invasive plant management principles. It requires soil cover and native herbaceous plant populations at full ecological site potential to maximize resistance to invasion. Effects would be similar to Alternative A.

Impacts on GRSG habitat from vegetation management for invasive plants under Alternative F are the same as under Alternative B. Targets for restoration are not specified, increasing uncertainty of achieving desired outcomes. Overall, the guidance regarding invasive plant control targets is more specific that in older

plans, but less specific than in newer plans, increasing likelihood of differing interpretations across administrative units over time.

For Alternative F, the habitat trend from VDDT vegetation modeling (**Tables 4-3 and 4-4**) is upward through year 10 then downward through year 50 for sub-populations 902 and 903. The habitat trend is upward through year 50 for sub-populations 904, 906, and P04, with a higher rate of increase in the first 10 years and the greatest change for sub-population P04 (more than 10 percent). Overall habitat trend is upward through year 50 with greatest increase in first 10 years. Reducing the probability of unmanaged grazing by 50 percent under Alternative F had no effect on habitat trends. Reducing the probability of fire by 50 percent in the Warm-Dry Sagebrush Group in Alternatives B, D, E, and F to account for fuel breaks had no effect on habitat trends.

COT Report Threat—Conifer Expansion

Impacts from Vegetation Management

Impacts on GRSG habitat from vegetation management for conifer encroachment under Alternative F would be the same as under Alternative C.

COT Report Threat—Grazing and Free-Roaming Wild Horses and Burros

Impacts from Range Management

Under Alternative F, 25 percent of livestock grazing acreage in PHMA and GHMA would be unavailable to grazing each year, and use levels in open areas would be limited to 25 percent, reducing available AUMs by approximately 62 percent. Other provisions would be the same as under Alternative B. As under Alternative B, range management structures, fences, and water features would be designed to minimize impacts on GRSG. The reduction in grazing levels is intended to reduce the impacts of livestock grazing on GRSG and their habitat, as described in **Section 4.3.2**. Reducing levels of grazing could decrease disturbance to nesting GRSG and reduce loss of sagebrush understory vegetation.

Reducing rather than eliminating grazing, as under Alternative C, would avoid an increased need for fencing, which can harm GRSG and fragment habitat. Habitat quality and acres of sagebrush habitat could increase in areas where livestock was a factor for habitat degradation. Alternative F's approach of reducing grazing could limit the loss of understory vegetation for GRSG nesting, while maintaining the range benefits provided by livestock grazing, and may lead to improved sagebrush habitat quality. However, as shown in **Tables 4-3** and **4-4**, VDDT modeling suggests the grazing reduction under Alternative F does not increase the percentage of GRSG habitat in preferred condition.

Impacts from Wild Horse and Burro Management
Under Alternative F, wild horse and burro AML would be cut 25 percent to reduce impacts on GRSG habitat. Alternative F is more restrictive of wild horse and burro use than Alternatives A, B, C, D, and E.

COT Report Threat—Energy Development and Mining

Impacts from Leasable Fluid Minerals Management
Impacts on GRSG from leasable minerals management under Alternative F are the same as those described for Alternative C, and the percentage of each population affected by these decisions would be the same as described for Alternative C. This alternative would also avoid leasing PHMA by closing it to new mineral leases or exploration permits, as under Alternatives B and C. For existing leases, RDFs would avoid or minimize impacts in existing leases in PHMA to the extent the law allows.

Impacts from Mineral Materials (Salables) and Locatable Mineral Entry
Impacts on GRSG from salable and locatable minerals management under Alternative F would be the same as those described for Alternative B, and the percentage of each population affected by these decisions would be the same as described for Alternative B.

COT Report Threat—Infrastructure

Impacts from Lands and Realty Management
Impacts on GRSG habitat from lands and realty and travel management under Alternative F are the same as those described for Alternative B, and the percentage of each population affected by these decisions would be the same as described for Alternative B.

COT Report Threat—Recreation

Impacts from Recreation Management and Travel Management
Impacts from recreation management and travel under Alternative F are the same as Alternative B, and the percentage of each population affected by these decisions would be the same as described for Alternative B.

COT Report Threat—Sagebrush Removal, Agricultural Expansion, and Urban Development

Impacts from Land Tenure Decisions
No lands in PHMA would be available for disposal under Alternative F. Impacts from land tenure decisions are the same as Alternative B, and the percentage of each population affected by these decisions would be the same as described for Alternative B.

Impacts from ACECs

Under Alternative F, 2,760,783 acres of GHMA and 1,492,804 acres of GHMA would be designated as new ACECs. In ACECs where GRSG is a relevant and important value, management prescriptions would be tailored to the threats to GRSG in the specific location and would be more likely to protect intact GRSG habitats or populations than under Alternative A.

Summary

Alternative F would apply many of the same provisions of Alternatives B, D, and E for control of invasive plant species and conifers, recreation, land tenure, and fire suppression. Alternative F would restrict surface disturbance to 3 percent in PHMA from all human disturbances, including fire. In addition, it would reduce, rather than eliminate, grazing in GRSG habitat. Alternative F would restrict mineral leasing over all occupied habitat, and would establish new ACECs for GRSG, similar to Alternative C. Reducing rather than eliminating grazing could avoid the counterproductive side effects under Alternative C, and may lead to improved sagebrush habitat quality or understory vegetation. Alternative F's approach of reducing livestock grazing could limit the loss of herbaceous understory vegetation for GRSG nesting without losing the range benefits provided by livestock grazing. However, VDDT modeling does not indicate an improvement in preferred habitat condition under this alternative.

Alternative F would place the greatest restrictions on development, but would reduce BLM management flexibility to address threats to GRSG habitat, and could result in development being pushed onto private lands lacking BLM land use controls. Overall, Alternative F would provide approximately the same level of protection as Alternative B, be more protective of GRSG than Alternatives A, C, or E, but ultimately less protective than Alternative D because of its lack of management flexibility.

4.3.10 Proposed Plan

Under the Proposed Plan, the BLM would manage lands to conserve, enhance, and restore GRSG habitat. Management and impacts would be similar to Alternative D, though the Proposed Plan would incorporate more flexibility. This is because it calls for the use of active management tools, monitoring and mitigation, and adaptive management applied to resource uses to account for sub-regional conditions.

PHMA and GHMA would be designated (**Table 4-2**). The Proposed Plan would also include a 3 percent cap on human disturbance in PHMA and GHMA, which would additionally be mitigated to ensure a net conservation gain to GRSG. This would reduce the likelihood for habitat loss, degradation, or fragmentation.

COT Report Threat—Fire

Impacts from Wildland Fire Management

The Proposed Plan would manage wildland fire similarly to Alternative D. Recommendations from the BLM FIAT report would direct field offices to prioritize landscapes for fire prevention and fuels management within GRSG habitat to minimize the risk of wildfire in PHMA. The use of prescribed fire in GRSG habitat would be avoided unless evaluation of site-specific conditions showed a net benefit to GRSG. The Proposed Plan also establishes objectives that would provide a quantifiable indication of progress. It includes fuel breaks as part of the overall approach of managing fuel continuity across landscapes.

The Proposed Plan provides more explicit guidance for fire suppression policies. This provision would be more protective for areas governed by older plans than Alternative A and would provide a similar level of threat reduction as Alternative D.

Additional management flexibility and guidance would be incorporated to tailor management for specific vegetation communities. Fuels treatment would be designed and implemented with seasonal restrictions on treatments within winter range. Fire suppression in sagebrush areas would protect mature sagebrush and GRSG from wildfire. Post-burn restoration, such as seeding perennial grasses, forbs, and shrubs, would improve recovery rates of habitat compared with Alternative A.

COT Report Threat—Invasive Plant Species

Impacts from Vegetation Management

A different type of VDDT analysis was conducted after the DEIS, intended as an aid to developing vegetation management objectives for the Proposed Plan. The purpose of the second analysis was to identify the level of treatment needed to have 70 percent of the GRSG range provide suitable habitat at the end of 50 years.

To better integrate across administrative boundaries in the Great Basin, the BLM used information that was common to all states (Oregon, Idaho, southwest Montana, western Utah, Nevada, and northeast California). The most recent LANDFIRE vegetation data set was used to derive existing conditions, but there were significant differences between the LANDFIRE data and the ILAP data set that the Oregon BLM provided for the original analysis. This second analysis also encompassed a larger area, although areas mapped as nonhabitat in the LANDFIRE data set were not included.

Additional treatments in the second analysis included fuel breaks and assumptions concerning the effectiveness of fuel breaks in reducing wildfire size. After reviewing the results of this second analysis, the BLM determined that the results did not align with known problems in several locations, nor did they align

with the restoration priorities identified by the regional-level Great Basin Fire and Invasives Assessment Team. However, the primary vegetation management concern remained the same between the original analysis and the second analysis: While the BLM could effectively reduce the threat posed by encroaching conifers, they could not effectively reduce the threat posed by invasive annual grasses.

The intended goal of 70 percent of the GRSG range providing effective habitat at year 50 was met; habitat availability was declining and would have dropped below the goal shortly after year 50. Therefore, the BLM did not use the VDDT results in developing the vegetation management objectives in the Proposed Plan.

Impacts from habitat restoration and vegetation management on GRSG under the Proposed Plan would be similar to Alternative D. Management would also prioritize restoration projects and would use the most current science when implementing restoration. The Proposed Plan provides additional guidance for invasive plant treatments and measures to incorporate invasive plant prevention during wildfire response.

The objective of Proposed Plan management is to reduce the area dominated by invasive annual grasses to no more than 5 percent of the area (2.5 square miles, or 1,600 acres) within 4 miles of leks over the next 20 years. The objective includes managing vegetation to increase resistance to invasion where annual grasses dominate less than 5 percent of the area.

The Proposed Plan recommends testing new potential restoration methods in areas with a sagebrush overstory and annual grass understory. It establishes priority areas for treatment, lists allowable control methods, and requires actions during land management activities and wildfire response. These are intended to reduce the risk of additional spread and new invasions. It requires integrated vegetation management and ecologically based invasive plant management principles.

The estimated successful treatment rate would be approximately 12,700 acres of invasive annual grasses per year to meet its stated objective. The ability to successfully treat at such a high rate is uncertain, given the current estimated success rates for treating annual grasses in the western United States. Access to a broader array of herbicides should increase treatment success rates in Oregon; these rates have been lower than average, due to injunctions against herbicide use.

Some of the areas included within 4 miles of leks have very large annual grass infestations. Invasive plant species' spread may continue at current rates outside of the 4-mile radius. This is because other invasive plant species are not targeted, annual grass infestations are not outside of the 4-mile radius, and

funding for invasive plant treatment is limited. Use of bio-controls and targeted grazing outside of the 4-mile radius would most likely continue.

Overall, the risk of invasive plant spread is similar across the action alternatives and would contribute to reducing threats of habitat loss, fragmentation, and degradation from invasive plants, though the current management (Alternative A) approach to addressing these threats is similar.

COT Report Threat—Conifer Expansion

Impacts from Vegetation Management

Habitat restoration and vegetation management under the Proposed Plan is similar to Alternatives B and D. It contains clear priorities for juniper treatment to reduce disturbance to GRSG and loss of sagebrush or sagebrush understory vegetation. This guidance would improve the likelihood for successful sagebrush restoration and GRSG habitat enhancement over the long term, compared with Alternative A.

Under the Proposed Plan, the objective is to remove all juniper within 1 mile of leks and to reduce juniper cover to less than 5 percent within 4 miles of leks within 20 years. It would retain all old growth juniper stands and individual old trees, regardless of location. The treatment rate is estimated at approximately 5,000 acres per year within 1 mile of leks and 40,250 acres per year within 4 miles of leks, for a treatment rate of approximately 5 percent per year. The Proposed Plan provides direction on post-treatment seeding, allowable post-treatment juniper condition, and timing of prescribed burning when jackpot burning juniper.

Treatments under the Proposed Plan are focused on leks and on GRSG habitat. No treatments are directed at habitat between leks that are outside the 4-mile radius. The treatment rate would slightly exceed the most recent estimate of encroachment rate (4.5 percent) within 4 miles of leks, but encroachment could continue outside of that radius.

COT Report Threat—Grazing and Free-Roaming Wild Horses and Burros

Impacts from Range Management

Under the Proposed Plan, there would be a small decrease in the available AUMs and acreage open for livestock grazing, compared with Alternatives A and B. More specific guidance to achieve measurable GRSG habitat objectives is provided concerning livestock grazing management. It would increase the probability of more consistent approaches to livestock grazing management to support GRSG habitat and would reduce degradation and loss of understory vegetation. In addition, enhanced monitoring under the Proposed Plan would help maintain rangeland health by overseeing the implementation and effectiveness of habitat improvement.

In SFA, grazing permits would be prioritized for review in GRSG habitat. Adhering to GRSG habitat objectives in permit renewals would ensure that restoration would improve nesting and wintering habitat for GRSG.

In addition, the BLM would prioritize allotments for processing livestock grazing permits and leases and would prioritize land health assessments based on the type of allotment and time since the last assessment. This would increase the probability that problem areas would be identified and corrected.

Range management structures and water sources would be avoided in GRSG habitat where possible. Where avoidance is not possible, they would be designed to minimize West Nile virus and other harmful impacts on GRSG. As a result, livestock grazing management under the Proposed Plan would enhance GRSG habitat quality and would reduce disturbance to GRSG more than under Alternative A.

Impacts from Wild Horse and Burro Management

The Proposed Plan's impacts from wild horse and burro management are similar to those described for Alternatives B and D. The Proposed Plan also provides enhanced monitoring of rangeland health and restoration and guidance for prioritizing land health evaluations, which would improve the efficiency and response time to improve GRSG habitat conditions.

COT Report Threat—Energy Development and Mining

Impacts from Leasable Fluid Minerals Management

Under the Proposed Plan, acres closed to fluid mineral leasing in PHMA and GHMA would be the same as Alternative A (see **Table 2-11**). However, acreage subject to major stipulations (NSO) would apply to all PHMA, an increase in protection relative to Alternative A.

In SFA, NSO stipulations would apply without waiver, modification, or exception. In addition, operational constraints would be applied to existing leases for oil, gas, and geothermal energy, and mitigation measures would apply for any harm to GRSG PHMA.

RDFs would avoid or minimize impacts on PHMA to the extent the law allows, and human disturbance would be limited to 3 percent in PHMA. **Table 4-32** below shows the percentage of each GRSG population affected by closures to fluid minerals under the Proposed Plan. Approximately one-third of the Western Great Basin population would be within areas closed to fluid mineral leasing. Over 10 percent of the Northern Great Basin population and one percent or less of the Central Oregon and Baker populations would be protected by these measures.

Table 4-32
Percent of GRSG Populations Affected by Closures to Fluid Minerals—Proposed Plan

Population	Percent of Population Affected (Based on Acres of Habitat Affected)	
	GHMA	PHMA
Baker	0.00	0.00
Central	1.82	0.32
Northern Great Basin	13.19	13.66
Western Great Basin	31.34	26.39

These provisions would reduce the impacts of fluid mineral leasing and development on GRSG habitat loss, degradation, and fragmentation more than Alternative A.

Impacts from Mineral Materials (Salables), Nonenergy Leasable Minerals Management, and Locatable Mineral Entry

Under the Proposed Plan, PHMA would be closed to new salable mineral material site development and nonenergy leasable minerals. This would reduce impacts on GRSG habitat, though it could push development onto private lands, which are not subject to the 3 percent disturbance cap or other land use controls.

Table 4-33 below shows the percentage of each GRSG population affected by closures to salable minerals under the Proposed Plan. Approximately one-third of PHMA in the Northern Great Basin and Western Great Basin populations would be within areas closed to salable mineral development, with less than 10 percent of the Central Oregon and Baker populations protected by these measures.

Table 4-33
Percent of the Populations Affected by Closures to Salable Minerals—Proposed Plan

Population	Percent of Population Affected (Based on Acres of Habitat Affected)	
	GHMA	PHMA
Baker	0.00	2.37
Central	0.93	6.26
Northern Great Basin	6.65	31.83
Western Great Basin	15.05	29.85

The Proposed Plan recommends withdrawal from locatable mineral entry under the General Mining Act in SFA, which could decrease fragmentation and surface disturbance to GRSG habitat compared with Alternative A.

Prospecting for nonenergy leasable minerals would be permitted after appropriate environmental review. However, this alternative would minimize habitat loss and other impacts from locatable mineral development in PHMA by limiting surface disturbance to 3 percent.

COT Report Threat—Infrastructure

Impacts from Lands and Realty Management

PHMA would be managed as ROW avoidance areas (4,229,620 acres), and ROW exclusion areas would be established for wind and solar energy outside of the three southeast Oregon counties (**Table 2-10**). ROWs would be allowed in avoidance areas if the disturbance would be under the 3 percent disturbance cap and would result in a net conservation gain. ROW authorization would include evaluation and implementation of effective mitigation to offset any resulting loss of GRSG habitat. The threat to GRSG from avian predators would be reduced through the RDF requiring perch deterrents on all power lines.

In GHMA, the actions described under the Proposed Plan would consider ROW authorization on a case-by-case basis, with assessments to determine impacts on GRSG habitat and connectivity. Locations outside PHMA would be prioritized when possible.

The Proposed Plan would eliminate such impacts as habitat fragmentation and increased predation from solar and wind energy development in PHMA outside the three southeastern counties. It would reduce impacts in the rest of PHMA and all of GHMA. In split-estate, potential relocation of development onto adjacent private lands could occur.

Table 4-34 shows the percentage of each GRSG population affected by ROW exclusion and avoidance, including wind power, under the Proposed Plan. Close to 5 percent of the Western Great Basin would be in ROW exclusion areas, along with less than one percent of the other population areas. Close to 40 percent of the Northern Great Basin and Western Great Basin populations would be within ROW avoidance areas, with over 15 percent of the Central Oregon and one percent of the Baker populations protected by these measures.

Table 4-34
Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas—Proposed Plan

Population	Percent of Population Affected (Based on Acres of Habitat Affected)	
	Exclusion	Avoidance
Baker	0	1.4
Northern Great Basin	0.34	39.4
Western Great Basin	4.4	36.9
Central Oregon	0.76	16.8

COT Report Threat—Recreation

Impacts from Recreation and Travel Management
Impacts from recreation and travel management under the Proposed Plan are the same as Alternatives B and D.

COT Report Threat—Sagebrush Removal, Agricultural Expansion, and Urban Development

Impacts from Land Tenure Decisions
No lands in PHMA would be available for disposal unless the action would result in net conservation gain to GRSG, or it would not directly or indirectly adversely impact GRSG. Impacts from land tenure decisions are the same as those under Alternatives B and D.

Table 4-35 shows the percentage of each GRSG population affected by unavailability to land disposal. Approximately 10 percent of the Northern Great Basin, Central Oregon, and Western Great Basin populations would be within areas unavailable to land disposals, with only 2 percent of the Baker population protected by these measures.

Table 4-35
Percent of the Populations Affected by Unavailability to Land Disposals—Proposed Plan

Population	Percent of Population Affected (Based on Acres of Habitat Affected)
Baker	2.5
Northern Great Basin	13.2
Western Great Basin	9.9
Central Oregon	10.4

Impacts from ACECs
No additional ACECs would be designated under the Proposed Plan; impacts on GRSG would be the same as under Alternative A.

Summary
The Proposed Plan uses flexibility in applying development restrictions in GRSG habitat. It would use ROW avoidance but not exclusion areas, up to an allowable disturbance cap of 3 percent human disturbance, not including from fire. Less GRSG habitat would be closed to mineral development than under Alternatives B or C, but the Proposed Plan applies protective stipulations and buffers and requires mitigation for any damage to GRSG habitat.

In addition, the 3 percent disturbance cap in PHMA would limit the extent of damage to important GRSG habitat. The use of adaptive management and

monitoring would allow the BLM to evaluate population response and improve its management of habitat over time. These protective measures would reduce the spread of new power lines, energy development, mines, and roads in GRSG habitat and would reduce the associated threat from predators, particularly ravens. The Proposed Plan provides a more targeted approach to prioritizing GRSG habitat areas, compared with the other action alternatives. The flexibility of Alternative D allows management to adapt to regional conditions and would provide the highest level of protection for GRSG habitat of all the action alternatives.

4.3.11 Summary

Fire

For fire, Federal Wildland Fire Management Policy applies under all alternatives. The purpose of wildfire response is to support attainment of applicable land use plan goals and objectives, one of which is to restore fire as an ecosystem process. Ultimately, there is little effective difference among the alternatives for fire suppression priorities. Although the wording is different, intent of all alternatives is to protect breeding and wintering habitat for GRSG. The primary difference is in fire management direction in the less than 12-inch precipitation zone (Warm-Dry and Shallow-Dry Sagebrush Groups, predominantly); in Oregon, there is a high degree of overlap between these two habitat types.

Alternatives B, C, and F do not address fuel homogeneity. Homogeneous fuel beds typically produce homogeneous burn patterns and result in invasive plant issues considered adverse for GRSG habitat quality and quantity. Post-fire seeding success rates are generally very low in the less than 12-inch precipitation zone.

Alternative D or the Proposed Plan are most likely to reduce fire risks since the widest range of techniques is allowed and the use of unplanned fire to meet habitat objectives is explicitly permitted. However, these alternatives still carry a risk of unfavorable outcomes, since treatment efficacy has not been established and it is unclear if treatment rates will be sufficient. Alternative E is more likely to be effective than Alternatives B, C, or F since it does allow for treating sagebrush to create mosaics, but its approach is generally more cautious than under Alternative D or the Proposed Plan.

Alternative A has similar probable outcomes but the lack of clear desired conditions under A allows for potentially less effective management to guide use of fire and fuels management for sagebrush-steppe restoration.

Invasive Plants

For treatment of invasive plant species under the existing management approach, BLM's Integrated Vegetation Management Handbook (H-1740-2) includes BMPs for limiting the spread of invasive plant species during any ground-disturbing activity, which includes construction projects within or

adjacent to sagebrush habitats. In addition, Federal Wildland Fire Management Policy requires wildfire responses support attainment of applicable land management objectives, including protection of habitat values, and BLM's Burned Area Emergency Stabilization and Rehabilitation Handbook (H-1742-1) stipulates monitoring for 3 years post-treatment to prevent establishment of invasive plants. Reclamation is also required post-mining, under BLM's Planning for Fluid Mineral Resources Handbook H-1624-1 (leasable minerals), Mineral Materials Disposal Handbook H-3600-1 (salable minerals), Surface Management Handbook H-3809-1 (locatable minerals), and 43 CFR 3100, 3200, 3600, and 3800.

Most COT report recommendations for invasive plants do not require a LUP decision to implement; exceptions include limiting OHV use to existing routes, limiting allowable stocking levels and utilization levels for grazing, setting surface occupancy limitations for mining, and restricting the locations of new infrastructure. However, in the absence of any vegetation treatment, habitat trend is downward for all populations, largely due to expansion of annual grass at approximately 0.1 percent per year.

Thus, the alternatives would have a small impact on vegetation management. The Northern Great Basin population would remain stable or would slightly increase for the first 10 years under all alternatives. After 50 years, the percentage of habitat in preferred condition would be stable under Alternatives A, B, E, and F; it would be down under Alternative C and up under Alternative D. Of the six alternatives analyzed, Alternative D would be most beneficial to GRSG habitat for this population.

For the Western Great Basin population, after 10 years the percentage of GRSG habitat in preferred condition would remain stable or would increase under all alternatives. After 50 years, the results would differ between analysis areas for this population. The larger area (903) would see a drop in habitat percentage in preferred condition under Alternatives A, C, D, and E, and habitat percentage would be stable under Alternatives B and F; the smaller area (906) would increase the percentage of habitat in preferred condition under all alternatives, with the largest increase under Alternative D (from 30 percent to 43 percent).

The Central Oregon population would have a stable percentage of habitat in preferred condition under all alternatives and an increase after 50 years, the largest increase of which would be under Alternative D. Overall, the largest improvements would occur under Alternatives B, E, and F after 10 years and under Alternatives D and F after 50 years.

The area with 10 to 30 percent sagebrush cover would differ by alternative; for various subpopulations it would be between 7 and 10 percent over 50 years, at a 1 percent treatment rate (**Tables 4-3** and **4-4**). Alternative C may be

counterproductive by increasing the probability of invasive plant spread, because of its focus on passive management to restore sagebrush-steppe.

For the Proposed Plan, the BLM conducted a different type of VDDT analysis with results not comparable to the results in **Tables 4-3** and **4-4**. This second analysis was to identify treatment rates needed to provide adequate GRSG habitat over 70 percent of the area capable of providing habitat. It also used common data layers across the entire Great Basin, resulting in significant differences in how the existing vegetation was characterized, compared with the previous VDDT analysis, and for all other purposes in this analysis. While that run was able to meet the stated goal, habitat was still declining across the entire planning area, largely due to continued expansion of annual grasses.

Conifer Expansion

For conifers, the existing Standards for Rangeland Health promote the development of healthy rangeland ecosystems with characteristic plant community types and species compositions, and juniper encroachment into sagebrush-steppe is considered undesirable. Treatment of juniper encroachment generally has a high success rate, although at the present time it is not possible to establish whether sagebrush-steppe response is adequate.

Alternatives A, B, D, and F and the Proposed Plan are very similar with respect to conifer encroachment, with the clearest treatment priorities under Alternative D and the Proposed Plan, which identify Restoration Opportunity Areas as key location for restoration projects and provide subsequent criteria for conifer removal. Whether these alternatives would treat at an adequate rate to maintain existing GRSG habitat would depend on funding.

Alternative C, with its focus on passive restoration, could be counterproductive, resulting in an increase in juniper extent over time, and reducing GRSG habitat availability, especially in late brood-rearing habitat. Alternative E places strict limits on the ability to treat juniper and thus is also likely to result in failure to treat juniper at its rate of expansion, resulting in a reduction in GRSG habitat availability, although at a slower rate than under Alternative C.

Grazing and Range Management

For grazing and range management, management guidance vary in specificity in older land management plans; however, Standards for Rangeland Health and Guidelines for Grazing Management apply. The standards and guidelines require periodic assessments of range conditions and adjustments to grazing practices to improve ecosystem function. Allowable utilization can be adjusted during permit renewals to account for the current conditions. Newer plans often have some guidance related to drought, and IM 2013-094 provides detailed procedures for adjusting grazing during drought that apply to all plans.

Grazing is widespread across GRSG habitat and its impacts of grazing on GRSG are debated, but research suggests that grazing up to moderate levels can co-

exist with GRSG habitat and may support range health by reducing dead fuel buildup in grass crowns, limiting bunchgrass mortality during fires and helping to maintain healthy bunchgrass plants and allow for seed production.

Alternatives A and B have the lowest probability of adjusting grazing management to meet GRSG habitat needs. This is due to the lack of direction, to specific, measurable habitat objectives in the older plans under Alternative A, and to the unclear management direction under Alternative B. Grazing restrictions under Alternative C could be counterproductive and would decrease GRSG habitat quality and quantity over time. Alternative E is less likely to adjust grazing management to meet GRSG habitat needs, largely because assessments are not prioritized. Alternative D and the Proposed Plan provide the clearest direction with the highest likelihood of adjusting grazing management to meet GRSG habitat needs. Alternative F would restrict livestock and wild horse and burro grazing less than would Alternative C, so it may achieve some improvement in habitat quality. Currently the BLM does not gather wild horses, so management at AML is unlikely. This would reduce the likelihood of GRSG habitat improvements from restricting wild horses and burros.

Energy Development and Mining

For energy development and mining, the most definitive way to avoid new mining activities and associated infrastructure in GRSG habitat is to close the habitat to mineral development or withdraw it from mineral entry, in the case of locatable minerals.

For leasable and salable minerals, Alternatives B, C, and F would close all PHMA to new mineral leases. With Alternative E, new leases in suitable GRSG habitat within Core Area habitat would be avoided. Leasing in GRSG habitat would not be avoided in Alternative A. While Alternative D and the proposed Plan also would not close GRSG habitat to leasing but new leases would be subject to NSO or CSU stipulations and a total surface disturbance cap of 3 percent would be applied. Disturbed areas would be restored to habitats used by GRSG before additional disturbance would be allowed. While stipulations would be available to the BLM in Alternatives B, C, D, F, and the Proposed Plan, they can be imposed with leased fluid minerals only to the extent allowed by law. Thus, the alternatives that close GRSG to new leases (Alternatives B, C, and F) provide a greater degree of habitat protection on BLM-administered land, but may push development onto private lands that lack BLM land use controls.

For locatable minerals, Alternatives C and F would petition to withdraw the largest amount of GRSG habitat (all occupied habitat) from locatable minerals. Alternative B would withdraw only PHMA, which includes 95 percent of known occupied habitat in Oregon. Alternative E would not recommend withdrawing habitat, but states that no development in Core Areas would occur if there is evidence of GRSG use. Alternatives A and D do not recommend to withdraw

habitat from mineral entry. However, a 3 percent surface disturbance threshold in Alternative D and the Proposed Plan could preclude levels of development reported to cause range abandonment (Knick et al. 2013), because disturbance from locatable mineral entry would count towards the 3 percent disturbance cap. Further impact avoidance may occur if the operator agrees to implement BMPs (under the Proposed Plan).

All of the action alternatives, except Alternative E, have the same RDFs and BMPs. These RDFs and conservation measures include such requirements (to the extent allowed by law) as surface disturbance limitations, TLs, noise restrictions, structure height limitations, design requirements, water development standards, remote monitoring requirements, and reclamation standards.

In addition, under all alternatives, reclamation bonds are required (pursuant to 43 15 CFR, Part 3104), with amount of the bond required to be sufficient to ensure full restoration of lands. The objective is to restore disturbed areas to the pre-disturbance landforms and desired plant community that will meet sage-grouse habitat needs (Pyke 2011), though these objectives are not always achieved. Reclamation objectives for PHMA and GHMA in the RDFs apply to Alternatives B, C, D, F and the Proposed Plan. Reclamation of abandoned mine lands to healthy sagebrush ecosystems would occur consistent with priority objectives for GRSG habitat restoration and vegetation management.

Overall, Alternatives A, D, and E are less effective in avoiding new mining activities and/or any associated facilities within occupied habitats, because they rely on discretionary actions by BLM and/or mining operators, while Alternatives C and F would be more effective at protecting GRSG habitat on BLM-administered land from mining activities. However, Alternatives B, D, F and the Proposed Plan would adhere to a 3 percent disturbance cap to limit damage to GRSG habitat.

Infrastructure

For lands and realty, Alternative A would allow development in existing corridors, which have been established in location to minimize impacts on wildlife habitat. Alternatives B, C, E, and F would establish ROW exclusion areas in PHMA and avoidance areas in GHMA. Alternative D and the Proposed Plan would avoid ROWs in PHMA, and on a case-by-case basis in GHMA, but would not establish exclusion areas. Exclusion areas may be ineffective, because existing infrastructure corridors have been sited in locations that minimize impacts, and relocation could push ROW development onto adjacent private land with fewer land use restrictions. Thus, the flexible approach under Alternative D and the Proposed Plan would be most effective in protecting GRSG habitat.

Recreation, including Travel

Most recreational activity in GRSG habitat is benign, with the exception of off-road vehicle use. Issuance of SRPs would be restricted under Alternatives B, D, F, and the Proposed Plan but dispersed recreational activity does not require a permit and would not be impacted.

For road closures, Alternatives A, B, D, F and the Proposed Plan do not seasonally close roads in GRSG habitat. Alternative C closes roads seasonally in habitat areas and limits OHVs to existing routes and Alternative E also provides for seasonal closures during nesting season. Alternatives B and D and the Proposed Plan also limit OHVs to existing routes in PHMA. Alternatives C and E are most protective of GRSG from road impacts.

Land Tenure

All alternatives would be effective in retaining lands from disposal. Alternative A does not specify retention of GRSG habitat, but has a similar objective to retain land with wildlife habitat value. Alternative E retains Alternative A's approach. Alternatives B, C, D, F and the Proposed Plan would avoid disposal of GHMA/Core Area habitat lands, but Alternative C would also retain GHMA, protecting the largest acreage of GRSG habitat from exchange or disposal.

Alternatives C and F are the only alternatives to establish new ACECs for GRSG. In ACECs where GRSG is a relevant and important value, management prescriptions would be tailored to the threats to GRSG in the specific location and would be more likely to protect intact GRSG habitats or populations than alternatives lacking new ACECs.

Comparison of Alternatives Alleviation of USFWS-Identified Threats

Approaches to GRSG management and alleviation of the USFWS-identified threats to GRSG vary by alternative. **Table 4-36**, Comparison of Alleviated Threats to GRSG by Alternative, summarizes and cross references specific management by the applicable BLM resource programs under each alternative with the threat.

Table 4-36
Comparison of Alleviated Threats to GRSG by Alternative

Resource and Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
COT Report Threat—Fire							
Fire and Fuels							
Fire and fuels management	Current management allows fuels treatments in sagebrush and promotes developing fuel breaks.	In PHMA, implement fuels treatments that protect sagebrush, maintaining canopy cover and restricting fuels treatments.	Same as Alternative A	Develop fuel breaks to protect larger intact blocks of habitat. Treat 3 percent of GRSG habitat per year for 10 years to reduce the probability of homogeneous burn patterns.	Prevent fire from entering at-risk communities (e.g., cheatgrass)	Same as Alternative B	Same as Alternative D
Wildfire							
Fire operations	No similar action.	In PHMA, prioritize suppression in GRSG habitat immediately after life and property.	Same as Alternative A.	Same as Alternative B.	Give wildfire suppression priority to known GRSG habitat within the framework of the Federal Wildland Fire Policy	Same as Alternative B.	Same as Alternative B
Summary of Impacts on GRSG from Fire	For fire management, Alternatives B, C, and F would produce homogeneous fuel beds that could result in invasive plant issues post-burn. Alternative D or the Proposed Plan is most likely to reduce fire risks since the widest range of techniques is allowed and the use of unplanned fire to meet habitat objectives is explicitly permitted. Alternative E is more likely to be effective than Alternatives B, C, or F because it allows for treating sagebrush to create mosaics, but its approach is more limited than Alternative D or the Proposed Plan. The lack of clear desired conditions under A allows for less effective management of fire and fuels management for sagebrush-steppe restoration.						

Table 4-36
Comparison of Alleviated Threats to GRSG by Alternative

Resource and Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
COT Report Threat—Energy Development and Mining							
Unleased Fluid Minerals							
Areas closed to fluid mineral leasing (federal)	3,073,567	6,327,708	10,167,888	Same as Alternative A	Same as Alternative B	Same as Alternative C	Same as Alternative A
Areas open to mineral leasing with NSO stipulation	860,003	586,757	187,825	3,413,017	Same as Alternative B	Same as Alternative C	3,867,197
Open to fluid mineral leasing, total acres (federal)	3,830,575	2,633,287	899,375	Same as Alternative A	Same as Alternative B	Same as Alternative C	Same as Alternative C
Mining							
Locatable minerals—recommended for withdrawal	24,443	4,118,660	8,876,177	Same as Alternative A	Same as Alternative B unless nonhabitat	Same as Alternative B	1,816,802
Open for consideration for mineral materials disposal and salable minerals	8,857,980	5,624,414	1,824,289	Same as Alternative B	Same as Alternative B	Same as Alternative B	5,592,976

Table 4-36
Comparison of Alleviated Threats to GRSG by Alternative

Resource and Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Summary of Impacts on GRSG from Energy Development and Mining	For leasable and salable minerals, Alternatives B, C, and F would close all PHMA to new mineral leases, or Alternative E within Core Area habitat. Leasing in GRSG habitat would not be avoided under Alternative A. While Alternative D and the Proposed Plan also would not avoid leasing in GRSG habitat, new leases would be subject to NSO or CSU stipulations and a 3 percent maximum disturbance cap in PHMA. (Alternatives B and F also include a 3 percent disturbance cap, while Alternative C includes a 0 percent disturbance cap in PHMA.) While stipulations would be available to the BLM in Alternatives B, C, D, and F and the Proposed Plan, they could be imposed with leased fluid minerals only to the extent allowed by law. Thus, the alternatives that close GRSG to new leases (Alts. B, C, and F) provide a greater degree of habitat protection for federal lands. For locatable minerals, Alternatives C and F would recommend to withdraw the largest amount of GRSG habitat from locatable minerals. Alternative B would withdraw only PHMA, 95 percent of known occupied habitat in Oregon. Alternative E would not propose to withdraw habitat. Alternatives A and D do not propose to withdraw habitat from mineral entry. All of the action alternatives, except Alternative E, have the same RDFs and BMPs, as allowed by current law. Overall, Alternatives A and D are the least effective in avoiding new mining activities or associated facilities within occupied habitat, because they rely primarily on discretionary actions. Alternatives C and F would be the most effective at protecting GRSG habitat from mining activities.						
COT Report Threat—Infrastructure							
ROW avoidance areas	3,445,685	6,106,923	292,671	5,964,814	1,821,721	292,671	9,914,490
ROW exclusion areas	857,564	4,866,030	10,682,124	Same as Alternative A	Same as Alternative B	Same as Alternative C	858,203
Summary of Impacts on GRSG from Infrastructure	Alternative A would allow development in existing corridors. Alternatives B, C, E, and F would establish ROW exclusion areas in PHMA and avoidance areas in GHMA. Alternative D and the Proposed Plan would avoid ROWs in PHMA but would not establish exclusion areas. A 3 percent maximum disturbance cap would apply for Alternatives B, D, and F and the Proposed Plan. Exclusion areas may be ineffective because existing infrastructure corridors have already been sited in areas of minimal impact, and exclusion could force ROWs onto private land where they could impact a larger amount of GRSG habitat.						
COT Report Threats—Grazing and Range Management							
Areas available for livestock grazing	12,271,791	Same as Alternative A	787,139	12,183,315	Same as Alternative A	7,506,632 (75 percent of Sum of PPH and PGH Open for Alternative A)	12,291,667

Table 4-36
Comparison of Alleviated Threats to GRSG by Alternative

Resource and Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Areas closed to grazing	246,609	Same as Alternative A	11,762,357	335,588	Same as Alternative A	2,502,210 (25 percent of Sum of PPH and PGH of Alternative A)	297,601
Summary of Impacts on GRSG from Grazing	Alternatives B, D, and E would maintain existing acreage open to grazing but prioritize restoration of rangeland in GRSG habitat. Alternatives C and F would reduce or eliminate grazing in GRSG habitat areas, protecting GRSG from grazing impacts but also allowing for fuels buildup. Alternatives A and B have lower probability of adjusting grazing management to meet GRSG habitat needs due to lack of specific management direction. Alternative C and F's grazing restrictions could decrease GRSG habitat quality and quantity in some areas over the long term due to fuel buildup. Alternative E is less likely to adjust grazing management to meet GRSG habitat needs, because assessments are not prioritized and specific, measurable habitat objectives are lacking. Alternative D and the Proposed Plan provide more specific direction with higher likelihood of adjusting grazing management to meet GRSG habitat needs.						
COT Report Threats—Conifer Invasion and Invasive Plants (Vegetation Management)							
Areas prioritized for vegetation treatments	Maintain and improve condition of plant communities that provide wildlife habitat, recreation, forage, scientific, scenic, ecological, and water and soil conservation benefits	Prioritize restoration projects in areas most likely to benefit GRSG	Same as Alternative A	Priority locations for restoration projects should be in the Restoration Opportunity Areas	Sagebrush conversion on BLM-administered lands (e.g., crested wheatgrass seedings) should be avoided	Same as Alternative B	Same as Alternative D
Summary of Impacts on GRSG from Vegetation Management	Under existing management, BLM's Integrated Vegetation Management Handbook (H-1740-2) includes best management practices for limiting the spread of invasive plant species during any ground-disturbing activity, which includes construction projects within or adjacent to sagebrush habitats. Most COT report recommendations for invasive plants do not require a land use plan decision to implement, and overall, it is unlikely that collective actions would have significant effect on invasive plant species spread rates. Thus, the alternatives may have little impact on vegetation management. Alternative C may be counterproductive, increasing the probability of invasive plant spread, because of its focus on passive management to restore sagebrush-steppe. Among the other alternatives, Alternative D has the most specific language, reducing potential for differing interpretations.						

Table 4-36
Comparison of Alleviated Threats to GRSG by Alternative

Resource and Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
	For conifer encroachment, existing Standards for Rangeland Health promote the development of healthy rangeland ecosystems, and juniper encroachment into sagebrush-steppe is considered undesirable. Treatment of juniper encroachment generally has a high success rate. Alternatives A, B, D, F and the Proposed Plan are similar with respect to conifer encroachment, with the clearest treatment priorities under Alternative D and the Proposed Plan. Alternative C, with its focus on passive restoration, would be ineffective. Alternative E places strict limits on the ability to treat juniper and thus would also be likely to result in failure to treat juniper at its rate of expansion.						
COT Report Threat—Recreation							
Issuance of SRPs	No action	Only SRPs in PHMA that have neutral or beneficial impacts on GRSG	Same as Alternative A	Evaluate allowances for existing SRPs with stipulations in PHMA to reduce disturbance to GRSG	Protect GRSG from disturbance through seasonal closures of roads and areas	Same as Alternative B	Same as Alternative D
Open to cross-country (off-road) motorized travel	6,811,890	4,141,539	1,202,694	Same as Alternative B	3,913,675	Same as Alternative B	Same as Alternative B
Closed to off-road motorized travel	300,328	Same as Alternative A	Same as Alternative A	Same as Alternative A	274,965	Same as Alternative A	Same as Alternative A
Acres limited—vehicle use only on existing roads and trails with possible time restrictions	5,325,377	7,996,165	10,937,171	Same as Alternative B	6,043,851	Same as Alternative B	Same as Alternative B
Summary of Impacts on GRSG from Recreation	Most recreational activity in GRSG habitat is benign, with the exception of off-road vehicle use. Issuance of SRPs would be restricted under Alternatives B, D, F, and the Proposed Plan, but dispersed recreational activity does not require a permit and would not be impacted. For road closures, Alternatives A, B, D, F and the Proposed Plan do not seasonally close roads in GRSG habitat, though they may limit use on a seasonal basis. Alternative C closes roads year-round in habitat areas, and restricts most other roads. Alternative E provides for seasonal closures during nesting season. Alternatives C and E are most protective of GRSG from recreational road impacts.						

Table 4-36
Comparison of Alleviated Threats to GRSG by Alternative

Resource and Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
COT Report Threat—Sagebrush Removal, Agricultural Conversion, and Urban Development							
Acres delineated as PPH/PHMA/Core	4,547,043	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
Acres delineated as PGH/GHMA/Low Density	5,662,632	Same as Alternative A	Same as Alternative A	Same as Alternative A	3,923,539	Same as Alternative A	Same as Alternative A
Acres not available for exchange or disposal (Zone 1)	9,170,893	10,220,409	11,757,136	Same as Alternative B	Same as Alternative A	Same as Alternative B	Same as Alternative B
Areas of Critical Environmental Concern	715,048	Same as Alternative A	5,063,388	Same as Alternative A	Same as Alternative A	4,755,249	Same as Alternative A
Summary of Impacts on GRSG from Agriculture and Urbanization	All action alternatives establish GRSG management areas in priority or core habitat and general or Low Density habitat. Alternative A does not specify retention of GRSG habitat, but retains land with wildlife habitat value. Alternative E retains Alternative A's approach. Alternatives B, C, D, F and the Proposed Plan would avoid disposal of PPH/Core GRSG habitat, but Alternative C would also retain GHMA, thereby protecting the largest amount of habitat from exchange or disposal. Alternatives C and F are the only alternatives to establish new ACECs for GRSG. In ACECs where GRSG is a relevant and important value, management prescriptions would be tailored to the threats to GRSG in each specific location and would be more likely to protect intact GRSG habitats or populations than alternatives lacking new ACECs.						

4.4 VEGETATION

This section is a discussion of expected impacts on untargeted vegetation and special status plants from proposed management actions and the expected impacts of vegetation management targeted at increasing habitat quality in dense sagebrush and crested wheatgrass seedings.

4.4.1 Methods and Assumptions

Indicators

Indicators of impacts on vegetation are as follows:

Untargeted Vegetation

- Risk of unintentional damage to aspen, mountain shrub, salt desert scrub, and riparian plant communities
- Potential reductions or loss of special status plant populations

Vegetation Management for Habitat Improvement

- Changes in resistance to invasion and resilience from wildfire
- Changes in species diversity and sagebrush cover in crested wheatgrass seedings

Assumptions

The analysis includes the following assumptions:

- The degree of impact attributed to any one disturbance or series of disturbances is influenced by several factors—location in the watershed; the type, time, and degree of disturbance; existing vegetation; precipitation; and mitigating actions applied to the disturbance.
- New invasions of invasive plant species would continue to occur and spread as a result of ongoing vehicle traffic in and out of the planning area, recreation, wildland fire, wildlife and livestock grazing and movements, and surface-disturbing activities. Ecological health and ecosystem functioning depend on a number of factors—vegetation cover, species diversity, nutrient cycling and availability, water infiltration and availability, percent cover of invasive plants, and climatic fluctuation.
- Pretreatment surveys for special status plants would occur before treatment and measures taken to avoid loss or damage to identified species and populations.
- Treatment blocks with logical boundaries (e.g., roads, ridges, and similar breaks in vegetation or fuels) may incorporate edges and inclusions of untargeted plant communities, such as aspen, salt desert scrub, mountain shrub, and riparian and wetland vegetation.

- Prescribed fire would be used in dense sagebrush, but the BLM would use radically different burning prescriptions compared with traditional prescriptions. For example, in sagebrush, the BLM would limit the extent of burned area.
- Treatment methods used in crested wheatgrass seedings successfully reduce crested wheatgrass and increase native plant species establishment, including sagebrush seedlings without increasing invasive plant species.
- Short-term effects on upland vegetation would occur for up to ten years, and long-term effects would occur over longer than ten years.
- Short-term effects on riparian and wetland vegetation would occur over two years or less, and long-term effects would occur over longer than two years.
- Impacts from the management of wild horses and burros, air quality, recreation, coal, and wildfire response methods do not substantially differ between all alternatives, including Alternative A, and have negligible to no impacts on untargeted vegetation and special status plants beyond what could occur under current policies and plans.
- Areas recommended for withdrawal would be withdrawn from locatable mineral development.

Because very few studies concerning the potential impacts of climate change on rangeland vegetation have occurred, the BLM conducted the analysis assuming continuation of the current climate regime.

4.4.2 Nature and Type of Effects

The potential impacts of managing juniper encroachment and invasive plant species are discussed under the relevant COT report threats in **Section 4.3**. This section examines the potential impacts of actions to restore sagebrush where the canopy cover is too low or too high to provide high quality GRSG habitat, species diversity, and sagebrush canopy cover in crested wheatgrass seedings. It also discusses the potential impacts of a variety of actions, including vegetation management, on untargeted vegetation communities (aspen, mountain shrub, salt desert scrub, and riparian vegetation) and on special status plants. The actions most likely to have undesired impacts on untargeted vegetation communities and special status plants are vegetation management of targeted communities, including fuels management and post-fire rehabilitation; livestock grazing; minerals development, primarily leasable and salable minerals; new ROW development; and travel management, primarily OHV management.

Other actions are unlikely to have measureable impacts and are not discussed further. BLM policy already requires avoiding adverse impacts on special status

plant populations and vegetation, particularly riparian vegetation, when undertaking the following actions:

- Locating and constructing new infrastructure to aid in managing wild horses and burros or livestock
- Locating temporary infrastructure for wildfire responses
- Locating and constructing recreation facilities

Wildfires have far greater impacts than the wildfire management actions taken to benefit GRSG. The potential impacts of land tenure adjustments to benefit GRSG are too speculative because they would depend on the ecological site, vegetation condition, and location of the parcel. Designating additional ACECs with GRSG habitat as an important or relevant value would not confer any additional protections; that is, not beyond what is already provided by other actions in this amendment and by BLM policies. Affected communities would be aspen, mountain shrub, salt desert scrub, and riparian vegetation and special status plants.

Vegetation Management and Habitat Restoration

High-quality GRSG habitat includes a diversity of herbaceous species, vegetation and reproductive health of native grasses, and an abundance of sagebrush across the landscape with canopy cover of 10 to 25 or 30 percent, depending on the general sagebrush community type (Manier et al. 2013). Over the long term, vegetation treatments that maintain sagebrush across the landscape in the appropriate canopy cover range and that enhance native vegetation and overall ecosystem productivity would remain resistant to annual grass invasions and resilience to stand-replacing disturbances, such as wildfires (Chambers et al. 2014a; Chambers et al. 2014b).

In addition to vegetation treatments that reduce threats to GRSG habitat, treatments that increase sagebrush canopy cover where it is too low, that reduce sagebrush canopy cover where it is too high, and that increase both sagebrush canopy cover and native herbaceous species diversity also improve the abundance and distribution of high quality GRSG habitat.

The overall goals are to maximize the extent of source habitat[2] and to minimize the extent of sink habitat.[3] Locally and regionally, the distribution of these treatments can affect the distribution of GRSG and sagebrush habitats (Manier et al. 2013). Vegetation treatments would have short-term effects from vegetation removal and disturbance; but they would result in long-term improvements in vegetation structure, composition, and diversity and may improve communities' resilience and resistance to disturbance.

[2]Habitat that maintains and promotes GRGS population growth
[3]Habitat used by GRSG that does not maintain population growth

Sagebrush and Crested Wheatgrass Seeding Management

Some areas capable of supporting sagebrush are candidates for restoration treatments. These areas either have no sagebrush or have low canopy, or they are areas with sagebrush canopy cover that exceeds 25 percent in warm-dry sagebrush and 30 percent in cool-moist sagebrush. Where sagebrush canopy cover is low or missing, seeding and planting would increase canopy cover if the effort were successful. Where sagebrush canopy cover is too high, thinning treatments using mechanical methods, prescribed fire, or herbicides would open sagebrush canopies and enhance production in the herbaceous layer, including tall bunchgrasses and forbs important to GRSG.

Some sites may be still in the earlier stages of recovery from a stand-replacing disturbance, such as a wildfire, or earlier vegetation treatment. Natural recovery can occur as quickly as 15 years in cool-moist sagebrush or as long as 80 to 100 years in warm-dry sagebrush (Nelson et al. 2013; Evers et al. 2013; Manier et al. 2013; Schlaepfer et al. in press). Factors influencing sagebrush germination and establishment are the following (Nelson et al. 2013; Evers et al. 2013; Schlaepfer et al. in press):

- Type, amount, and timing of precipitation between late fall and spring
- Size and edge-to-interior ratio of the disturbance
- Number and distribution of surviving reproductively mature sagebrush plants
- Seed mass
- Degree of soil compaction
- Litter depth

Sagebrush establishment is episodic, with poor conditions associated with high establishment episodes (Nelson et al. 2013; Schlaepfer et al. in press). As such, identifying when seeding or planting should occur to optimize treatment success remains difficult and success rates are low. Several trials of new seeding methods are underway, with test plots established in certain areas that burned in 2012.

Thinning sagebrush has relied primarily on mechanical means in Oregon, although chemical means have been used in other states. Mechanical means use heavy equipment to create strips or blocks of treated areas where sagebrush is mowed, crushed, or otherwise substantially damaged. Sagebrush recover as long as some of the plant remains alive, but recovery can take 20 years or more, depending on the ecology of the site (Davies et al. 2009).

Impacts on herbaceous species depend on such factors as mow height, the type of equipment used, and the depth of the resulting shredded vegetation;

however, these have not been well studied. Herbicides kill varying amounts of sagebrush, depending on the particular herbicide used and the application rate (Wachocki et al. 2001; Olson and Whitson 2002; Chi 2004). Recovery rates tend to be quicker than with mechanical methods because sagebrush structure remains in the treated area. Treating sagebrush with tebuthiron in particular has few to no adverse impacts on the understory vegetation (Wachocki et al. 2001; Olson and Whitman 2002; Chi 2004).

Thinning with prescribed fire likely is possible, given that both naturally started and human-ignited wildfires played an important role historically in creating a mosaic of sagebrush structure classes (McAdoo et al. 2013). However, use of fire would require the development of new prescriptions that limit its spread and more closely resemble how Native Americans used fire in sagebrush before Euro-American contact (McAdoo et al. 2013). Controlled burning also carries the risk of promoting invasive plant species, damaging untargeted vegetation that may be included in the treatment block, and damaging or destroying special status species. More traditional burning prescriptions would continue to work in crested wheatgrass seedings as a site preparation method.

Successful treatment of crested wheatgrass seedings also includes seeding or planting desired species, including sagebrush, as well as reducing the extent of crested wheatgrass. Mechanical treatment, such as disking, or using herbicides can reduce crested wheatgrass, followed by seeding or planting (Hulet et al. 2010; Fansler and Mangold 2011; Davies et al. 2013). Disking alters soil characteristics and can damage or destroy sagebrush and native herbaceous species.

Herbicides to specifically treat crested wheatgrass do not exist, which means that some damage to other herbaceous species is likely, particularly at higher application rates designed for greater reductions in crested wheatgrass. Planting sagebrush would result in greater establishment of sagebrush at lower levels of crested wheatgrass control than would seeding (Davies et al. 2013). Restoration in patches or strips would reduce the extent of adverse impacts on whatever existing native vegetation was already present than treating the entire seeding (Davies et al. 2013). The establishment of desired herbaceous species depends on the volume and timing of precipitation after seeding (Hulet et al. 2010). The additional treatment of crested wheatgrass may be needed, as it can recover to near pre-treatment levels within 2 to 5 years (Hulet et al. 2010; Fansler and Mangold 2011).

Actions taken to improve GRSG habitat in sagebrush and crested wheatgrass seedings can have unintended consequences on untargeted vegetation communities (aspen, mountain shrub, salt desert scrub, and riparian vegetation) and on special status plants. For one, treatment blocks often include untargeted vegetation communities. Aspen, mountain shrub, and salt desert scrub are most likely to be found around the edges of treatment blocks with easily recognized

physical features as boundaries, such as roads and ridgetops. Riparian communities and special status plant populations are likely to be present in the interior of treatment blocks.

All forms of treatment could alter plant community composition or damage or destroy untargeted communities and special status plants through such factors as heavy equipment compacting, trampling, crushing, and uprooting the plants; direct kill from herbicide drift; burning from prescribed fire; and herbivory when using biocontrols for invasive plant species. Physical disturbance poses a bigger threat than prescribed fire (Lavin et al. 2013). The more area planned for vegetation treatments to benefit GRSG, the higher the potential to adversely affect untargeted vegetation communities and special status plants (**Table 4-37**).

The BLM has several policies in place to reduce potential adverse impacts on untargeted vegetation. Treating riparian areas is avoided unless the planned treatment would also help restore riparian vegetation and functioning condition. By law, the BLM must adhere to label directions for applying any given herbicide. Using ground-based application methods and applying herbicides when wind speeds are low minimize the risks of herbicide drift (BLM 2010a). Broad-leaved species are vulnerable to herbicides that target broad-leaved plants. Anecdotal evidence suggests imazapic kills more forbs than the label indicates.

In addition, the BLM must conduct surveys for special status plants and take protective measures before project implementation, largely because potential species response to various treatment types is not known. One difficulty, however, is that special status plant surveys occur only once before project implementation. Surveys conducted at the wrong time of year may not detect special status species, which is most likely to occur with species that are short-lived and bloom in early spring. Several annuals and some biennial and geophyte species do not bloom every year, and thus can be missed in the survey.

The treatment responses of a few special status plants are known. Most paintbrush species (*Castilleja* spp.) are partial root parasites on sagebrush (Coffey 2004) and tend to disappear when sagebrush is killed over large areas. Long-flowered snowberry (*Symphoricarpos longiflorus*) typically resprouts following fire. Many milkvetch species (*Astragalus* spp.) have relatively large populations within sagebrush and resprout after top-killing, so they would likely respond favorably to burning. Burning too frequently or burning dense sagebrush on a large scale, however, may produce sufficient fire intensity or severity to damage special status species and other untargeted vegetation through lethal heating of the soil, through lethal heating of leaves, buds, and stems (scorch), or through direct consumption by flames. Species particularly

sensitive to fire are those with primary meristems[4] at or above the soil surface and those that are weak sprouters, such as mountain mahogany.

Wildland Fire

Unplanned fire ignitions could cause short- or long-term damage to all vegetation, including special status plants, depending on the seral stage and vegetation community affected, the extent, and the severity of the fire. In the short term, fire and fuels treatments may remove untargeted vegetation and cause bare areas to be more susceptible to soil loss or nonnative plant invasion.

In the long term, wildland and prescribed fires and fuels treatments would reduce dense vegetation, would create vegetation mosaics, would improve herbaceous understory populations and diversity, and would return nutrients to the soil. Often, fire and fuels treatments improve vegetation diversity and ecosystem function and lower the risk for an uncharacteristically large or severe wildfire. Emergency stabilization and rehabilitation can help stabilize soils and reestablish desirable plant communities.

The use of fire as a restoration tool is described above under *Sagebrush and Crested Wheatgrass Seeding Management*.

Livestock Grazing and Range Management

Livestock grazing can alter the herbaceous plant community through differential pressure because some species are preferred and others are avoided. The BLM converted large areas of degraded sagebrush steppe to crested wheatgrass largely because it can tolerate higher grazing pressure than native vegetation. Restoring crested wheatgrass seedings reduces the extent of these areas that may be more attractive to livestock than native plant communities.

However, moderate levels of livestock use are generally considered compatible with maintaining perennial bunchgrass, with the level of sustainable use depending on a number of environmental factors (Hagen 2011; Boyd et al. 2014). In addition, properly managed grazing can help restore functioning condition of riparian areas where the main problem is altered vegetation. It can also reduce litter and fine fuel loading, helping to reduce fire size and severity under moderate burning conditions (Boyd et al. 2014; Strand et al. 2014).

Grazing practices that maintain or improve rangeland health avoid many of the potentially adverse effects of grazing. The BLM uses rangeland health evaluations to assess rangeland condition and to identify where a change in grazing management would be beneficial to rangeland health. However, special status plant species remain vulnerable to livestock grazing, due to scattered and limited distribution and low populations. Managing areas as unavailable to livestock grazing increases the protection of any special status plants in the closed area,

[4]Growing points

although vulnerability to loss from wildfire may increase as fine fuel loads build in the absence of grazing (**Table 4-37**).

Table 4-37
Estimated Acres of Management Allocations and Planned Treatment Level Important to Special Status Plants

Management Allocation and Planned Treatment	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Unavailable to grazing	246,609	246,609	11,762,357	335,588	246,609	2,502,210	297,601
Closed to OHV travel	300,328	300,328	300,328	300,328	274,965	300,328	367,108
Limited to existing roads and trails	5,325,377	7,996,165	10,937,171	7,996,165	6,043,851	7,996,165	11,043,240
ROW exclusion for major ROWs[2]	857,564	4,866,030	10,682,124	857,564	4,866,030	10,682,124	858,203
Closed to fluid mineral leasing	3,073,567	6,327,708	10,167,888	3,073,567	6,327,708	10,167,888	3,073,567
Open to fluid mineral leasing, subject to NSO	860,003	586,757	187,825	3,413,017	586,757	187,825	3,867,197
Open to fluid mineral leasing, subject to CSU	4,281,916	2,498,309	790,972	4,660,101	2,498,309	790,972	4,205,921
Closed to mineral minerals disposal	3,188,080	6,421,645	10,221,771	6,421,645	6,421,645	6,421,645	6,453,084
Vegetation treatment[3]	49,483	49,483	49,483	108,856	49,483	49,483	108,011

[1]Core and low density acres apply to Alternative E; PHMA and GHMA acres apply to all other action alternatives.
[2]By law, certain ROWs cannot be completely excluded; exclusion may apply to some uses, such as commercial-scale wind and solar development, and not others, such as providing legal access to a private in-holdings, depending on the alternative.
[3]Estimated annual treatment level within 4 miles of occupied and pending leks.

Water developments and fencing also facilitate movement, distribution and concentration of livestock more evenly across the range, improving and reducing impacts on vegetation communities and soils by restricting access during critical plant growth periods, providing rest after wildfires, using underused areas, and deferring use to times when soils are saturated.

Wild Horse and Burro Management

While not as widespread as livestock grazing, wild horse and burro management is still a major land use across portions of the sagebrush biome. Wild horse and burro grazing has impacts similar to livestock grazing in its effect on soils, vegetation health, species composition, water, and nutrient availability by consuming vegetation, redistributing nutrients and seeds, trampling soils and vegetation, and disrupting microbial systems (Connelly 2004), despite differences in grazing techniques and habits.

A horse consumes 20 to 65 percent more forage than a cow of equivalent body mass, due to physiological differences (Connelly et al. 2004). Horses and burros can reduce total vegetation cover, lower sagebrush canopy cover, increase shrub canopy fragmentation, and lower species richness in GRSG habitat (Beever and Aldridge 2011). Additionally, because horses use higher elevations and steeper slopes than cattle, wild horse grazing occurs in areas of sagebrush that cattle do not typically graze (Connelly et al. 2004). Effects of wild horses on habitats may also be more pronounced during periods of drought and vegetation stress (NTT 2011, p. 18). Unlike livestock, wild horse and burro use is yearlong and can have more impacts on vegetation cover than livestock use. These effects would be amplified if wild horses and burros were to exceed AML.

Travel and Transportation

Most adverse impacts on vegetation occur in areas open to cross-country travel, particularly motorized use. Cross-country motorized travel can compact and displace soil and crush plants, especially along popular routes and hill-climbing areas. Vegetation cover loss and soil rutting can occur when soils are wet. They also promote erosion and can lead to rill and gully formation, further damaging plant communities. Special status plant species are particularly vulnerable to damage from OHV cross-country travel. Many special status plant populations occur only at single known sites with only a few individual plants. Restrictions on cross-country motorized use in GRSG habitat would limit damage to special status plants in these areas (**Table 4-37**). Such restrictions would limit use to designated routes, would close areas for the season, and would limit the number of users or types of uses permitted (NTT 2011).

Lands and Realty

ROW construction could have either short-term or permanent impacts on vegetation, depending on the type of ROW involved. Aboveground linear and underground ROWs, such as transmission lines or pipelines, would temporarily remove vegetation during construction, but areas would be reclaimed or restored after construction. Vegetation could be unintentionally damaged or removed occur during project construction, but impacts are likely to be short-term. Maintenance could cause ongoing impacts on a smaller scale. Conversely, construction and maintenance of surface linear ROWs, such as roads, would permanently remove vegetation. In addition, aboveground and surface linear

ROWs can extend for many miles, fragmenting vegetation communities, potentially introducing or spreading invasive plant species, and damaging or destroying special status plant populations.

Wind and solar energy development in particular can affect large areas, depending on the size of the development and the specific design, especially for solar development. Development may occur on private land, as much of it has thus far, but the generating sites also require transmission lines in order to deliver the generated power to market.

ROW exclusion areas would prohibit all development of ROWs in areas where they are designated (**Table 4-37**), which would directly protect vegetation, including special status plants, from disturbance and removal. In ROW avoidance areas, impacts on vegetation could still occur, but sensitive communities such as riparian areas, as well as special status plants, would be avoided to the extent feasible.

Mineral Resources

Energy and mineral development requires roads, open extraction pits, well pads, wells, borrow areas, leach pads, stockpiles, and other infrastructure, depending on the type of mineral development involved, as well as associated noise, traffic, and lights. These conditions alter, degrade, or entirely displace native ecosystems in the short term and long term (Manier et al. 2013). Surface disturbance associated with mineral development removes vegetation, reduces the condition of native vegetation communities and the connectivity of habitat, and facilitates the spread of invasive plants (NTT 2011). Since most existing mines or claims in Oregon are relatively small, the surface impacts would also be relatively small.

There is also the potential for additional wind energy development and for solar and geothermal development. Wind and solar development are discussed above under *Lands and Realty*. Most geothermal exploration to date has occurred on the periphery of GRSG habitat, reducing the potential impacts from development, although not necessarily from transmission.

Vegetation removal would convert areas to an earlier seral stage, which could change vegetation community succession and reduce desired plant communities or special status plant populations. The remaining vegetation could have reduced vigor or productivity due to mechanical damage, soil compaction, and dust. Impacts would not occur in areas closed to mineral leasing or development, except where leases or claims remain.

The BLM requires reclamation plans for mining before any surface disturbance. Such plans address vegetation, invasive plants, and other important resource values, such as sensitive vegetation communities and special status plants, with the goal of reducing impacts and restoring functional ecosystems. However, given the general lack of knowledge on the needs of special status plants, any

affected populations likely would be permanently lost in the development of salable and locatable minerals. Various stipulations attached to leasable mineral and energy development (e.g., NSO and CSU) pose a lower risk to special status plants and sensitive vegetation, such as riparian areas. Closing areas to new salable and leasable mineral development and withdrawal from locatable mineral development would reduce the potential for adverse impacts on special status plants and sensitive vegetation communities (**Table 4-37**).

4.4.3 Impacts Common to All Alternatives

There are no impacts on vegetation common to all alternatives from any of the management presented in Chapter 2.

Impacts from Special Status Plants Management

Managing to protect special status plant species can affect the size, place, and even type of treatment planned to benefit GRSG. These changes, can, in turn, affect treatment success and whether the treatment is optimally designed to benefit GRSG. However, the likelihood is very low that managing to protect special status plants would have a measureable impact on vegetation treatments designed to maintain, restore, or enhance GRSG habitat. This is because special status plants occur only in specific areas.

4.4.4 Alternative A

Alternative A would provide the lowest level of restoration, moderate potential to adversely affect untargeted vegetation communities, and highest potential to adversely affect special status plants. Older plans generally do not address sagebrush or crested wheatgrass seeding restoration, although such restoration could occur regardless. Newer plans include language for restoring sagebrush to a desirable mix to benefit GRSG and other sagebrush obligate species and increasing species diversity in crested wheatgrass seedings; however these plans do not specify how many acres should be treated.

Further, any treatments that might occur are not necessarily targeted to the sites that would most benefit GRSG and there are no restrictions on how to conduct prescribed burning so that it thins overly dense sagebrush, instead of replacing it. Given the importance of crested wheatgrass seedings to livestock grazing, the likelihood that any restoration would occur is low. Alternative A assumes the current treatment rate would continue, with standard measures taken to protect untargeted vegetation communities, particularly riparian communities. Livestock grazing and cross-country OHVs carry the highest risk to special status plants. Alternative A poses the highest risks to special status plants of the alternatives since no additional closures or restrictions would occur.

Impacts from Vegetation Management

Older plans are generally silent about treating sagebrush to enhance structural diversity, increase resistance to invasion, and manage potential wildfire effects.

The Three Rivers RMP prohibits removal of sagebrush within 2 miles of leks when a wildlife biologist determines such removal would be detrimental to GRSG habitat. Newer plans have objectives or actions to increase structural diversity in sagebrush to meet habitat needs for GRSG, sagebrush obligate wildlife species, or both. The Andrews, Steens, and Lakeview RMPs reference General Technical Report PNW-172 (Maser et al. 1984) for desired shrub cover values. The Lakeview RMP also references the ODFW's 2005 GRSG strategy for guidance on managing vegetation to benefit GRSG. The Southeastern Oregon RMP references tables for structural diversity in sagebrush; this table was published as a BLM Technical Note 417 (Karl and Sadowksi 2005). The Upper Deschutes RMP requires development of a long-term conservation strategy for GRSG habitat, in cooperation with other federal and state wildlife agencies.

Expected acreages for different vegetation treatments under all alternatives is presented in **Table 4-38**. Under Alternative A, the BLM would continue to incorporate vegetation objectives in management actions. This would improve the condition and increase the extent of native vegetation in areas where they are applied. In particular, the BLM would manage for the benefit of vegetation that provides wildlife forage, forbs, and sagebrush. BLM vegetation management policy states a preference for using native plant species in post-fire rehabilitation and other restoration work; however, it allows some introduced species in areas where they are necessary for site stabilization, restoration, and protection from invasive plant species.

Table 4-38
Estimated Total Acres of Expected Annual Vegetation Treatments by Alternative within 4 Miles of Occupied and Pending Leks[1]

Alternative	Sagebrush Thinning	Crested Wheatgrass Restoration	Conifer Reduction	Invasive Plant Control[2]	Total
A	21,217	0	17,183	11,083	49,483
B	21,217	0	17,183	11,083	49,483
C	21,217	0	17,183	11,083	49,483
D	73,623	0	24,150	11,083	108,856
E	21,217	0	17,183	11,083	49,483
F	21,217	0	17,183	11,083	49,483
Proposed Plan	53,217	1,844	40,250	12,700	108,011

[1]Includes post-fire rehabilitation and vegetation management that addresses specific COT report threats.

[2] Principally annual grasses

Note: in the absence of specific treatment targets, expected treatment acreages for action alternatives are assumed to be equal to Alternative A.

Impacts from Wildland Fire Management

Impacts from wildland fire management would continue under Alternative A, as described in **Section 4.4.2**.

Impacts from Livestock Grazing and Range Management

Livestock grazing would continue to occur under Alternative A, with over 9.98 million acres available for grazing and over 253,000 acres unavailable to grazing on BLM-administered and National Forest System lands. Grazing management must conform to the Oregon-specific standards for rangeland health and guidelines for grazing management as well as direction under 43 CFR, Part 4180, generally; thus vegetation communities would continue to be maintained and improved to some extent across the planning area over the short term and long term. As needed, the BLM would modify grazing management on individual allotments where rangeland health standards were not met and livestock grazing was causing adverse impacts on vegetation. Riparian and wetland areas would be managed to maintain or attain PFC. Closing areas to grazing primarily reduces potential adverse impacts on special status plants.

Impacts from Travel Management

Impacts from OHV use would continue under Alternative A over the short term and long term on 6.8 million acres that would be open to cross-country motorized travel. Impacts would be reduced or eliminated over the 5.6 million acres either closed to cross-country motorized travel or with travel limited to designated routes (**Table 4-37**). Under Alternative A, most GRSG habitat would be open. Route and trail modifications would be considered on a case-by-case basis. Impacts described under **Section 4.4.2** would continue to occur, particularly in areas open to OHV use.

Impacts from Lands and Realty Management

Under Alternative A, lands and realty management would continue, with over 3 million acres of ROW avoidance and over 800,000 acres of ROW exclusion areas. Impacts from ROW avoidance and exclusion areas would be similar to those described under **Section 4.4.2**.

Impacts from Leasable Minerals Management

Under Alternative A, over 3.8 million acres would be open to leasing, while over 3 million acres would be closed (**Table 4-37**). Stipulations and COAs would be applied in certain areas to reduce impacts from mineral leasing or development over the short term and long term, but these stipulations would not be applied consistently across the planning area. Impacts from leasable mineral development on vegetation, as described under **Section 4.4.2**, would continue in areas open to leasing and development.

Impacts from Locatable Minerals Management

Under Alternative A, over 24,000 acres of GRSG habitat would be recommended for withdrawal. Impacts from locatable mineral development on

vegetation, as described under **Section 4.4.2**, would continue to occur in areas open to development.

Impacts from Mineral Materials (Salables) Management

Under Alternative A, over 3 million acres would be closed to mineral materials development, while 8.8 million acres would be open (**Table 4-37**). NSO stipulations would be applied in some areas, which would reduce impacts over the short term and long term. Impacts from mineral materials development on vegetation, as described under **Section 4.4.2**, would continue to occur in areas open to development.

Impacts from Nonenergy Leasable Minerals Management

Impacts would be similar to those described for leasable minerals above (**Table 4-37**). Impacts from nonenergy leasable development on vegetation, as described under **Section 4.4.2**, would continue to occur in areas open to leasing and development.

Impacts from Mineral Split-Estate Management

Impacts on vegetation from mineral split-estate management are the same as those described for leasable minerals under Alternative A. No additional impacts on vegetation from mineral split-estate management are expected.

Impacts from Special Status Plants Management

Impacts on vegetation are the same as those described under **Section 4.4.3**. There would be no additional impacts on vegetation from special status plant management under Alternative A.

4.4.5 Alternative B

Alternative B would provide the same level of restoration and potential to adversely affect untargeted vegetation as Alternative A and the fourth highest potential to adversely affect special status plants. It would provide more targeted direction for sagebrush and crested wheatgrass seeding but would not identify how many acres should be restored over a set period; thus it is unlikely that the average annual number of acres treated would differ from Alternative A.

In the absence of specific objectives, sagebrush and crested wheatgrass seedings may or may not be treated. Alternative B would focus sagebrush restoration primarily on areas where sagebrush is lacking, and it does not address sagebrush that is overly dense. This could increase the risks of large stand-replacing fires and homogeneous burn patterns and the subsequent dominance by invasive annual plants. Alternative B would prohibit the use of fire in warm-dry sagebrush, except as a tool of last resort, thereby removing a potentially valuable method. The effects of removing prescribed fire as a vegetation management tool are not well known, but similar experience in forests suggests that prohibiting fire may well be counterproductive because no other methods have the same biochemical effects as fire.

Although Alternative B would not close any additional areas to livestock grazing, it would roughly double Alternative A's number of acres where cross-country motorized travel would not be allowed. Collectively, all the closures and restrictions would increase the level of protection afforded to special status plants.

Impacts from Special Status Species—GRSG Management

PHMA (4.5 million acres) and GHMA (5.6 million acres) would be designated. The BLM would apply a 3 percent human disturbance cap and would implement numerous conservation measures in PHMA. (Treatments and restoration would not be counted as part of the 3 percent cap.) This would reduce the likelihood for human-caused removal, degradation, or fragmentation of all vegetation, including special status plants.

Impacts from Vegetation Management

Under Alternative B, vegetation management actions would aim to improve GRSG habitat and prioritize restoration to benefit GRSG habitats. The same number of acres would be treated as under Alternative A (**Table 4-37**). The BLM would require the use of native species, would design post-restoration management to ensure the long-term persistence of the restoration, and would consider changes in climate when determining species for restoration.

Together, these management actions would maintain the condition and increase the extent of native vegetation communities, would reduce the likelihood of invasive plant species introduction and spread, and would reduce the extent of invasive plants through restoration and seeding over the long term. Treatments designed to prevent encroachment of trees and nonnative species would alter the condition of native vegetation communities by changing the density, composition, and frequency of species within plant communities. Habitat connectivity for GRSG could be increased through vegetation manipulation designed to restore vegetation, particularly in degraded riparian areas, such as perennial streams that are deeply downcut or incised.

However, requiring the use of native species could limit achieving restoration objectives especially in warm-dry sagebrush or in areas that have already been converted to nonnative annual grasses; this is because native species are not as successful in restoration as some desirable nonnative species. Invasive annual grasses could outcompete native species seedings and become dominant in some areas.

Vegetation manipulations in riparian areas, such as invasive plant treatments, native plantings, and erosion control in the channel, would improve the acreage and condition of the riparian vegetation community, individual riparian species, and hydrologic functionality to attain PFC over the long term.

Impacts from Wildland Fire Management

Fuels treatments under Alternative B would be designed to protect sagebrush ecosystems by maintaining sagebrush cover and applying seasonal restrictions on fuels management activities in winter range. Post-fuels treatments and emergency stabilization and rehabilitation (ES&R) would be designed to attempt to promote long-term persistence of seeded areas and native plant restoration areas. The BLM would also prioritize suppression in PHMA, which would retain the existing conditions and trends of vegetation, including special status plants in these areas. Impacts from fuels treatments, ES&R, and suppression are similar to those described under **Section 4.4.2**.

However, requiring the use of native species could limit achieving restoration objectives, especially in warm-dry sagebrush, or in areas that have already been converted to nonnative annual grasses. This is because native species are not as successful in restoration as some desirable nonnative species. Invasive annual grasses could outcompete native species seedings in some areas, leading to further reductions in resistance to invasion and resilience from wildfire and increased susceptibility to wildfires.

Impacts from Livestock Grazing and Range Management

Under Alternative B, the BLM would not change acres open or closed to livestock grazing, compared with Alternative A (**Table 4-37**). However, the BLM would implement a number of management actions in PHMA to incorporate GRSG habitat objectives and management considerations into livestock grazing management, as follows:

- Prioritizing completion of rangeland health assessments
- Considering grazing methods and systems to reduce impacts on GRSG habitat
- Improving management of riparian areas and wet meadows
- Evaluating introduced perennial grass seedings, water developments, and structural range improvements

Such measures would help to maintain or improve the acreage and vegetation condition of rangeland and riparian and wetland areas. Together, these efforts would reduce, but would not eliminate, some impacts from grazing on vegetation in PHMA, such as reduced acreage and condition of native vegetation, by focusing conservation measures in PHMA.

Impacts from Travel Management

Under Alternative B, nearly 8 million acres (50 percent more than under Alternative A) would be limited to existing roads, primitive roads, and trails within PHMA not already closed to off-road use (**Table 4-37**). This would reduce the likelihood of impacts caused by roads, as described under **Section 4.4.2**.

Impacts from Lands and Realty Management

Managing PHMA as ROW exclusion (4.8 million acres, four times more than Alternative A) and GHMA as ROW avoidance areas (6.1 million acres, 77 percent more than Alternative A) would reduce impacts on vegetation, as described under **Section 4.4.2**.

Impacts from Leasable Minerals Management

In addition to acres closed to fluid mineral leasing in PHMA (over two times more acres closed than under Alternative A), the BLM would require numerous conservation measures in leased PHMA. Over the long term, closures and NSO stipulations would protect existing vegetation from removal, degradation, fragmentation, and nonnative invasive plant introduction or spread in unleased areas. Conservation measures would help to reduce such impacts in leased areas; restoration would improve the condition and would increase the extent of vegetation and, depending on the location, could remove nonnative invasive plants and reduce fragmentation.

Impacts from Locatable Minerals Management

The BLM would recommend all PHMA for withdrawal from locatable mineral entry (43 CFR, Part 2300; 168 times more acres than under Alternative A), which would reduce the likelihood that vegetation, including special status plants, would be removed, degraded, or fragmented in these areas over the short term and long term.

Impacts from Mineral Materials (Salables) Management

In addition to acres closed to mineral material sales (over two times more than under Alternative A; **Table 4-37**), the BLM would restore salable mineral pits no longer in use. Over the long term, closures would protect existing vegetation, including special status plants, from removal, degradation, fragmentation, and nonnative invasive plant introduction or spread. Restoration could take many years but would ultimately increase the extent of vegetation and, depending on the location, could remove nonnative invasive plants and reduce fragmentation.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative B, PHMA would be closed to nonenergy leasable mineral leasing (over twice the acres of Alternative A), and BMPs would be required on existing leases. This would prevent impacts on vegetation from nonenergy leasable mineral development in unleased areas, as described under **Section 4.4.2**. It also would reduce impacts in leased areas.

Impacts from Mineral Split-Estate Management

Under Alternative B, over twice the acres would be closed to fluid mineral leasing compared with Alternative A. In addition, conservation measures and RFDs would be applied on mineral split-estate in PHMA where possible. This would reduce impacts on vegetation, as described for leasable minerals on these lands.

Impacts from Special Status Plants Management

Impacts are the same as those described under **Section 4.4.3**. There would be no additional impacts on vegetation from special status plant management under Alternative B.

4.4.6 Alternative C

Alternative C would have the same level of restoration as Alternative A and slightly less potential to adversely affect untargeted vegetation due to additional restrictions on treatment types and locations. It would have the least potential to adversely affect special status plants in the short term but may be counterproductive in the long term.

Alternative C would focus treatments on sagebrush where canopy cover is lacking and on crested wheatgrass seedings. However, it has the highest number of restrictions on where vegetation treatments can occur and what methods can be used, thereby reducing potential treatment effectiveness and potentially failing to restore degraded winter range.

Nearly all GRSG habitat would be closed to grazing and OHV travel. However, since native ungulate populations are not high enough to make up the difference, the lack of livestock grazing would promote buildup of dead fuels in the bunchgrasses across much of the landscape, leading to higher potential of mortality following wildfire and opening habitat for invasive annual grasses (Davies et al. 2009; Strand et al. 2014). That effect would eventually reduce special status plant populations.

Impacts from Special Status Species—GRSG Management

Impacts from designation of PHMA are similar to those described for Alternative B. The exception is that they would apply to a larger area (all occupied habitat) and a zero percent disturbance cap would be applied, thus protecting more vegetation under Alternative C.

Impacts from Vegetation Management

Management under Alternative C would be similar to that described under Alternative A, though with an increased focus on restoration. Impacts are similar to those described for Alternative A; however, impacts would be reduced over the long term in areas where vegetation can be restored to the reference state of the appropriate ecological site description. In some areas, this restoration may not be possible, especially given the requirement in Alternative C to use local ecotypes of native species. Since some native species are poor competitors against invasive plants, especially annual grasses, the sole use of these plant species in restoration in the warm-dry sagebrush, or in areas already converted to annual grasses, could limit achieving restoration.

Impacts from Wildland Fire Management

Impacts from wildland fire management on vegetation under Alternative C are similar to those described for Alternative A.

Impacts from Livestock Grazing and Range Management

Under Alternative C, livestock grazing would be removed from all occupied GRSG habitats (**Table 4-37**). The effects of livestock exclusion would depend on site conditions, including climate, soils, fire history, and disturbance and grazing history (Strand and Launchbaugh 2013). Grazing is associated with direct and indirect impacts on vegetation as described below and in **Section 4.4.2**.

There is evidence that improper grazing can reduce resistance to invasion from cheatgrass (Reisner et al. 2013), reduce water infiltration, increase soil compaction and erosion, and decrease water quality (Braun 1998; Dobkin et al. 1998, in USFWS 2010a). Cessation of grazing could relieve these impacts and allow for recovery of native understory perennials and could increase cover of sagebrush and herbaceous understory vegetation (Strand and Launchbaugh 2013). This would improve habitat components important to GRSG nest success, including cover and forage, by increasing the insect population.

However, the effects of grazing on perennial grass cover in sagebrush steppe and semidesert communities depends on a number of factors, including precipitation, soil characteristics, season of grazing, grazing intensity, and type of herbivore (Strand and Launchbaugh 2013). Furthermore, information regarding the influence of longer term rest from grazing is limited, and ecosystem properties may not necessarily be improved (Davies et al. 2014).

Research suggests that understory herbaceous productivity does not increase in depleted sagebrush ranges when grazing is removed (Beck and Mitchell 2000). Other studies have shown that changing grazing management from detrimental use to modern recommended grazing practices or dormant season use likely has the same benefits as long-term grazing rest in some instances (Davies et al. 2014). When all rangeland health standards have been met, it is expected that current grazing management is adequate to support GRSG habitat objectives, so removing grazing may not have additional benefits. In addition, in some areas, passive restoration is not sufficient to improve GRSG habitat, and in these areas, restoration is necessary (Davies et al. 2011).

Riparian and wetland areas that have been altered by grazing-associated water developments would be restored over the long term. This could increase the acreage and improve the condition of these vegetation communities toward PFC. However, impacts from wild horses and burros and other wildlife use of riparian and wetland areas would continue.

In addition, moderate livestock grazing has been shown to decrease the risk of adverse wildfire effects in sagebrush steppe plant communities, so removing grazing could also allow for buildup of fuel from grasses that could otherwise be consumed by livestock. This could result in stand replacement and loss of vegetation over large areas in both the short term and long term. The influence on fire spread, severity, and intensity would depend on such factors as weather, fuel characteristics, and landscape features. Evidence suggests that the potential

role of grazing on fire behavior is limited under extreme burning conditions—low fuel moisture and relative humidity and high temperature and wind speed (Strand and Launchbaugh 2013).

Impacts from Travel Management

Under Alternative C, nearly 11 million acres (over twice that of Alternative A) would be limited to existing roads, primitive roads, and trails in PHMA not already closed to off-road use (**Table 4-37**). This would reduce the likelihood of impacts caused by roads, as described under **Section 4.3.2**.

Impacts from Lands and Realty Management

Managing all occupied habitats and ACECs as ROW exclusion (10.6 million acres, 12 times more than Alternative A) would reduce impacts on vegetation, as described under **Section 4.4.2**.

Impacts from Leasable Minerals Management

Impacts from leasable minerals management under Alternative C are similar to those described for Alternative B, although both PHMA and GHMA would be closed to leasing (over three times more acres than under Alternative A).

Impacts from Locatable Minerals Management

Under Alternative C, over 8.8 million acres would be recommended for withdrawal (363 times more acres than under Alternative A). This would prevent impacts on vegetation from locatable mineral management, as described under **Section 4.4.2**.

Impacts from Mineral Materials (Salables) Management

Under Alternative C, over three times more acres would be closed to mineral materials disposal compared with Alternative A. This would prevent impacts on vegetation from salable mineral management, as described under **Section 4.4.2**.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative C, over three times more acres would be closed to nonenergy leasable mineral exploration and development compared with Alternative A. This would prevent impacts on vegetation from nonenergy leasable mineral development in unleased areas, as described under **Section 4.4.2**.

Impacts from Mineral Split-Estate Management

Under Alternative C, the BLM would manage over 3.5 times more acres as closed to fluid mineral leasing on split-estate lands, compared to Alternative A. Such management would reduce impacts on vegetation, as described under **Section 4.4.2.**

Impacts from Special Status Plants Management

Impacts are the same as those described under **Section 4.4.3**. There would be no additional impacts on vegetation from special status plant management under Alternative C.

4.4.7 Alternative D

Alternative D would increase the number of acres treated compared with Alternative A, with a concomitant increased potential to adversely affect untargeted vegetation communities and the fifth highest potential to adversely affect special status plants. Alternative D would focus treatments on both dense sagebrush and sagebrush that is too open, but the alternative is silent on treating crested wheatgrass seedings.

Alternative D would establish a specific treatment level over a 10-year period for vegetation treatments generally but leaves it up to BLM districts to determine how much of the target to apply to restoring sagebrush. Treatment of crested wheatgrass seedings could occur, but given the importance of these seedings to livestock grazing, the probability of treatment is low. Alternative D would close additional acres to livestock grazing and provide the same amount of restrictions on cross-country travel by OHVs as Alternative B. The limits and closures would provide the third highest level of protections for special status plants.

Impacts from Special Status Species—GRSG Management

Impacts from GRSG management on vegetation under Alternative D are the same as those described for Alternative B.

Impacts from Vegetation Management

Management under Alternative D would be similar to that described for Alternative B. However, the BLM would conduct sagebrush treatments over 2.5 times more acres and would increase juniper treatments by 40 percent (**Table 4-37**). The BLM would identify strategic areas to prioritize restoration projects and would use the most current science when implementing restoration projects. In addition, Alternative D provides guidance and priorities for sagebrush, juniper, and invasive plant treatments. Invasive plant prevention measures would be incorporated during wildfire response and other agency activities. Together, these management actions would improve the likelihood for successful sagebrush restoration and vegetation and invasive plant treatments in GRSG habitat over the long term.

Impacts from Wildland Fire Management

Wildland fire management under Alternative D would be similar to that described for Alternative B, with additional management flexibility and guidance incorporated to tailor management to specific vegetation communities. The BLM would implement a comprehensive approach, with priorities for fuels management, wildfire management, and emergency stabilization and rehabilitation within GRSG habitat. This would improve wildland fire

management over the short term and long term, given the limited resources available, and would target those areas that need most protection. Alternative D also establishes quantifiable objectives that would provide a measurable indication of progress or success. As a result, the likelihood for large severe wildfires would be reduced over the long term, and subsequent impacts on vegetation from wildfire, as described under **Section 4.4.2**, would also be reduced.

Impacts from Livestock Grazing and Range Management

Under Alternative D, the BLM would manage 36 percent more acres as unavailable to grazing compared with Alternative A (**Table 4-37**). This is because some key RNAs would be closed to grazing, based on certain criteria, including nonattainment of rangeland health standards. In addition, the BLM would prioritize allotments for processing grazing permits and leases and would prioritize rangeland health assessments in GRSG habitat; management would change when the authorized livestock use was the cause for not maintaining or improving GRSG habitat values (43 CFR, Part 4180.2[c] and Standard 5). Such measures could improve resistance to invasion and resilience from wildfire through improved ecological condition of rangeland and riparian and wetland areas. The risk of unintentional damage to untargeted vegetation and special status plants remains where lands are available to grazing. Together, these efforts would improve consistency of management across the sub-region and would reduce impacts from grazing on vegetation, described in **Section 4.4.2.**

Impacts from Travel Management

Impacts on vegetation from travel management under Alternative D are the same as those described for Alternative B**.**

Impacts from Lands and Realty Management

Impacts on vegetation from lands and realty management under Alternative D are similar to those described for Alternative A. The same acreage would be managed as ROW exclusion areas, though nearly 75 percent more acres would be managed as ROW avoidance areas, providing additional protection to sensitive vegetation and special status plants in these areas.

Impacts from Leasable Minerals Management

Impacts from leasable minerals management under Alternative D are similar to those described for Alternative A (**Table 4-37**). However, nearly four times more acres would be open to leasing subject to NSO stipulations, thereby reducing impacts, as described in **Section 4.4.2**.

Impacts from Locatable Minerals Management

Impacts on vegetation from locatable minerals management under Alternative D are the same as those described for Alternative A.

Impacts from Mineral Materials (Salables) Management

Impacts on vegetation from mineral materials management under Alternative D are the same as those described for Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative D, impacts from closure to nonenergy leasable mineral exploration and development would be the same as those described for Alternative A. However BMPs and restoration would be required on existing leases. This would reduce impacts on vegetation from nonenergy leasable mineral development in unleased and leased areas, as described under **Section 4.4.2**.

Impacts from Mineral Split-Estate Management

Impacts from mineral split-estate management under Alternative D are similar to those described for Alternative A. However, over 400,000 acres would be open to leasing, subject to NSO stipulations, under Alternative D, thereby reducing impacts, as described in **Section 4.4.2**.

Impacts from Special Status Plants Management

Alternative D includes additional special status plants management to conserve or recover special status plants and prevent future listing of species. Measures include maintaining current inventories, developing project-level mitigation measures, and monitoring populations. Such measures would increase the likelihood of retaining the number and size of special status plant populations throughout the decision area over the short term and long term.

4.4.8 Alternative E

Alternative E would provide the same level of restoration as Alternative A, with slightly less potential to adversely affect untargeted vegetation due to additional restrictions on treatment types. Alternative E would have the third highest potential to adversely affect special status plants. Alternative E would not specify how many acres should be treated over any period and would include more restrictions on where certain treatment methods could be applied. Vegetation treatments would be targeted toward sagebrush lacking sufficient canopy cover and crested wheatgrass seedings. Other than providing a clearer focus on what to treat, in the absence of specific vegetation treatment objectives, Alternative E would not result in measurable changes in how much is treated, as compared with Alternative A. As a result, Alternative E would provide the third lowest level of additional protection for special status plants.

Impacts from Special Status Species—GRSG Management

Management of core area and low density habitat under Alternative E would have impacts similar to those described for Alternative B.

Impacts from Vegetation Management

Vegetation management under Alternative E emphasizes controlling invasive plants, avoiding conversion of sagebrush to increase livestock forage, and using the connectivity model and habitat monitoring techniques in the ODFW plan.

Invasive plant management includes conducting systematic detection surveys, setting priorities for invasive plant control, and establishing invasive plant protection areas. It provides guidance for detection, control, prevention, containment, and rehabilitation and restoration. The same number of acres would be treated as under Alternative A (**Table 4-37**). Some guidance is also provided for conducting vegetation treatments. Overall, Alternative E would likely substantially reduce the introduction and spread of invasive plants over the short term and long term, compared with Alternative A.

Impacts from Wildland Fire Management

Impacts from wildland fire management under Alternative E are similar to those described for Alternative D.

Impacts from Livestock Grazing and Range Management

Impacts on vegetation from livestock grazing under Alternative E are similar to those described for Alternative A. Alternative E emphasizes incorporating thresholds and responses in grazing permits. These would be more likely to reduce impacts on vegetation and special status plants compared with Alternative A if changes in livestock grazing management were made more quickly than under other alternatives.

Impacts from Travel Management

Impacts on vegetation from travel management under Alternative E are the same as those described for Alternative B (**Table 4-37**).

Impacts from Lands and Realty Management

Impacts from lands and realty management under Alternative E would be similar to those described for Alternative A (**Table 4-37**). However, fewer ROW avoidance areas would be managed under Alternative E, thus providing fewer protections to sensitive vegetation and special status plants.

Impacts from Leasable Minerals Management

Impacts from leasable minerals management under Alternative E are the same as those described for Alternative B.

Impacts from Locatable Minerals Management

Impacts on vegetation from locatable minerals management under Alternative E are the same as those described for Alternative B.

Impacts from Mineral Materials (Salables) Management

Impacts on vegetation from mineral materials management under Alternative E are the same as those described for Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Impacts on vegetation from nonenergy leasable minerals management under Alternative E are the same as those described for Alternative B.

Impacts from Mineral Split-Estate Management

Impacts on vegetation from mineral split-estate management are the same as those described for leasable minerals under Alternative E. No additional impacts on vegetation from mineral split-estate management are expected.

Impacts from Special Status Plants Management

Impacts are the same as those described under **Section 4.4.3**. There would be no additional impacts on vegetation from special status plant management under Alternative E.

4.4.9 Alternative F

Alternative F would be similar to Alternative C in the level of expected restoration and potential to adversely affect untargeted vegetation; however, Alternative F would have the second highest potential to adversely affect special status plants. The primary differences between Alternatives C and F is that Alternative F would not close additional areas to livestock grazing or further restrict OHV use. Alternative F has many of the same restrictions on how and where vegetation treatments can be conducted as Alternative C, which would reduce the potential effectiveness of restoration. However, by leaving much more area open to livestock grazing, Alternative F would avoid the potential risks of additional fuel buildup and resulting adverse fire effects under Alternative C. Alternative F would provide similar risks to special status plants as Alternative A.

Impacts from Special Status Species—GRSG Management

Impacts on vegetation from GRSG management under Alternative F are similar to those described for Alternative B. However, Alternative F would provide greater restrictions on allowable uses, and the 3 percent disturbance cap would include prescribed fire. This would further reduce the acreage of vegetation that would be removed or fragmented by human disturbances in occupied habitat over the long term.

Impacts from Vegetation Management

Impacts on vegetation from vegetation management under Alternative F are the same as those described for Alternative B.

Impacts from Wildland Fire Management

Impacts from wildland fire management under Alternative F are similar to those described for Alternative A.

Impacts from Livestock Grazing and Range Management

Impacts from livestock grazing management under Alternative F are similar to those described for Alternative B, though Alternative F would reduce grazing by

62 percent (amount that grazing AUMs would be reduced) (**Table 4-37**) and the BLM would incorporate more stringent guidance and restrictive measures. This could further reduce impacts on vegetation in GRSG habitat areas, depending on where and how the measures were applied.

Impacts from Travel Management

Impacts from travel and transportation management under Alternative F are similar to those described for Alternative B, though there would be fewer impacts on vegetation, including special status plants, under Alternative F. This is because no new road construction would be allowed within 4 miles of leks in PHMA and mitigation of impacts from route construction would be required. Acres open, closed, and limited to OHV use would be the same as those described for Alternative A (**Table 4-37**).

Impacts from Lands and Realty Management

Impacts from management of ROW avoidance and exclusion areas under Alternative F are the same as those described under Alternative C.

Impacts from Leasable Minerals Management

Impacts on vegetation from leasable minerals management under Alternative F are the same as those described for Alternative C.

Impacts from Locatable Minerals Management

Impacts on vegetation from locatable minerals management under Alternative F are the same as those described for Alternative B.

Impacts from Mineral Materials (Salables) Management

Impacts on vegetation from salable minerals management under Alternative F are the same as those described for Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Impacts on vegetation from nonenergy leasable minerals management under Alternative F are the same as those described for Alternative B.

Impacts from Mineral Split-Estate Management

Impacts on vegetation from mineral split-estate management under Alternative F are the same as those described for Alternative C.

Impacts from Special Status Plants Management

Impacts are the same as those described under **Section 4.4.3**. There are no additional impacts on vegetation from special status plant management under Alternative F.

4.4.10 Proposed Plan

The Proposed Plan would provide a similar level of restoration as Alternative D, with similar potential to adversely affect untargeted vegetation. It would provide the second highest level of protection for special status plants. The Proposed

Plan would include specific restoration targets for sagebrush and crested wheatgrass seedings within 4 miles of occupied and pending leks, addressing the habitat used by approximately 90 percent of the birds using those leks. Some, but not all, connectivity habitat would be included within that 4-mile radius, potentially leading to weaker connections between some populations.

The Proposed Plan is the only alternative that would target crested wheatgrass seedings. It focuses sagebrush restoration on dense sagebrush, assuming that time is one factor in what is needed to increase sagebrush canopy cover where it is lacking. The Proposed Plan would close all or parts of key RNAs to livestock grazing and would increase the number of acres with restrictions on OHV use by 2.6 times over Alternative A. These, plus additional closures and restrictions in new ROW development and new mining activities, provide the second highest level of protection for special status plants.

Impacts from Special Status Species—GRSG Management

Impacts from GRSG management on vegetation under the Proposed Plan would be similar to those described for Alternative B. However, the Proposed Plan would include management of SFA within PHMA. This would provide greater restrictions on allowable uses, including fluid mineral and locatable mineral development. RDFs, buffers, and seasonal restrictions would be applied to leks in PHMA and GHMA. A 3 percent disturbance cap would be applied and mitigation would be required for human disturbances. These actions would further reduce the acreage of vegetation, including special status plants, which would be disturbed, removed, or fragmented by human disturbances over the long term.

Impacts from Vegetation Management

Management under the Proposed Plan would be similar to that described for Alternative D. The BLM would implement over two times more sagebrush and juniper treatments and 14 percent more invasive plant species treatments compared with Alternative A. The BLM would also begin crested wheatgrass treatments and would remove conifers encroaching into sagebrush habitats (**Table 4-37**). In addition, the Proposed Plan includes management and vegetation treatment objectives and prescriptions that would increase the resistance of GRSG habitat to invasive annual grasses and the resiliency of GRSG habitat to disturbances. The Proposed Plan also includes management to improve GRSG habitat in crested wheatgrass seedings. Together, these management actions increase the amount of suitable GRSG habitat over the long term.

Impacts from Wildland Fire Management

A comprehensive strategy for wildland fire management would be implemented under the Proposed Plan, including recommendations from the GRSG Wildfire, Invasive Annual Grasses, and Conifer Expansion Assessment. The assessment would identify priority habitat areas and management strategies to reduce the

threats to GRSG from invasive annual grasses, wildfires, and conifer expansion. It would incorporate recent scientific research on resistance and resilience of Great Basin ecosystems as well as interdisciplinary team knowledge. Potential management strategies include proactive measures, such as fuels management and habitat restoration and recovery, and reactive measures, such as wildfire response and post-fire rehabilitation. Together, these actions would improve wildland fire management, given the limited resources available, and would target those areas that need the most protection. As a result, the likelihood for adverse wildfire effects on GRSG habitat, untargeted vegetation, and special status plants, as described under **Section 4.4.2**, would be reduced when compared with Alternatives A through F.

Impacts from Livestock Grazing and Range Management

Under the Proposed Plan, all or portions of key RNAs would be unavailable for grazing. The BLM would also implement a number of management actions to meet vegetation objectives in SFA and PHMA, including prioritizing the review and processing of grazing permits and leases in SFA, particularly in areas not meeting rangeland health standards that also contain riparian areas, including wet meadows. Additional management would maintain, enhance, or reestablish riparian areas in GRSG habitat. Such measures could improve resistance to invasion and resilience from wildfire through improved ecological condition of rangeland and riparian and wetland areas. The risk of unintentional damage to vegetation and special status plants remains where lands remain available for grazing. Together, these efforts would improve consistent management across the sub-region and would reduce impacts from grazing on vegetation, described in **Section 4.4.2.**

Impacts from Travel Management

Impacts on vegetation from travel management under the Proposed Plan would be similar to those described for Alternative B. Under the Proposed Plan, over 11 million acres (over two times more than Alternative A) would be closed or limited to existing roads, primitive roads, and trails. This would reduce the likelihood of impacts caused by roads, as described under **Section 4.4.2**.

Impacts from Lands and Realty Management

Under the Proposed Plan, the BLM would manage nearly the same number of acres as ROW exclusion for major and minor ROWs, compared with Alternative A. However, 3 million acres would be ROW exclusion for solar and wind ROWs. In addition, 9.9 million acres (nearly three times more than Alternative A) would be ROW avoidance for major and minor ROWs. Mitigation would be required for all human disturbances. Such management would reduce impacts on vegetation, as described under **Section 4.4.2.**

Impacts from Leasable Minerals Management

Impacts from leasable minerals management under the Proposed Plan are similar to those described for Alternative D (**Table 4-37**). In addition, SFA would be

managed as NSO without waiver, exception, or modification, thereby providing additional protections in these areas. Mitigation would be required for all human disturbances, further reducing impacts.

Impacts from Locatable Minerals Management

Under the Proposed Plan, over 1.8 million acres would be recommended for withdrawal (74 times more acres than under Alternative A). This would prevent impacts on vegetation from locatable mineral management on those acres, as described under **Section 4.4.2**.

Impacts from Mineral Materials (Salables) Management

Impacts on vegetation from mineral materials management under the Proposed Plan are similar to those described for Alternative B, though with more acres (over 30,000 acres) closed to disposal. Mitigation would be required for all human disturbances, further reducing impacts.

Impacts from Nonenergy Leasable Minerals Management

Impacts on vegetation from nonenergy leasable minerals management under the Proposed Plan are similar to those described for Alternative B, though with 91 more acres closed to exploration and development. Mitigation would be required for all human disturbances, further reducing impacts.

Impacts from Mineral Split-Estate Management

Impacts on vegetation from mineral split-estate management under the Proposed Plan are similar to those described for Alternative D, though with more acres managed as NSO and fewer acres managed as CSU.

Impacts from Special Status Plants Management

Impacts are the same as those described under **Section 4.4.3**. There are no additional impacts on vegetation from special status plant management under the Proposed Plan.

4.5 FISH AND WILDLIFE

4.5.1 Methods and Assumptions

The fish and wildlife environmental consequences discussion below is focused on the analysis of potential impacts on special status wildlife species from a range of alternative management actions. Implementing management for general fish and wildlife, big game, and migratory birds discussed in **Section 3.5**, Fish and Wildlife, would have negligible or no impacts on those resources and are not addressed in this analysis. Fish species (not Federally listed or proposed species) might be of high economic and recreational value, but the proposed management alternatives within this EIS could have a potential impact on fish species and their habitats. For sagebrush-obligate wildlife species (not Federally listed or proposed species), habitat improvements designed to enhance GRSG habitat and reduce human disturbance activities would improve their habitat

quality, quantity, and connectivity. Impacts on special status plant species are discussed in **Section 4.4**, Vegetation.

Data on known locations and habitats within the planning area are available, however, the data are not complete or comprehensive concerning all special status wildlife species known to occur or potential habitat that could exist. Known and potential special status wildlife species and habitat locations were considered in the analysis; however, the potential for species to occur outside of these areas was also considered, and, as a result, some impacts are discussed in more general terms.

The BLM consulted with the USFWS and NMFS under the Endangered Species Act Section 7 regulations for potential impacts on federally listed and proposed species and critical habitat from implementing the Proposed Plan. The BLM determined "No Effect" to these species (**Appendix W**). Impacts on special status species described below apply only to non-listed or proposed wildlife species.

Impacts on special status wildlife species would primarily result from unmitigated surface disturbance such as wildfires, wildfire-suppression activities, erosion, and trampling. Direct and indirect impacts on special status species may result from any surface-disturbing activity or alteration to occupied habitats. All federal actions would comply with ESA consultation requirements, and all implementation actions would be subject to further special status species review before site-specific projects are authorized or implemented. Federal regulations and BLM policy protecting threatened, endangered, and sensitive species were considered for reducing the potential impacts from permitted activities. If adverse impacts are identified, mitigation measures, including avoidance, would be implemented to minimize or eliminate the impacts.

Indicators

Special Status Wildlife Species
Indicators of impacts on special status wildlife species are as follows:

- Amount and condition of available habitat
- Likelihood of mortality, injury, or direct disturbance
- Likelihood of habitat disturbance

Assumptions
In addition to the assumptions in **Section 4.2.1**, Analytical Assumptions, this analysis includes the following assumptions:

- The analysis presented is largely qualitative due to the lack of data or uncertainty in existing data on certain special status species' occurrences. Furthermore, because special status species may use

currently unoccupied habitat, and wildlife distribution and abundance may fluctuate, predicted effects on occupied habitat and species could change over time as knowledge of species locations increases.

- Short-term effects are defined as those that would occur over a timeframe of 5 years or less, and long-term effects would occur over longer than 5 years.
- USFWS would be consulted on any action that could potentially affect a listed or proposed wildlife species or their habitat.

4.5.2 Nature and Type of Effects

Special status wildlife species may inhabit the GRSG population areas within the decision area. Special status wildlife habitats on BLM-administered lands within the decision area would be affected under all alternatives, and habitat condition is directly linked to vegetation conditions and progression toward land health standards (**Section 4.4**, Vegetation). Habitat loss or modification due to human activity is a substantial threat to special status species and has effects on species adapted to specific ecological niches. The BLM's land management practices are intended to sustain and promote species that are legally protected and to prevent plant and animal species that are not yet legally protected from needing such protection.

Changes to special status wildlife species and their habitats would be caused by the following: 1) disturbance and disruption from casual use; 2) disturbance and disruption from permitted activities; and 3) changes to habitat conditions. Changes are described for special status species that are not listed or proposed for listing. There would be no effect on listed special status species (see **Appendix L**).

Disturbance and Disruption from Casual Use

The BLM does not actively manage casual use activities on federal lands, however, activities such as recreation, motorized vehicle use, and use of authorized and unauthorized routes can threaten special status wildlife species and their habitat. Examples of impacts on special status wildlife from casual use include habitat loss, fragmentation, or degradation; mortality or injury of animals; sedimentation of waterways; increased turbidity; decreased water quality; disturbance to species during sensitive or critical periods in their life cycle such as spawning, nesting, or denning; short-term displacement; and long-term habitat avoidance by species such as raptors that are sensitive to noise or human presence. Some species would adapt to disturbances over time and could recolonize disturbed habitats. Areas open to motorized travel could impact special status species due to noise disturbance, human presence, potential for invasive plant spread and habitat degradation, and the potential for injury or mortality to wildlife from vehicle collisions.

Both short-term, loud noise (such as from vehicles or construction) and long-term, low-level noise (such as from industrial activities such as oil and gas development) have been documented to cause physiological effects on multiple wildlife species. These effects include increased heart rate, altered metabolism, and changes in hormones, foraging, anti-predator behavior, reduced reproductive success, density, and community structure (Radle 2007; Barber et al. 2009a). In addition, noise can impact wildlife species including mammals and birds through the disruption of communication and environmental cues (Slabbekoorn and Ripmeester 2008; FHA 2011). Determining the effect of noise is complicated because different species and individuals have varying responses, and certain species rely more heavily on acoustical cues than others (Radle 2007; Barber et al. 2009b). Impacts would be both short- and long-term, depending on the type and source of noise, and the depending on the species.

On-site management of recreation and motorized activity, and designation and closure of travel routes could prevent or reduce impacts. Seasonal closure of routes would prevent impacts on species during sensitive or critical times of the year, such as during winter or birthing periods.

Disturbance and Disruption from Permitted Activities

Permitted, surface-disturbing activities (e.g., mineral exploration and development, and ROWs) would result in short-term direct impacts on special status wildlife species through mortality, injury, displacement, and noise or human disturbance caused by increased vehicle traffic and use of heavy machinery. Displacement of species could increase competition for resources in adjacent habitats. Over the long term, these activities would remove and fragment habitats due to road development and use, facility construction and placement, creation of well pads and pipelines, and construction within ROWs. Species could avoid developed areas over the long term, or would adapt and recolonize sites after construction. ROW avoidance and exclusion areas and an human disturbance cap would reduce or avoid habitat impacts and could reduce the total acreage of habitat disturbance and fragmentation.

Bird mortality or injury could occur from collision or electrocution with transmission lines and other ROW structures. Development in areas where there are existing ROWs would reduce impacts, since resident birds could have adapted to the existing ROWs. Wind energy could also cause direct impacts on birds and bats, including blade strikes, barotrauma (injury or mortality caused by rapid or excessive pressure changes), habitat loss, and displacement. Indirect impacts could include introduction of invasive vegetation that may result in alteration of wildfire frequency; increase in predators or predation pressure; decreased survival or reproduction of the species; and decreased habitat effectiveness. Areas managed under NSO, CSU, and TL stipulations would limit surface disturbance and associated impacts in certain areas.

Changes to Habitat Conditions

Vegetation and invasive plant treatments; livestock grazing; GRSG habitat enhancements; wildfire; fuels treatments; and range improvements alter habitat conditions. Overall, the BLM would aim to achieve or move toward achieving Rangeland Health Standard 5: Native, Threatened and Endangered, and Locally Important Species, which would maintain and/or restore habitat values for fish and wildlife. Over the short term, vegetation treatments and wildfire would reduce habitat quality or temporarily remove habitat until the desired condition was established. Invasive plant treatments, when successful, should improve habitat conditions over both the short- and long-term. Over the long term, vegetation and habitat treatments would increase habitat structural and compositional diversity, increase cover and nesting habitat, prevent sedimentation of waterways, and retain riparian and wetland habitats. Depending on the extent and severity, wildland fire can improve habitat for some species based upon their specific habitat needs.

Special Status Species, that use rangelands can benefit from the proper management of livestock. These benefits include providing sustainable, diverse, and vigorous mixtures of native vegetation for forage and habitat. Also, proper management of grazing livestock can control invasive plants and reduce fuel accumulations, protect intact sagebrush habitat, and increase habitat extent and continuity (NRCS 2011). If grazing is unmanaged it could result in, overutilization of forage by livestock, leading to increased competition with wildlife for forage, and potentially reduced cover and nesting habitat for other species. Livestock could also spread invasive plants, which would degrade habitats. Special status wildlife could be displaced from their habitats, which could increase competition for resources in adjacent habitats. Impacts would vary depending on the extent of vegetation removal, type of habitat impacted, and length of the grazing period. Livestock could degrade riparian areas, which could impact riparian-dependent, aquatic, and fish species.

Natural disturbances such as unplanned wildfire ignitions could cause short- or long-term damage to habitats depending on the seral type affected, extent, and severity of the wildfire. In the short term, wildfire removes nesting and cover habitat and leaves bare areas that provide little habitat value and could erode to cause sedimentation of waterways. Wildfire could displace species from suitable habitat, which could increase competition for resources in adjacent habitats. In the long term, wildfires and prescribed fires, as well as fuels treatments, can improve habitat by increasing structural diversity. When properly designed and implemented, prescribed fire and fuels treatments can lower the risk for an uncharacteristically large or severe wildfire that could impact a large acreage of wildlife habitats.

Management actions and special designated areas (e.g., ACECs) that restrict surface-disturbing activities would reduce impacts such as habitat removal, fragmentation, and human disturbance. Such management actions include

stipulations to protect GRSG; closure of areas to mineral leasing and development; ROW avoidance and exclusion areas; areas proposed for withdrawal from mineral entry; restrictions within ACECs; and route closures or restrictions.

Criteria would be used to guide land exchanges, disposals, and acquisitions, which could reduce the fragmentation of BLM-administered land in the planning area. This could improve the BLM's ability to implement management actions that would result in improved habitats, undisturbed fish and wildlife populations, and attainment of land health standards. However, lands identified for disposal could cause fragmentation and habitat loss if the disposed land is converted to other uses, such as agriculture or residential or industrial development.

4.5.3 Impacts Common to All Alternatives

There are no impacts on special status wildlife species that are common to all alternatives.

4.5.4 Alternative A

Impacts from Special Status Species—GRSG Management

There would be no new impacts on special status wildlife species resulting from GRSG management under Alternative A.

Impacts from Vegetation Management

Under Alternative A, the BLM would continue to protect special status species habitat or populations to avoid the species from being federally proposed or listed. These actions would continue to implement current management efforts to protect habitat for all special status species described in **Section 3.5**, Fish and Wildlife, which overlap with GRSG habitat. There would be no new impacts on special status wildlife species resulting from vegetation management under Alternative A.

Impacts from Wild Horse and Burro Management

Under Alternative A, the BLM would continue to manage wild horses and burros to AML within 2,657,537 acres of HMAs on GRSG habitat (800,757 acres of PHMA and 1,562,111 acres of GHMA). Impacts on special status wildlife species would occur when wild horse and burro populations exceed AML; this is similar to those described for livestock management in **Section 4.5.2**, *Nature and Type of Effects*. Management actions, including maintaining herds at or below AML, would increase habitat quality for sagebrush-dependent special status species, including many of those listed in **Section 3.5**, *Fish and Wildlife*. Special status fish, amphibians, and other aquatic species habitat quality would also increase under Alternative A as a result of herd management.

Impacts from Wildland Fire Management

Alternative A would limit the number of projects in GRSG spring-summer-fall range to 60 percent of the area in a 10 year period and reduce encroaching

conifers from riparian and sagebrush habitats. These actions would increase and enhance habitat for special status wildlife species that occur in sagebrush and riparian habitats. Special status wildlife that occupy western juniper trees less than 120 years old that are encroaching on sagebrush or GRSG riparian areas would have reduced habitat as a result of Alternative A. Impacts from wildland fire on special status wildlife species described in **Section 4.5.2**, *Nature and Type of Effects*, would continue under Alternative A.

Impacts from Livestock Grazing and Range Management

Under Alternative A, 12,258,337 acres would remain available to livestock grazing, and 253,504 would remain unavailable to livestock grazing. Under Alternative A, livestock grazing could be used to promote the establishment of sagebrush by reducing stands of competing vegetation. Efforts to enhance and maintain wet meadows including riparian and wetlands, would be managed to meet proper functioning condition status. Seeding projects would increase desirable forage in areas of low vegetation diversity. These actions could result in increased habitat for sagebrush dependent special status species including many of the species listed in **Section 3.5**, Fish and Wildlife. Special status fish, amphibians, and other aquatic species habitat would increase under Alternative A as a result of riparian and wetlands restoration activities.

Impacts from Travel Management

Under Alternative A, approximately 6,811,890 acres would remain open to unrestricted cross-country motorized travel. Impacts on special status wildlife species as a result of continued motorized vehicle use described in **Section 4.5.2** would continue.

Impacts from Lands and Realty Management

Under Alternative A, lands and realty would continue to manage approximately 857,564 acres as ROW exclusion and approximately 3,445,685 acres as ROW avoidance areas. Management actions would not change under Alternative A and, therefore, there would be no new impacts on special status wildlife species.

Impacts from Leasable Minerals Management

Under Alternative A, 7,560,605 acres of GRSG habitat (3,720,426 acres of PHMA and 3,840,179 acres of GHMA) would continue to be open to mineral leasing; 2,657,254 acres (1,117,502 acres of PHMA and 1,539,752 acres of GHMA) would be closed. Impacts on special status wildlife species that occupy GRSG as a result of leasable minerals management, including habitat avoidance and other impacts described in **Section 4.5.2**, would continue in areas open for leasing under Alternative A.

Impacts from Locatable Minerals Management

Under Alternative A, areas inhabited by federally-listed species and lands within 0.6 miles of GRSG leks would be withdrawn or recommended for withdrawal from locatable mineral exploration and development. Areas that remain open for locatable mineral development that overlap with special status wildlife

species not federally-listed, including the majority of bird, amphibian, mammal, and invertebrate species would continue to be impacted under Alternative A as described in **Section 4.5.2**.

Impacts from Mineral Materials (Salables) Management

Similar to the management actions proposed under locatable minerals in Alternative A, areas inhabited by federally-listed species and lands within 0.6 miles of GRSG leks would be withdrawn or recommended for withdrawal from mineral exploration and development. Areas that remain open for mineral development that overlap with special status wildlife species not federally-listed, including the majority of the bird, amphibian, mammal, and invertebrate species, would continue to be impacted under Alternative A as described in **Section 4.5.2**.

Impacts from Nonenergy Leasable Minerals Management

Nonenergy leasable minerals management actions proposed under Alternative A would have similar impacts on special status wildlife species as described for locatable minerals and mineral materials management above. Areas inhabited by federally-listed species and lands within 0.6 miles of GRSG leks would be withdrawn or recommended for withdrawal from mineral exploration and development. Areas that remain open for mineral development that overlaps with special status wildlife species not federally-listed, including the majority of the bird, amphibian, mammal, and invertebrate species, would continue to be impacted under Alternative A as described in **Section 4.5.2**.

Impacts from Mineral Split-Estate Management

Under Alternative A, management of mineral split-estate would not close, withdraw, or propose to withdraw locatable mineral entry. Approximately 2,216,012 acres would continue to remain open to locatable mineral exploration or development. Impacts on special status wildlife species would continue as described in **Section 4.5.2**.

Impacts from Special Designations Management

Management of 715,048 acres of ACECs would continue to protect wildlife habitat and special status species under Alternative A. Management actions would not change under Alternative A and, therefore, there would be no new impacts on special status wildlife species.

Impacts from Air Quality and Climate Change Management

The current RMPs do not address climate change. Therefore, under Alternative A, no new impacts on special status wildlife species from air quality and climate change management are expected.

Impacts from Special Status Plants Management

Special status wildlife species habitat would not be impacted under special status plants management actions proposed under Alternative A.

4.5.5 Alternative B

Impacts from Special Status Species—GRSG Management

Under Alternative B, 4,547,043 acres of PHMA and 5,662,632 acres of GHMA would be designated and a 3 percent disturbance cap on human activities in PHMA would be applied. Compared with Alternative A, the actions proposed under Alternative B would increase habitat protection for special status wildlife species that occupy GRSG habitat listed in **Section 3.5**, Fish and Wildlife.

Impacts from Vegetation Management

Vegetation restoration efforts proposed under Alternative B would prioritize projects that would most likely improve GRSG habitat including seasonally important habitats and riparian areas. Special status wildlife species, including riparian species that overlap with GRSG habitat would receive increased habitat quality and protection under the vegetation management actions proposed under Alternative B compared with Alternative A.

Impacts from Wild Horse and Burro Management

Under Alternative B, management of wild horses and burros would incorporate GRSG objectives and assess land health within HMAs. These actions would likely increase habitat quality and protection for special status wildlife species within these areas relative to Alternative A.

Impacts from Wildland Fire Management

Wildland Fire management under Alternative B in PHMA would be designed and implemented to protect existing sagebrush communities. These actions would likely reduce impacts from wildfire on GRSG habitat as described in **Section 4.5.2** and therefore, increase protection from wildfire on special status wildlife species that overlap with GRSG habitat compared with Alternative A.

Impacts from Livestock Grazing and Range Management

The total number of acres open to livestock grazing would be the same as Alternative A. Under Alternative B however, the BLM would incorporate GRSG habitat objectives and considerations into all BLM grazing allotments through AMPs or permit renewals. Additional actions would include conducting land health assessments specific to achieving GRSG habitat objectives. Objectives to conserve, enhance, or restore PHMA would be developed and include wetlands and riparian areas. Grazing management actions would be included to meet seasonal GRSG habitat requirements. These management actions would protect and improve special status wildlife habitat within livestock grazing rangeland as well as riparian and wetlands habitat. Compared with Alternative A, these actions would reduce impacts from grazing described in **Section 4.5.2** on special status wildlife species.

Impacts from Travel Management

Under Alternative B, 4,141,539 acres would remain open to cross-country motorized travel and 4,498,590 acres within PHMA would be limited to existing

routes until travel management planning is complete. Actions proposed under Alternative B would reduce impacts described in **Section 4.5.2** on special status wildlife species compared with Alternative A.

Impacts from Lands and Realty Management

Under Alternative B, PHMA would be ROW exclusion areas (4,547,043 acres) and GHMA would be ROW avoidance areas (5,662,632 acres). The designation of ROW exclusion and avoidance areas would reduce habitat fragmentation to allow improved sagebrush connectivity for GRSG. These efforts would reduce impacts from permitted activities described in **Section 4.5.2** on special status wildlife species compared with Alternative A.

Impacts from Leasable Minerals Management

Management actions proposed under Alternative B would close all PHMA (4,371,643 acres) to fluid mineral leasing; 3,840,192 acres would remain open in PHMA. Approximately 1,539,752 acres of GHMA would be closed to fluid mineral leasing, the same amount as would remain closed in Alternative A. The actions under Alternative B would reduce impacts from fluid mineral leasing (see **Section 4.5.2**) described under Alternative A on special status wildlife species that inhabit PHMA.

Impacts from Locatable Minerals Management

Under Alternative B, 4,110,053 acres would be petitioned for withdrawal from locatable mineral entry. Additionally, the BLM would recommend applying best management practices in PHMA from the NTT report as COAs. Actions described under this alternative would reduce the impacts described under permitted activities in **Section 4.5.2** on special status wildlife species in PHMA compared with Alternative A.

Impacts from Mineral Materials (Salables) Management

Alternative B would close all PHMA to mineral material sales and restore defunct mineral pits to meet GRSG habitat objectives. These actions would reduce the potential impacts on special status wildlife species described in **Section 4.5.2** (permitted activities) compared with Alternative A.

Impacts from Nonenergy Leasable Minerals Management

Nonenergy leasable minerals management actions proposed under Alternative B would close PHMA to leasing; no new leases to expand would be issued. Additionally, best management practices and design features would be applied during solution mining. Compared with Alternative A, special status wildlife species within PHMA would receive increased habitat protection from these measures and reduced impacts described under permitted activities in **Section 4.5.2.**

Impacts from Mineral Split-Estate Management

Under Alternative B, where federal mineral estate occurs under non-federal surface ownerships in PHMA, the BLM would apply the same conservation

measures as would be applied on public lands. Best management practices and design features would be applied to surface developments where the surface is federally owned and the mineral estate is non-federal. These actions would reduce the potential for impacting special status wildlife species in PHMA compared with Alternative A.

Impacts from Special Designations Management

Management actions proposed under Alternative B would be the same as those in Alternative A. Management actions would not change under Alternative B and, therefore, there would be no new impacts on special status wildlife species.

Impacts from Air Quality and Climate Change Management

Under Alternative B, no impacts on special status wildlife species from air quality and climate change management are expected.

Impacts from Special Status Plants Management

Special status wildlife species habitat would not be impacted under special status plants management actions proposed under Alternative B.

4.5.6 Alternative C

Impacts from Special Status Species—GRSG Management

Proposed management actions under Alternative C would designate the same acreage of PHMA (4,547,043 acres) and GHMA (5,662,632 acres) as Alternative B except that a zero percent disturbance cap would be applied. As a result, under Alternative C, special status wildlife species and their habitat would receive more protection than under both Alternative A and Alternative B.

Impacts from Vegetation Management

Under Alternative C, vegetation management actions would be similar to those described under Alternative A. However, actions proposed under Alternative C to restore riparian and meadow vegetation by removing livestock watering infrastructure (troughs, pipelines, and wells) could reduce the availability of water for special status wildlife species compared with Alternative A.

Impacts from Wild Horse and Burro Management

Under Alternative C, management of wild horses and burros would result in impacts on special status wildlife species similar to those described under Alternative A.

Impacts from Wildland Fire Management

Wildland fire management under Alternative C would impact special status wildlife species the same as described under Alternative A.

Impacts from Livestock Grazing and Range Management

All occupied GRSG habitat would be closed to grazing under Alternative C, and there would be zero AUMs available. Potential impacts on special status wildlife

from proper and improper grazing management described under changes to habitat conditions in **Section 4.5.2** would be avoided. However, the elimination of livestock grazing may increase the potential for large and severe wildfires as fuel loads increased in the absence of managed grazing. Therefore, impacts on special status wildlife species under Alternative C would increase compared with Alternatives A and B. This is especially true for Alternative B, under which GRSG habitat objectives and considerations would be considered in managing grazing allotments.

Impacts from Travel Management

Under Alternative C, 1,202,694 acres would be open to cross-country travel, which is a reduction compared with Alternatives A and B. No PHMA would be open to cross-country travel, which is the same as Alternative B. Additionally, 10,937,171 acres would be open to motorized travel on existing roads, with additional seasonal restrictions, which is an increase over Alternatives A and B. Therefore, impacts on special status wildlife species from travel management actions under Alternative C would be less than those described under Alternatives A and B.

Impacts from Lands and Realty Management

Management proposed under Alternative C would prohibit transmission corridor, ROW corridor, and tower construction in all GRSG habitat including PHMA and GHMA. New corridors or infrastructure would be located outside of GRSG habitat. These actions would reduce impacts from permitted activities as described in **Section 4.5.2** on special status wildlife; however, special status species that inhabit areas outside of sagebrush ecosystems could receive more impacts from development in ROWs in non-GRSG habitat.

Impacts from Leasable Minerals Management

Under Alternative C, all occupied habitat would be closed to fluid mineral leasing. Management actions proposed under Alternative C would result in an increase of 4,481,900 acres of GHMA closed to leasing compared with Alternatives A and B. Therefore, Alternative C would provide the greatest amount of habitat protection for sagebrush-obligate special status wildlife species from leasable mineral development compared with all alternatives.

Impacts from Locatable Minerals Management

Impacts on special status wildlife species from locatable minerals management proposed under Alternative C would be similar to those described under Alternative A; however, under Alternative C an additional 4,757,517 acres of PHMA would be recommended for withdrawal from locatable mineral entry.

Impacts from Mineral Materials (Salables) Management

Impacts on special status wildlife species from mineral materials management proposed under Alternative C would be reduced, compared with impacts under Alternative A and B. Under Alternative C, additional GHMA would be closed to

mineral materials disposal, and PHMA and GHMA would not be open for consideration for mineral materials disposal.

Impacts from Nonenergy Leasable Minerals Management

Impacts on special status wildlife species from nonenergy leasable minerals management proposed under Alternative C would be reduced, compared with impacts under Alternatives A and B. Under Alternative C, additional GHMA would be closed to nonenergy solid leasable mineral exploration and development, and PHMA and GHMA would not be open for consideration of nonenergy solid leasable mineral exploration or development.

Impacts from Mineral Split-Estate Management

Impacts on special status wildlife species from mineral split-estate management proposed under Alternative C would be the same as those described under Alternative A.

Impacts from Special Designations Management

Under Alternative C, all PHMA would be designated as new ACECs for GRSG conservation and habitat protection. These efforts would increase habitat quality and reduce impacts on special status wildlife species in PHMA as described in changes to habitat conditions (see **Section 4.5.2**).

Impacts from Air Quality and Climate Change Management

Under Alternative C, no impacts on special status wildlife species from air quality and climate change management are expected.

Impacts from Special Status Plants Management

Special status wildlife species habitat would not be impacted under special status plants management actions proposed under Alternative C.

4.5.7 Alternative D

Impacts from Special Status Species—GRSG Management

Impacts on special status wildlife species as a result of management actions proposed under Alternative D would be similar to the impacts described under Alternative B.

Impacts from Vegetation Management

Under Alternative D, vegetation management would prioritize restoration opportunity areas, throughout all occupied habitat. Restoration opportunity areas are a subset of GRSG strategic areas that, if restored, can provide increased habitat quality and increased habitat connectivity for GRSG, as described in **Chapter 2**. These actions would increase special status wildlife habitat quality and protection relative to Alternative A.

Impacts from Wild Horse and Burro Management

Under Alternative D, management of wild horses and burros would result in impacts on special status wildlife species similar to those described under Alternative B.

Impacts from Wildland Fire Management

Alternative D provides the most comprehensive wildland fire management direction of all the alternatives. Wildland fire management under Alternative D would increase the focus of implementing protection for multiple resources including GRSG habitat. These efforts would reduce the impacts from wildfire described in **Section 4.5.2** on special status wildlife species.

Impacts from Livestock Grazing and Range Management

Management actions proposed under Alternative D would result in 12,183,315 acres available for livestock grazing, a reduction of over 75,000 acres relative to Alternative A. Also, Alternative D provides more comprehensive livestock grazing and range management actions aimed at protecting and restoring GRSG habitat compared Alternative A. Therefore Alternative D would reduce impacts described in changes to habitat conditions in **Section 4.5.2** on special status wildlife compared with Alternative A.

Impacts from Travel Management

Under Alternative D, impacts on special status wildlife species from travel management actions would be similar to those described under Alternative B.

Impacts from Lands and Realty Management

Under Alternative D, lands and realty management actions would continue to manage current BLM ROWs in PHMA as exclusion areas. The remaining PHMA (4,289,889 acres) would be managed as avoidance areas. GHMA under Alternative D would be open to new ROWs and would require the local BLM wildlife biologist, in cooperation with ODFW, to conduct a field evaluation to determine if the proposal would impact occupied, suitable, or potential habitat for GRSG. Additionally, development within avoidance areas would be allowed but subject to a 3 percent disturbance cap for human disturbance activities. Management actions proposed under Alternative D would be more protective of special status wildlife species within GRSG habitat compared with Alternative A; however, not as protective as Alternative B.

Impacts from Leasable Minerals Management

Under Alternative D, leasable minerals management would result in the same number of acres open and closed as Alternative A. However, Alternative D would impose a 3 percent disturbance limitation and an authorization to limit impacts from permitted activities (**Section 4.5.2**) on GRSG. Therefore, special status wildlife species that occupy GRSG habitat would receive an increased level of habitat protection under Alternative D than Alternative A.

Impacts from Locatable Minerals Management

Impacts on special status wildlife species from locatable minerals management proposed under Alternative D would be the same as those described under Alternative A. Alternative D would include more protective considerations for GRSG and their habitat that could also increase protection for special status wildlife in sagebrush ecosystems.

Impacts from Mineral Materials (Salables) Management

Impacts on special status wildlife species from mineral materials management proposed under Alternative D would be the same as those described under Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Impacts on special status wildlife species from nonenergy leasable minerals management proposed under Alternative D would be the same as those described under Alternative B.

Impacts from Mineral Split-Estate Management

Impacts on special status wildlife species from mineral split-estate management proposed under Alternative D would be the same as those described under Alternative B.

Impacts from Special Designations Management

Under Alternative D, the management plans for existing ACECs and RNAs in the planning area would be revised and updated to improve the management for GRSG and sagebrush habitat. Compared with Alternative C, only 20 percent of PHMA and/or 50 percent of GHMA GRSG habitat would be managed for GRSG. Therefore, impacts on special status wildlife species would be less than those as a result of Alternative A but greater than those described under Alternative C.

Impacts from Air Quality and Climate Change Management

Under Alternative D, no impacts on special status wildlife species from air quality and climate change management are expected.

Impacts from Special Status Plants Management

Under Alternative D, the BLM would coordinate with the USFWS, ODFW, Oregon State Department of Agriculture, Oregon Biodiversity Information Center, and other organizations on the conservation efforts for special status species. Direction provided under Alternative D would include tools for establishing and assessing objectives for monitoring special status species populations. Compared with Alternative A, these measures would improve habitat within special status plant communities and increase the habitat quality for special status wildlife that could occur in those habitats.

4.5.8 Alternative E

Impacts from Special Status Species—GRSG Management

Management actions proposed under Alternative E would include a zero percent disturbance cap applied in Core Area habitats; however, the disturbance threshold would not be implemented in non-GRSG habitat. Habitat improvements in Low Density habitat (3,923,539 acres) under Alternative E would provide 1,739,093 fewer acres of protection for special status wildlife habitat in these areas compared with Alternative A.

Impacts from Vegetation Management

Under Alternative E, vegetation management actions would recommend planting alfalfa within expansive sagebrush areas but would recommend avoiding the conversion of GRSG habitat on public lands solely for increasing livestock forage. Vegetation treatments would not occur during sensitive GRSG nesting and brood-rearing periods. Alternative E would also recommend using native seed sources for habitat restoration activities and provide increased protection for resilient sagebrush habitats in Core Area habitat. Water development for livestock would be added or relocated to maintain or improve GRSG habitat. The actions proposed under Alternative E would reduce impacts on special status wildlife described in **Section 4.5.2** compared with Alternative A. In addition, compared with the other action alternatives, Alternative E would increase the availability of water in GRSG habitat which would increase habitat quality for special status wildlife in those areas including riparian and aquatic species.

Impacts from Wild Horse and Burro Management

Under Alternative D, management of wild horses and burros would result in impacts on special status wildlife species similar to those described under Alternative A with slightly more considerations given for the protection of GRSG habitat.

Impacts from Wildland Fire Management

Under Alternative E, impacts on special status wildlife from wildland fire management would be similar to those described under Alternative D with less focused protection directions. These actions would reduce the impacts described in **Section 4.5.2** on special status wildlife species compared with Alternative A but to a lesser degree than Alternative D.

Impacts from Livestock Grazing and Range Management

Impacts on special status wildlife species from livestock grazing management proposed under Alternative E would be similar to those described under Alternative A. However, Alternative E would provide more management flexibility in assessing and correcting impacts from overgrazing of livestock to improve habitat quality. Special status wildlife habitat in these areas would increase in quality and be more protected under Alternative E compared with

Alternative A; however, management actions would not be as comprehensive as those described under Alternative D.

Impacts from Travel Management

Under Alternative E, impacts on special status wildlife species from travel management actions would be similar to those described under Alternative B.

Impacts from Lands and Realty Management

Lands and realty management actions under Alternative E would include all Core Area habitat (4,547,043 acres) as ROW exclusion areas. The actions proposed under Alternative E would be more protective of special status wildlife species within GRSG habitat compared with Alternative A; and more protective than Alternative B.

Impacts from Leasable Minerals Management

Under Alternative E, impacts from leasable minerals management on special status wildlife species would be similar to Alternative B.

Impacts from Locatable Minerals Management

Impacts on special status wildlife species from locatable minerals management proposed under Alternative E would be the same as those described under the Alternative B.

Impacts from Mineral Materials (Salables) Management

Impacts on special status wildlife species from mineral materials management proposed under Alternative E would be the same as those described under Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Impacts on special status wildlife species from nonenergy leasable minerals management proposed under Alternative E would be the same as those described under Alternative B.

Impacts from Mineral Split-Estate Management

Impacts on special status wildlife species from mineral split-estate management proposed under Alternative E would be the same as those described under Alternative B.

Impacts from Special Designations Management

Under Alternative E, 715,048 acres of GRSG habitat would continue to be managed as an ACEC as described under Alternative A. Therefore, impacts on special status wildlife species would be similar to those described under Alternative A.

Impacts from Air Quality and Climate Change Management

Under Alternative E, climate change forecasting would be included in vegetation management of sagebrush and reduce impacts on special status wildlife species over the long term compared with Alternative A.

Impacts from Special Status Plants Management

Special status wildlife species habitat would not be impacted under special status plants management actions proposed under Alternative E.

4.5.9 Alternative F

Impacts from Special Status Species—GRSG Management

Impacts on special status wildlife species as a result of management actions proposed under Alternative F would be similar to the impacts described under Alternative B.

Impacts from Vegetation Management

Under Alternative F, vegetation management actions would result in similar impacts on special status wildlife as those described under Alternative B.

Impacts from Wild Horse and Burro Management

Under Alternative F, management of wild horses and burros would continue to provide 2,657,537 acres of HMAs. This would be the same number of HMA acres as Alternative A except that wild horse AMLs would be reduced by 25 percent for HMAs that contain PHMA and GHMA to reduce grazing pressure on vegetation. Therefore, the actions proposed under Alternative F would result in more available habitat and forage for special status wildlife species that rely on wild horse and burro ranges than all of the action alternatives.

Impacts from Wildland Fire Management

Alternative F would provide less direction for controlling invasive plants and resting recently treated vegetation areas from livestock grazing areas compared with Alternative B. These actions would reduce the impacts described in **Section 4.5.2** on special status wildlife species compared with Alternative A but to a lesser degree than Alternative B.

Impacts from Livestock Grazing and Range Management

Alternative F would close 25 percent of PHMA and GHMA to livestock grazing. These actions would reduce impacts from livestock grazing on special status wildlife habitat described in **Section 4.5.2** compared with all alternatives except Alternative C.

Impacts from Travel Management

Under Alternative F, new roads would not be constructed within 4 miles of a lek in PHMA and therefore would increase habitat protection for special status wildlife species that occupy those areas compared with Alternative B.

Impacts from Lands and Realty Management

Impacts on special status wildlife species from lands and realty management actions under Alternative F would be similar to those described under Alternative B.

Impacts from Leasable Minerals Management

Under Alternative F, 4,371,643 acres of PHMA would be closed to fluid mineral leasing (the same as Alternative B) and 5,371,643 acres of GHMA would also be closed to leasing (the same as Alternative C). No fluid mineral leasing would be allowed in GRSG occupied habitat similar to Alternative C. Impacts from leasable minerals management on special status wildlife species would close the greatest amount of occupied habitat of all the alternatives. Therefore, Alternative F would provide the most habitat protection for all special status wildlife species that overlap with GRSG habitat.

Impacts from Locatable Minerals Management

Impacts on special status wildlife species from locatable minerals management proposed under Alternative F would be the same as those described under the Alternative B.

Impacts from Mineral Materials (Salables) Management

Impacts on special status wildlife species from mineral materials management proposed under Alternative F would be the same as those described under Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Impacts on special status wildlife species from nonenergy leasable minerals management proposed under Alternative F would be the same as those described under Alternative B.

Impacts from Mineral Split-Estate Management

Impacts on special status wildlife species from mineral split-estate management proposed under Alternative F would be the same as those described under Alternative B.

Impacts from Special Designations Management

The designation of 17 ACECs to conserve GRSG and their habitat under Alternative F would provide the second-most total acres of protection for GRSG and their habitat compared with Alternative C. Therefore, impacts on special status wildlife species under Alternative F would be greater than those described under Alternative C.

Impacts from Air Quality and Climate Change Management

Under Alternative F, no impacts on special status wildlife species from air quality and climate change management are expected.

Impacts from Special Status Plants Management

Special status wildlife species habitat would not be impacted under special status plants management actions proposed under Alternative F.

4.5.10 Proposed Plan

Impacts from Special Status Species—GRSG Management

Under the Proposed Plan, 4,589,568 acres of PHMA (1,929,580 acres of which occurs in SFA) and 5,628,628 acres of GHMA would be designated. PHMA in SFA would provide additional protections for special status wildlife species due to more restrictive management in these areas for GRSG. SFA would also be recommended for mineral withdrawal. In addition to the 3 percent human disturbance cap, the Proposed Plan would implement a cap on the density of energy and mining facilities in GRSG habitat, as described in **Appendix I**. Finally, the Proposed Plan would incorporate adaptive management, regional mitigation, buffers, and seasonal restrictions. These would offer incidental protection to special status wildlife species by avoiding direct disturbance, maintaining or restoring habitat, and limiting habitat disturbance for GRSG. Impacts from GRSG management on special status wildlife species described in **Section 4.5.2**, *Nature and Type of Effects*, would be lessened under the Proposed Plan, relative to the other action alternatives.

Impacts from Vegetation Management

Under the Proposed Plan, vegetation management actions would aim to achieve certain vegetation objectives to improve GRSG habitat (See **Table 2-5**). Additionally, a comprehensive strategy for vegetation management with respect to wildland fire management would be implemented (see also *Impacts from Wildland Fire Management* below). Potential vegetation management would include proactive measures such as fuels management (e.g., conifer removal), which may result in short-term or direct impacts on special status species that use these habitats. However, the long-term benefit to special status wildlife species through habitat improvement would represent a net beneficial impact as a result of vegetation management under the Proposed Plan.

Impacts from Wild Horse and Burro Management

Under the Proposed Plan, management of wild horses and burros would result in impacts on special status wildlife species similar to those described under Alternative D. However, the Proposed Plan includes approximately 7,500 more HMA acres in PHMA and 8,000 fewer HMA acres in GHMA than Alternative D. These additional areas of PHMA would be managed to AML, increasing areas under both Alternative D and Alternative A under vegetation management standards. This would provide an incremental increase in habitat quality for special status wildlife species that occupy GRSG habitat.

Impacts from Wildland Fire Management

Under the Proposed Plan, wildland fire management would result in impacts on special status wildlife species similar to those described under Alternative D. However, under the Proposed Plan, a comprehensive strategy for wildland fire management would be implemented (see also *Impacts from Vegetation Management*, above). The GRSG Wildfire, Invasive Annual Grasses and Conifer Expansion Assessment would identify priority habitat areas and management strategies to reduce the threats to GRSG from invasive annual grasses, wildfires, and conifer expansion. It would include proactive measures, such as fuels management and habitat restoration and recovery, and reactive measures, such as fire operations and post-fire rehabilitation. These efforts would reduce the impacts from wildfire described in **Section 4.5.2** on special status wildlife species, relative to Alternative D.

Impacts from Livestock Grazing and Range Management

Management actions under the Proposed Plan would result in 12,232,499 acres available for livestock grazing. This is a slightly higher amount than Alternative D (12,183,315 acres) and is slightly lower than Alternative A (12,258,337 acres). Alternative D provides more comprehensive livestock grazing and range management actions aimed at protecting and restoring GRSG habitat compared with Alternative A, and impacts under the Proposed Plan would be similar to those under Alternative D. Therefore the Proposed Plan would reduce impacts described in changes to habitat conditions in **Section 4.5.2** on special status wildlife, compared with Alternative A.

Impacts from Travel Management

Under the Proposed Plan, approximately 1,202,682 acres would remain open to unrestricted cross-country motorized travel, representing fewer acres open than all alternatives except Alternative C (1,202,694 acres). Under the Proposed Plan, more acres would be closed to cross-country motorized travel, including in PHMA (82,726 acres) and GHMA (144,931 acres) than under all other alternatives. Similarly, the Proposed Plan would place more acres under limited restrictions, including in PHMA (4,506,296 acres) and GHMA (5,481,426), allowing travel on existing roads with additional seasonal restrictions. Impacts from applying lek buffers, the human disturbance cap, and RDFs and BMPs would also provide beneficial impacts on special status species due to reduction of disturbance and habitat loss. Additional regional mitigations for GRSG habitat loss and degradation included in the Proposed Plan would provide additional benefit to habitat quality. Therefore, the Proposed Plan would reduce impacts on special status wildlife species as a result of cross-country motorized vehicle use described in **Section 4.5.2**, relative to the other alternatives.

Impacts from Lands and Realty Management

Under the Proposed Plan, impacts from lands and realty management would be similar to those described under Alternative D. However, under the Proposed Plan, approximately 3,021,993 acres of GRSG habitat would be ROW exclusion

areas, and approximately 7,935,975 acres would be ROW avoidance areas for wind and solar energy. RDFs and BMPs would be applied to further reduce impacts. Management actions under the Proposed Plan would be more protective of special status wildlife species within GRSG habitat compared with Alternative A; however, not as protective as Alternative B.

Impacts from Leasable Minerals Management

Under the Proposed Plan, leasable minerals management would result in the same number of acres closed to fluid mineral leasing and open to leasing subject to standard terms and conditions as Alternative D. A similar number of acres would be open subject to NSO (454,180 additional acres under the Proposed Plan) and CSU (454,180 additional acres under Alternative D). However, additional actions in the Proposed Plan would include recommending SFA for withdrawal, subject to valid existing rights, and incorporating measures including the human disturbance cap, RDFs, BMPs, and additional regional mitigations that would increase the level of habitat protection for special status wildlife species that occupy GRSG habitat. Therefore, the Proposed Plan would reduce impacts on special status species from leasable minerals management relative to Alternative D.

Impacts from Locatable Minerals Management

Impacts on special status wildlife species from locatable minerals management under the Proposed Plan would be similar to those described under Alternative D. However, under the Proposed Plan, SFA would be recommended for withdrawal, subject to valid existing rights. Incorporation of measures, including the human disturbance cap, RDFs, BMPs, and additional regional mitigations, would increase the level of habitat protection for special status wildlife species that occupy GRSG habitat. The Proposed Plan would include the most protective considerations for GRSG and their habitat, which could also increase protection for special status wildlife in sagebrush ecosystems.

Impacts from Mineral Materials (Salables) Management

Impacts on special status wildlife species from mineral materials management under the Proposed Plan would be similar to those described under Alternative D. However, the Proposed Plan includes additional measures, including RDFs, BMPs, and regional mitigations to protect and restore GRSG and its habitat. The Proposed Plan would include the most protective considerations for GRSG and their habitat, which could also increase protection for special status wildlife in sagebrush ecosystems.

Impacts from Nonenergy Leasable Minerals Management

Impacts on special status wildlife species from nonenergy leasable minerals management under the Proposed Plan would be similar to those described under Alternative D. However, the Proposed Plan includes additional measures including RDFs, BMPs, disturbance cap, and regional mitigations to protect and restore GRSG and its habitat. The Proposed Plan would include the most

protective considerations for GRSG and their habitat that could also increase protection for special status wildlife in sagebrush ecosystems.

Impacts from Mineral Split-Estate Management
Impacts on special status wildlife species from mineral split-estate management under the Proposed Plan would be the same as those described under Alternative D.

Impacts from Special Designations Management
Impacts on special status wildlife species from special designations management under the Proposed Plan would be similar as those described under Alternative D.

Impacts from Air Quality and Climate Change Management
Under the Proposed Plan, no impacts on special status wildlife species from air quality and climate change management are expected.

Impacts from Special Status Plants Management
Impacts on special status wildlife species from special status plants management under the Proposed Plan would be the same as those described under Alternative D.

4.6 WILD HORSES AND BURROS

4.6.1 Methods and Assumptions

Indicators
Indicators of impacts on wild horses and burros are as follows:

- Changes in Acres available
- Changes in allocated AMLs
- Changes in funding or resources available for management

Sources of indicators of land health status include Standards for Rangeland Health, ESI data, NRCS Soil Survey Geographic Database (SSURGO) Soil-Vegetation Inventory Method (SVIM), which is the predecessor to ESI. These sources provide the data to describe a site's vegetation and soil conditions and the potential for sagebrush to occupy the site. The sources also supply images of the current status of sagebrush on a site.

Assumptions
The analysis includes the following assumptions:

- Horses and burros depend on the herbaceous component of a shrub and grass plant community for forage. An increase in shrubs or encroachment of confers in these communities can decrease

grasses and forbs. Vegetation treatments, such as prescribed burns or invasive plant control, can enhance the plant community composition and forage availability.

- Although the BLM cannot control when or how much wild horses and burros graze certain areas, heavy or poorly timed wild horse and burro grazing may adversely affect plant composition, plant succession, and ground cover.
- Water is the primary resource associated with wild horse distribution. Water developments can be used to improve wild horse distribution. However, water developments that employ some type of mechanical device, such as a windmill or electric pump, can fail and cause horses to go without or to search elsewhere for water.
- Fences and other structures can restrict wild horse movement and access. Fences are sometimes necessary to restrict horse access to areas inside HMAs or to protect sensitive resources within HMAs.
- While wild horses and burros may be found on lands outside HMAs, these areas have no forage allocated to wild horses and burros. The BLM has no authority to manage wild horses and burros outside of HMAs, except to remove them.
- The scheduling for wild horse and burro gathers is influenced by a national priority process. Factors affecting gather priorities include determinations of excess horses and overpopulations, wild horse and range condition, annual appropriations, litigation and court orders, emergency situations, such as disease, weather, and fire, availability of contractors, the market for adoption, and long-term holding availability for unadoptable excess horses. The principal factor affecting gather priorities is that short- and long-term holding facilities are at or near capacity, significantly reducing the number of excess wild horses and burros that can be removed from HMAs.
- Population growth suppression (fertility control agents, sterilization, and sex ratio adjustments) can aid in population control, but periodic gathers are still necessary to remove excess wild horses.
- Wild horse and burro distribution varies by season, climatic conditions, water and forage availability, and population size.
- Intensive livestock grazing management strategies (scheduled pasture rotations) that involve fences are generally not appropriate for long-term wild horse management.

4.6.2 Nature and Type of Effects

All HMAs are managed for AML. Initially, AML is established in RMPs at the outset of planning and is adjusted based on monitoring data through revision of HMAPs and subsequent LUPA. Priorities for gathering excess wild horses and

burros to maintain AML are based on population inventories, resource monitoring objectives, gather schedules, and budgets. Gathers are conducted to maintain AML, for emergency situations due to lack of forage, water or for other human health and safety reasons,

Implementing management to protect GRSG generally involves reducing or otherwise restricting land uses and activities that could reduce forage and water availability or disturb a wild horse and burro population. For example, mineral extraction, recreation, and construction within ROW grants may result in any of the following:

- Reduce forage availability
- Disturb horses or burros
- Prohibit the ability of wild horses or burros to move freely across HMAs
- Limit ability to perform management activities (for example, energy development infrastructure may impact the ability to conduct helicopter gathers)

Limiting development from these activities to protect GRSG would also protect forage for wild horses and burros and would limit human and surface disturbance.

There could also be impacts on wild horses and burros and the ability to support AMLs when management options for HMAs are restricted. For example, establishment of priority for gather operations in PHMA could put HMAs that do not contain PHMA at risk for overpopulation. Impacts from range improvement restrictions would generally vary based on type of range improvement affected. Restrictions on fences would improve wild horse habitat by allowing free range, while limiting projects that could enhance forage and water availability would not help to support the AML.

Implementing management for the following resources would have negligible or no impact on wild horse and burro management and are therefore not discussed in detail: air quality, visual resources, cultural resources, wilderness characteristics, ACECs, socioeconomics, and tribal interests.

4.6.3 Impacts Common to All Alternatives

Across all alternatives, there would be no direct change to acres managed for wild horses and burros as HMAs. For the planning area as a whole, there are approximately 2,657,537 acres of HMAs, with approximately 808,316 overlapping PHMA and 1,554,165acres overlapping GHMA.

Impacts from Energy and Minerals Management

As described below, for many energy and mineral resources (i.e., leasable minerals and nonenergy leasables), current development is minimal and future

development levels are predicted to remain low. As a result, impacts on wild horses and burros management would be negligible across all alternatives. For locatable minerals, resource potential is unknown. Although some level of development may occur in the future, impacts on wild horses and burros are likely to be minimal.

Impacts from Leasable Minerals Management

While there is a potential for development, there have been no wells developed on the leases issued on occupied GRSG habitat in the planning area. Under all alternatives, the potential for reasonably foreseeably development is low; therefore, impacts on wild horses and burros from development would be limited, independent of the area available for leasing or stipulations applied.

Impacts from Locatable Minerals Management

All locatable minerals have the potential to exist within the planning area, but exploration has been minimal and potential is unknown across all alternatives.

Impacts from Nonenergy Leasable Minerals Management

Because mineral potential reports are not completed and there is currently no commercial interest in solid leasables, the potential is unknown. Impacts on wild horses and burros are likely to be minimal across all Alternatives.

Impacts from Mineral Split-Estate Management

Wild horse and burro HMAs occur only on public lands; therefore, impacts on from split-estate minerals would be negligible.

4.6.4 Alternative A

Impacts from Vegetation Management

Under Alternative A, the impacts on wild horse and burro management continue to be the same as those identified in the individual RMP documents.

Impacts from Wild Horse and Burro Management

Within the sub-region, all BLM field offices manage for wild horses and burros within established HMAs within AML. All HMAs contain GRSG habitat within a sagebrush vegetation community. Overall management direction is to manage for healthy populations of wild horses and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other **multiple uses.**

Prioritizing wild horse and burro gathers to maintain AML is not based on GRSG habitat needs; nevertheless, this is implicit in the congressional directive to maintain a thriving natural ecological balance.

Evaluation of AMLs and completing land health assessments may result in the need to reduce wild horse and burro populations in an HMA as well as outside

its boundaries in order to achieve GRSG habitat needs. Restricting removal and population control techniques could hamper proper management.

Impacts from Wildland Fire Management

Under Alternative A, the impacts on wild horse and burro management continue to be the same as those identified in the individual RMP documents.

Impacts from Livestock Grazing and Range Management

Under Alternative A, the impacts on wild horse and burro management continue to be the same as those identified in the individual RMP documents.

Impacts from Recreation Management

Under Alternative A, the impacts on wild horse and burro management continue to be the same as those identified in the individual RMP documents.

Impacts from Travel Management

Under Alternative A, the impacts on wild horse and burro management continue to be the same as those identified in the individual RMP documents.

Impacts from Lands and Realty Management

Under Alternative A, the impacts on wild horse and burro management continue to be the same as those identified in the individual RMP documents.

Impacts from Mineral Materials (Salables) Management

Under Alternative A, the impacts on wild horse and burro management continue to be the same as those identified in the individual RMP documents.

4.6.5 Alternative B

Impacts from Vegetation Management

Management prescriptions to conserve, enhance, or restore riparian areas and wet meadows in GRSG habitat could also improve forage conditions and water quality for wild horses and burros. However, when management requires increased fences to protect vegetation for GRSG, this could limit wild horse and burro access to riparian areas and reduce water availability. This could result in a change in horse distribution and potential need for reduction of wild horse and burro numbers within an HMA in the long term in order to meet vegetation objectives for GRSG.

Restoration projects in priority habitat would be designed to benefit GRSG and, based on the likelihood of success, with reestablishment of sagebrush cover as the highest priority. Projects to remove nonnative species and improve habitat could also improve rangeland health and forage conditions for wild horses and burros in the long term; however, value of forage for wild horses and burros would depend on the species replacing nonnatives. In the short term, vegetation treatments may result in site-specific reduction in available forage.

Impacts from Wild Horse and Burro Management

Developing or amending HMAPs to incorporate GRSG habitat objectives and management considerations, prioritizing the evaluation of AMLs in PHMA, and completing land health assessments could reduce wild horse and burro AMLs in PHMA to achieve GRSG habitat objectives. Prioritizing wild horse and burro gathers in HMAs that overlap PHMA can reduce the funding for or the ability to manage populations on HMAs outside of PHMA, although removals would be allowed in other areas, if necessary to prevent catastrophic environmental issues. Modifying, relocating, or developing alternative watering sites to conserve GRSG habitat could impact horses that are habituated to particular watering sites and may not adjust to new sites. Restricting removal and population control techniques could hamper proper management.

Authorization of new or modification of existing livestock watering sites that benefit or conserve PHMA and GHMA would be expected to benefit wild horses and burros. Eliminating or fencing water sources that may be identified as impacting PHMA and GHMA could reduce or eliminate water availability, resulting in a change in horse distribution and potential need for reduction of wild horse and burro numbers in an HMA. In addition, without the availability of water, horses and burros would be expected to move outside HMAs, increasing the cost of gathers for removing nuisance animals outside HMAs or that occupy private land.

Impacts from Wildland Fire Management

Fuels projects and fire suppression to protect sagebrush ecosystems and associated PHMA would benefit wild horses and burros where HMAs overlap due to a reduction in the likelihood of high intensity wildfire. However, temporary or long-term management changes to wild horses and burros, such as reduction in AML, removals, movement patterns, and forage access, may be necessary to achieve and maintain the desired project objectives. This would reduce management options for wild horse and burro management and consequently increase the costs of management.

Impacts from Livestock Grazing and Range Management

Management to conserve, enhance, or restore GRSG habitat and that benefit livestock would also benefit wild horses and burros within GRSG in the long term. Modifying or eliminating livestock watering sites would reduce water availability or impact horses that are habituated to existing watering sites and may not adjust to new sites. This could result in a change in horse distribution and the need to reduce wild horse and burro numbers or develop alternative water sources within specific HMAs.

Impacts from Recreation Management

Under Alternative B, limits on SRPs in PHMA may reduce any conflicts between large recreation groups and wild horse and burro management. Other conflicts with recreation would remain as discussed under *Nature and Type of Effects*.

Impacts from Travel Management

Under Alternative B, limits to motorized travel in PHMA would decrease any disturbance of horses and burros from OHV use. Administrative access for gathers would be retained; however, closures or reduced maintenance on routes during comprehensive travel management planning would have the potential to impact time, costs, and efficiency of gathers.

Impacts from Lands and Realty Management

Implementation of exclusion and avoidance actions to maintain priority GRSG habitat would reduce devolvement in these HMAs overlapping PHMA. This would indirectly reduce related disturbance to wild horses and burros, as discussed under *Nature and Type of Effects*.

Impacts from Mineral Materials (Salable) Management

Under Alternative B, PHMA would be closed to mineral materials development. As a result, the chance of development disturbing wild horses and burros from mineral development would be decreased in this area. However, it should be noted that in many cases in the planning area, mineral material extraction sites are small in size and result in minimal impacts on wild horses and burros.

4.6.6 Alternative C

Impacts from Vegetation Management

Restoration proposed under Alternative C includes removing livestock water developments. This would reduce available water in HMAs. It also would change horse distribution and the need to reduce wild horse and burro AMLs in HMAs. This would apply to occupied habitat where no alternative source of water were available, unless water developments were maintained specifically for wild horses and burros. Restoration would also include areas with crested wheatgrass seedings. This could result in short-term loss of forage for wild horses and burros in site-specific areas. In the long term, replacement with native vegetation could impact available forage, depending on species included and the forage value of these species for wild horses, as compared with crested wheatgrass.

Other vegetation management would be similar to current conditions, as dictated in existing RMPs.

Impacts from Wild Horse and Burro Management

Impacts are as discussed under Alternative A.

Impacts from Wildland Fire Management

Impacts are similar to those discussed under Alternative A.

Impacts from Livestock Grazing and Range Management

Eliminating livestock grazing in occupied habitat would provide additional forage for wild horses and burros where HMAs overlap these habitats. This would

occur by reducing competition for forage. Due to the lack of authorized grazing, no new water developments would be created, limiting wild horse and burro use of water to existing developments. Eliminating livestock watering sites could reduce water availability. This could change horse distribution and the potential need for reducing wild horse and burro numbers in an HMA.

Impacts from Recreation Management
Impacts are as discussed under Alternative A.

Impacts from Travel Management
Impacts are as discussed under Alternative A.

Impacts from Lands and Realty Management
Under Alternative C, new transmission corridors and ROWs for corridors would be prohibited. As a result, disturbance from development and related impacts on wild horses and burros management would be reduced compared with Alternative A.

Impacts from Mineral Materials (Salables) Management
Impacts from mineral materials are as described under Alternative A.

4.6.7 Alternative D

Impacts from Vegetation Management
Under Alternative D, PHMA and GHMA would be prioritized for restoration. Alternative D would emphasize Restoration Opportunity Areas Management for wild horses and burros most likely to be impacted in HMAs that overlap these areas. These areas are South Steen, Riddle Mountain, and portions of Kiger and Warm Springs (see **Figure 3-6**, Herd Management Areas in the Planning Area, and **Figure 2-1,** GRSG Habitat in the Planning Area).

Other portions of PHMA, GHMA, and other habitat deemed of importance for GRSG may also be treated. If wild horses and burros are found to be a factor in not meeting GRSG habitat objectives, an adjustment of AML would be assessed and implemented if warranted. Measures to prevent and reduce invasive plants in GRSG habitat would improve habitat for wild horses and burros in the long term. This would be the case if forage quality and quantity were increased. However, it could impact wild horses and burros in the short term if treatments were to affect forage or require exclusion of horses and burros from site-specific areas. Replacing annual grasses with perennial grasses may impact forage value for wild horses and burros. These impacts would vary. depending on the species of grasses selected.

Impacts from Wild Horse and Burro Management
Under Alternative D, total AML in the planning area would remain within the current range, which is similar to Alternatives A, B, and E. AML modification could occur if rangeland health analysis and monitoring data indicate that wild

horses and burros are a factor in not meeting GRSG habitat objectives. If this were found to be the case, the BLM would take appropriate action in HMAs to achieve objectives. Options to manage wild horses and burros are to control water sources, close gates, and move horses to other areas. If actions taken are not achieving objectives, AML could be adjusted.

Authorizing new or modifying existing livestock watering sites that benefit or conserve PHMA and GHMA would benefit wild horses and burros. Eliminating or fencing existing water sources that may be impacting PHMA and GHMA could reduce or eliminate water availability, resulting in a change in horse distribution and a potential need for reducing wild horse and burro numbers in an HMA. In addition, without the availability of water, horses and burros would be expected to move outside HMAs, increasing the cost of gathers for removing nuisance animals outside HMAs or that occupy private land.

Impacts from Wildland Fire Management

Under Alternative D, fire management actions would focus on a system of fuel breaks and treatment of up to 30 percent of GRSG habitat. The purpose of this would be to reduce the probability of large-scale wildfire. Wildfire suppression priorities would include all GRSG habitat types. HMAs that overlap these areas would have the risk of large-scale fires reduced. HMAs outside of priority areas, however, may have an increased risk or large-scale wildfire should resources for vegetation treatment or fire suppression not be available. Areas affected by wildland fire would be rested for at least two years or until objectives for the stabilization or restoration have been met. Should wildfire burn an entire HMA, wild horses and burros would be removed to temporary holding facilities until objectives have been met, resulting in substantial unplanned expenditures for the program.

Impacts from Livestock Grazing and Range Management

Under Alternative D, authorized grazing would be slightly reduced (12,183,315 acres open to grazing in GRSG habitat, an approximately 1 percent reduction compared with Alternative A). This would result in minimal direct impacts on wild horse and burro management, due to the lack of substance acreage or AUM change. Livestock grazing permits and leases would be processed and land health assessment would occur in Category "I" allotments most in need of habitat improvement with an emphasis on allotments in GRSG habitat, with PHMA prioritized over GHMA. As a result, range conditions for both livestock and wild horses and burros overlapping these allotments should be improved, compared with Alternative A. Range improvements, including seeps and springs, would be developed or modified to enhance functionality during periods that livestock are absent from the allotment. In addition, if water developments were to be removed for GRSG protection, new water sources would be located beforehand. As a result of these management actions, there is potential for maintained or enhanced use of water sources by horses and burros, increasing the ability to manage at or below AML.

In PHMA, forage enhancement treatments must also enhance GRSG habitat; therefore, there is a potential for reduced vegetation treatments, which benefit livestock forage. This could in turn impact forage availability for wild horses and burros. New structural range improvements would be the same as those under Alternatives B and E. Construction of new livestock facilities would be avoided within 1.2 miles of leks; supplemental feeding for livestock would also be avoided but would be authorized as needed for resource objectives, in accordance with BLM policy. Based on the trends, the use of supplemental feed is minimal and could reduce or enhance available forage by improving vegetation community composition. This would reduce available forage for wild horses and burros that may use those areas.

Impacts from Recreation Management

Changes may occur to SRPs and RUPs in PHMA in order to reduce direct and indirect disturbance to GRSG. As a result, the potential for disturbance of wild horses and burros from organized recreation groups would be similarly reduced. General disturbance from recreation would continue, as discussed under *Nature and Type of Effects*.

Impacts from Travel Management

Travel management impacts are similar to those described under Alternative B.

Impacts from Lands and Realty Management

Under Alternative D, current ROW exclusion areas would be retained in PHMA. All other GRSG habitat, including GHMA, would be managed as open for ROWs, unless already managed as avoidance or exclusion by the existing planning. All new ROWs in GHMA would require the BLM to cooperate with ODFW to determine impacts on occupied, suitable, or potential habitat, and development and associated disturbance to wild horses and burros would be avoided in occupied habitat, and minimized in suitable or potential habitat.

Impacts from Mineral Materials (Salables) Management

Impacts are the same as described under Alternative B.

4.6.8 Alternative E

Impacts from Vegetation Management

Under Alternative E, vegetation management would include the connectivity model and habitat monitoring suggested in the ODFW Plan to minimize the impacts of habitat loss and fragmentation. Should the implementation of this plan improve and maintain habitat for GRSG, habitat for wild horses and burros may also be maintained or improved. Measures to reduce invasive plant spread would improve habitat for wild horses and burros in the long term.

Impacts from Wild Horse and Burro Management

Under Alternative E, AML would remain within the current range unless monitoring data warrants a change that benefits GRSG habitat suitability, as

discussed under Alternatives A, B, and D. Under this alternative, management agencies would be strongly encouraged to prioritize funding for wild horse gathers in GRSG areas that are over AML. In the absence of additional overall funds, funding and resources for HMAs outside of GRSG habitat would be reduced. This would impact the ability to meet AMLs and manage for rangeland and herd health in these areas in the long term.

Impacts from Wildland Fire Management

Preventing fire from entering at-risk communities would be a high priority for protecting GRSG habitat under Alternative E. As a result, the risk of ignition and spread of fire in occupied GRSG habitat would be reduced, thereby reducing the impacts of fire on HMAs in GRSG habitat. The risk of fire spread in other habitat could increase, should limited resources be allocated for GRSG. Removing juniper in GRSG habitat would improve forage for wild horses and burros. An emphasis on fire suppression near leks would reduce the risk of fire spread for HMAs.

Impacts from Livestock Grazing and Range Management

Changes to livestock grazing systems under Alternative E would be made if management were to result in livestock removing forage to the point that it would be detrimental to GRSG due to decrease in cover. Impacts would be similar with changes in management under all alternatives to meet the BLM's Standards for Rangeland Health.

In the case of range improvements, water developments would be located or relocated to maintain or enhance habitat quality. Existing water improvements would be directed to maintain free-flowing nature and wet meadow characteristics. These requirements may necessitate changes to water developments that would limit the ability of wild horses and burros to use water, especially if dirt tanks or overflow ponds were removed. This may change horse distribution and AMLs in HMAs, where alternative water sources are not available. New livestock facilities would be required to meet certain characteristics, including being at least 1.2 miles from leks. These requirements may impose limits on locating developments and impact the related ability to manage wild horse and burro populations with water developments.

Impacts from Recreation Management

Under Alternative E, recreation management would be similar to that described under Alternative A, but seasonal restrictions may be imposed to limit disturbance to GRSG. Such restrictions would likely reduce disturbance to wild horses and burros also.

Impacts from Travel Management

Seasonal and site-specific limits on OHV travel in GRSG habitat would limit disturbances on wild horses and burros from other recreational users. As described in Alternative B, administrative access for gathers would be retained; however, closures or reduced maintenance on routes during comprehensive

travel management planning would have the potential to increase time and costs and decrease effectiveness of population control gathers.

Impacts from Lands and Realty Management

All PHMA would be classified as an exclusion area, decreasing the risk of development and associated disturbance to wild horses and burros, compared with Alternative A as discussed under *Nature and Type of Effects*.

Impacts from Mineral Materials (Salables) Management

Under Alternative E, no development is recommended in Core Area habitat if they occur in GRSG habitat with evidence of GRSG presence. Due to the potential for greater flexibility in the application of restrictions, some level of development and related disturbance of wild horses and burros may increase in GRSG habitat as compared with other action alternatives. However, it would be at a reduced level, as compared with Alternative A, where few restrictions are specific GRSG habitat.

4.6.9 Alternative F

Impacts from Vegetation Management

Under Alternative F, restoration would be prioritized in areas that have the most likely chance of successful restoration. Because the exact areas prioritized would be determined at implementation, comparison with other alternatives is difficult; however, emphasis on areas likely to have successful restoration would likely result in more effective vegetation treatments. Habitat for wild horses and burros could be improved as compared with Alternative A in the long term should GRSG treatments benefit forage for wild horses and burros. Meeting objectives for GRSG in occupied habitat would be the highest restoration priority. As a result, habitat improvement would most likely occur in occupied GRSG habitat.

Impacts from Wild Horse and Burro Management

Under Alternative F, proposed management would reduce AML 25 percent compared with current AMLs. As a result, costs for management, particularly related to gathers, would increase dramatically above Alternative A due to the need to conduct additional gathers and/or increase fertility control measures and to conduct NEPA associated with these site-specific actions. Available funding and national level restrictions of the wild horse and burro program (such as lack of space in long-term holding facilities) may impact the ability to achieve this objective. Location specific population reductions and impacts on particular HMAs would be determined at implementation and likely related to land health and current population size.

Other management actions and related impacts are similar in nature to those described under Alternative B.

Impacts from Wildland Fire Management

Impacts from wildland fire management are similar to those described under Alternative B. Areas affected by wildland fire would be rested for at least two years or until objectives for the stabilization or rehabilitation have been met. Closures in place for livestock grazing post-fire until woody and herbaceous cover achieve GRSG habitat objectives could result in long-term (10 to 50 years or longer) exclusion of burned sites. Should wildfire burn an entire HMA, wild horses and burros would be removed to temporary holding facilities until objectives have been met, resulting in substantial unplanned expenditures for the program. The level of impacts would depend on the location, size, and intensity of wildfire in GRSG habitat in relation to the location of HMAs.

Impacts from Livestock Grazing and Range Management

Under Alternative F, 25 percent of the PHMA and GHMA would be unavailable to grazing each year and use levels in open areas would be limited to 25 percent use of current year's growth. This would result in an approximately 62 percent reduction in AUMs. As described in Alternative C, a reduction in areas available for livestock grazing could add forage available for wild horses and burros. In addition, new water developments would be prohibited and modifications to existing developments would be required, including potentially dismantling them.

The inability to construct new water developments would restrict opportunities to provide sufficient water for wild horses and burros and to manage for AML. Alternative F also calls for avoiding all new structural range developments in occupied GRSG habitat, unless independent peer-reviewed studies show that range improvement structures benefit GRSG. In practice, this would result in few range developments being approved. The lack of new range improvements could limit opportunities for making changes in livestock grazing management, which could affect forage conditions for wild horses and burros.

Impacts from Recreation Management

Recreation management would be similar to management proposed under Alternative B. In addition, camping and other nonmotorized recreation would be prohibited within 4 miles of active GRSG leks. This would reduce potential conflicts between wild horses and burros and recreationists in these areas.

Impacts from Travel Management

Impacts from travel management are similar to Alternative B, with the addition of limitations on road construction within 4 miles of active leks in occupied GRSG habitat. As a result, any potential disturbance from roads to wild horses and burros would be reduced; however, potential access routes for wild horses and burros management, including gathers, monitoring herd health and data acquisition to support gathers may be reduced. This would increase the time and costs and decrease effectiveness of management

Impacts from Lands and Realty Management

For Alternative F, occupied GRSG habitat areas would be exclusion areas for new ROW permits. As a result of ROW exclusion, no additional development would occur in these areas, thus reducing potential impacts on wild horses and burros.

Impacts from Mineral Materials (Salables) Management

Under Alternative F, impacts are as described under Alternative B.

4.6.10 Proposed Plan

Impacts from Vegetation Management

Management under the Proposed Plan would be similar to that described for Alternative D. The BLM would implement over two times more sagebrush and juniper treatments and 14 percent more invasive plant species treatments compared with Alternative A, as well as crested wheatgrass treatments. In addition, the Proposed Plan includes management and vegetation treatment objectives and prescriptions that would decrease invasive annual grasses and reduce conifer encroachment into sagebrush. Use of site-specific analysis and tools like VDDT and the FIAT report would help refine the location for specific areas to be treated. These treatments (e.g., conifer removal) could impact forage or require exclusion of horses and burros from specific areas in the short term but would improve forage conditions in the long term.

Other portions of PHMA, GHMA, and other habitat deemed of importance for GRSG may also be treated. If wild horses and burros are found to be a factor in not meeting GRSG habitat objectives, AML would be adjusted if warranted.

Impacts from Wild Horse and Burro Management

Under the Proposed Plan, total AML in the planning area would remain within the current range. AML modification could occur if rangeland health analysis and monitoring data indicate that wild horses and burros are a factor in not meeting GRSG habitat objectives. If this is found to be the case, the BLM would take appropriate action within HMAs to move toward achieving objectives. Options to manage wild horses and burros are controlling water sources, closing gates, and moving horses to other areas. If actions taken are not moving toward achieving objectives, adjustments in AML could be applied.

Prioritizing gathers in HMAs would directly and indirectly impact wild horses and burros. The following HMAs fall within SFA: Beaty's Butte, Coyote Lake-Alvord-Tule Springs, and Jackies Butte. These HMAs would have the highest priority for gathers to retain AML. This focused management strategy would ensure that AML is maintained, along with the necessary forage for the wild horses in these HMAs; however, it may increase the number of gathers needed to maintain AML, which could increase the disturbance to the populations and could disrupt herd dynamics. Prioritization could also put HMAs that fall in the lowest priority at risk for overpopulation; however, under this LUPA, provisions

would allow for exceptions as needed for herd health-limiting impacts. The Proposed Plan when compared with Alternative A would require more intensive management, particularly within the boundaries of the SFA.

Authorizing new or modifying existing livestock watering sites that benefit or conserve PHMA and GHMA would provide alternate sources of water for wild horses and burros. Eliminating fencing or existing water sources that may be impacting PHMA and GHMA could reduce or eliminate water availability. This could result in a change in horse distribution and potential need for reducing wild horse and burro numbers in an HMA. In addition, without the availability of water, horses and burro move outside HMAs, increasing the cost of gathers for removing nuisance animals from outside HMAs or from private land.

Finally, the BLM would continue to coordinate with professionals from other federal and state agencies, researchers at universities, and others to use and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the wild horses and burros program. This would ensure practical and efficient management of wild horses and burros in AML, while protecting GRSG habitat.

Impacts from Wildland Fire Management

The Proposed Plan, as in Alternative D, would focus on the cooperative assessment, planning, and implementation of actions to minimize the risk of severe wildfire in GRSG habitat. The Proposed Plan would require preparing a burn plan before prescribed fire in GRSG habitat and assessing management needs based on local conditions, as detailed in **Appendix H**. Potential management includes fuels management and habitat restoration and recovery, as well as fire operations and post-fire rehabilitation. These actions may result in site-specific temporary exclusions of wild horses and burros or reduced forage; however, it would help to reduce the likelihood of catastrophic wildfire and subsequent disturbance of wild horses and burros and would reduce forage in the long term, as compared with Alternative A.

Impacts from Livestock Grazing and Range Management

Under the Proposed Plan, a slight reduction would occur in authorized grazing and AUMs (less than 1 percent). This would result in minimal direct impacts on wild horse and burro management, due to the lack of substance acreage or AUM change. Livestock grazing permits and leases would be processed and land health would be assessed in Category 1 allotments most in need of habitat improvement. Allotments in GRSG habitat would be prioritized, with SFA prioritized over PHMA and then GHMA. As a result, range conditions for both livestock and wild horses and burros overlapping these allotments should be improved, compared with Alternative A.

Range improvements, including seeps and springs, would be developed or modified to enhance functionality when livestock are absent from the allotment. In addition, if water developments were to be removed for GRSG protection,

new water sources would be located beforehand. As a result of these management actions, there is potential for maintained or enhanced use of water sources by horses and burros, increasing the ability to manage at or below AML.

In PHMA, forage enhancement treatments must also enhance GRSG habitat; therefore, there is a potential for reduced vegetation treatments, which benefit livestock forage. This could in turn impact forage availability for wild horses and burros. New livestock facilities would be avoided within 1.2 miles of leks. Supplemental feeding for livestock would be avoided but would be authorized as needed for resource objectives, in accordance with BLM policy; this would reduce available forage for wild horses and burros that may use those areas. Based on the trends, the use of supplemental feed is minimal and could reduce or enhance available forage by improving vegetation community composition.

Impacts from Recreation Management

General disturbance from recreation would continue, as discussed under *Nature and Type of Effects*. The Proposed Plan also restricts the construction of recreation facilities unless a net conservation gain would result. Construction would require assessing SRMAs for consistency with the Adaptive Management Strategy (**Appendix D**). Restrictions would further limit disturbance to wild horses and burros from recreation.

Impacts from Travel Management

Under the Proposed Plan travel management plans would be implemented within 5 years. In those plans PHMA and GHMA would be designated as limited to existing roads unless already designed as limited or closed. Specific implementation level criteria to protect GRSG would also be applied, further limiting locating new roads and volume of traffic on new and existing roads. As a result, the disturbance of wild horses and burros from recreation traffic would be reduced, as compared with Alternative A. Under the Proposed Plan, temporary closures would also be permitted as determined necessary for resource protection, which would further reduce disturbances to wild horses and burros.

Impacts from Lands and Realty Management

Under the Proposed Plan, the greatest restrictions on ROW development would occur in the HMAs in SFA, followed by PHMA and GHMA. Under the Proposed Plan, the BLM would manage a similar amount of ROW exclusion for major and minor ROWs as Alternative A. However, 3,021,993 acres would be ROW exclusion for solar and wind ROWs. In addition PHMA and GHMA (16,312,486 acres, nearly 4.5 times more than Alternative A) would be ROW avoidance for major and minor ROWs. New ROWs would also be collocated with existing disturbances when possible. These restrictions would provide for the greatest protection of wild horse and burro forage and water sources and would limit disturbance in SFA; however, they could push development to areas outside of occupied GRSG habitat, creating increased disturbance and

harassment of wild horses and burros in HMAs that are the lowest priority of GHMA.

The Proposed Plan would also include a 3 percent cap on human disturbance. Human disturbances in PHMA and GHMA would additionally be mitigated to ensure a net conservation gain to GRSG. In addition, conservation measures would be implemented in PHMA and GHMA, such as RDFs and buffers (see **Appendices C** and **S**). As a result, indirect disturbance of wild horses and burros or their forage from other development could be reduced, as compared with Alternative A. These management actions would minimize impacts on wild horses and burros from ROW development, including direct disturbance and disturbance of forage, as compared with Alternative A. Implementing the GRSG mitigation strategy, monitoring framework, and assessment of land health standards under the Proposed Plan would ensure that this increased level of protection of forage and water resources and reduction of wild horse and burro harassment would be maintained.

Impacts from Energy and Minerals Management

Under the Proposed Plan, the greatest restrictions on development of mineral resources would occur in the HMAs in SFA, followed by PHMA and GHMA. These restrictions would provide for the greatest protection of wild horse and burro forage and water sources and would limit disturbance in SFA; however, they could push development to areas outside of occupied GRSG habitat, creating increased disturbance and harassment of wild horses and burros in HMAs that are in the lowest priority of GHMA.

The Proposed Plan would also include a 3 percent cap on human disturbance. Human disturbances in PHMA and GHMA would additionally be mitigated to ensure a net conservation gain to GRSG. In addition, conservation measures would be implemented in PHMA and GHMA, such as RDFs and buffers (see **Appendices C** and **S**). As a result, indirect disturbance of wild horses and burros and their forage from other development could be reduced, as compared with Alternative A. These management actions would minimize impacts on wild horses and burros from energy and minerals development, including direct disturbance and disturbance of forage, as compared with Alternative A. Implementing the GRSG mitigation strategy, monitoring framework, and hard trigger adaptive management responses under the Proposed Plan would ensure that this increased level of protection of forage and water resources and reduction of wild horse and burro harassment would be maintained.

Impacts from Mineral Materials (Salables) Management

Impacts would be similar to those described under Alternative B.

4.7 WILDLAND FIRE MANAGEMENT

4.7.1 Methods and Assumptions

Indicators

Indicators of impacts on wildland fire management are as follows. Details for each of these factors is included in the current conditions discussion in **Section 3.6**:

- Alteration of vegetation cover or composition that is likely to result in a shift in fire regime condition class (FRCC)
- A change in the likelihood of human-caused wildfire in the planning area
- A change in the size, extent, or occurrence of wildfire in the planning area
- Changes in the response to wildfire or appropriate treatments to prevent wildfire

Assumptions

The analysis includes the following assumptions:

- Fire is an essential, functional, natural disturbance in many of the ecological systems found in the planning area.
- A direct relationship exists between fuel characteristics and potential fire intensity and severity.
- The necessity for fuels treatments would likely continue over the life of this plan.
- There will be increased demand on suppression resources for managing wildfires in order to protect values at risk.
- BLM will implement mitigation efforts through Industrial Fire Protection Levels (IFPL) and other prevention and education activities.

4.7.2 Nature and Type of Effects

Impacts on wildland fire management are generally the result of the following:

- Activities that alter vegetation cover or composition, including wildfire response
- The ability to respond to wildfires or to implement appropriate treatment methods to manage wildfire
- Impacts from human-caused wildfires

Key types of impacts are detailed below. As discussed in Section 3.6, Wildland Fire Management, there has been a number of wildfires in GRSG habitat.

There is a high probability for wildfires in GRSG habitat in the future. During the 2012 fire season nearly one million acres burned, most of which was in designated PPH. Section 3.6 also states that most of the lands in the planning area have a moderate to high level of departure from historical conditions and related wildfire risk. Actions that change the condition class from highly altered ecosystems (FRCC 3) to one closer to historical conditions (FRCC 1 or 2) could reduce the risk of losing key ecosystems and could decrease wildfire risk.

Various resource uses may introduce additional ignition sources into the planning area. These sources increase the probability of wildfire and the need for fire prevention. Fire intensity can be affected by activities that decrease fuel loading and alter fuel arrangement, such as vegetation treatments and activities that alter the composition and structure of vegetation communities.

Characteristics of individual fire events as well as the collective fire regime are important drivers of structure, composition, and abundance of vegetation within sagebrush communities (Miller et al. 2011). Individual fires are described by severity (the level of biological and physical effect of fire on all plant layers, soils, and animals), intensity (the amount of energy released during a fire), season, extent or size, and complexity (patchiness of burned and unburned areas within the fire boundary). Fire regime is a function of the mean and range of the interval (usually in years) between fire events for a defined area. The fire regime for a specific area is influenced by climate, regional location, fuel characteristics (biomass and structure), recovery time following disturbance, topography, season and frequency of ignition, and vegetation composition (Miller et al. 2011).

Transportation and travel management can impact fire occurrence by changing the probability of human-caused fires. The risk of ignition increases where travel is less restrictive, particularly where motorized vehicles travel cross-country. All forms of travel encourage the spread of invasive plant species (CEC 2012), particularly cheatgrass. This can shift fire regimes and increase fire behavior potential, size, extent, and occurrence. If management restricts access, wildfire risk may be decreased and a trend toward historic conditions may occur. Yet, transportation management may impact fire management activities; when routes are closed and rehabilitated, they become unavailable for response to wildfires, limiting access for firefighters.

Similarly, the level and type of recreation permitted can impact wildfire risk. Increased recreation may increase the probability of unintentional fire starts and the need for fire suppression. Threats from recreation and recreation management are addressed under Travel Management (**Table 2-1**), therefore, recreation is not addressed as a separate topic in this section. Lands and realty actions may indirectly result in development and associated fire risk. For example, issuing ROWs can result in indirect impacts by increasing the

probability of human-caused ignition should construction of transmission lines, renewable energy projects, or other developments occur. Permitted activities, such as construction of utility ROWs, involve vegetation removal. This alters the condition of native vegetation communities and individual native plant species and can encourage the spread of invasive plant species, thereby altering potential fire behavior and fire effects. Whether these situations increase wildfire occurrence and extent depends on the degree of vegetation change and the resulting plant community.

Surface disturbance caused by development would generally contribute to the modification of the composition and structure of vegetation communities in the vicinity of developed areas. This may increase the probability of wildfire starts. ROW exclusion areas would prohibit all development of ROWs in areas where they are designated. This would limit the potential alteration of vegetation cover or composition to an uncharacteristic vegetation type and subsequent shift in fire regime condition class (FRCC.).

However, constructing roads and removing invasive plants associated with developments may facilitate wildfire response and help limit the size or extent of wildfires. These activities would create fuel breaks and staging areas for wildfire management. In ROW avoidance areas, the BLM would consider on a case-by-case basis whether a ROW should be allowed.

Overall, the development of energy and minerals resources can increase the probability of wildfires by introducing new ignition sources (Shlisky et al. 2007). Associated facilities, infrastructure, and transmission lines (wildland urban interface) can increase fire and fuels program costs while decreasing wildfire suppression options. Energy development also poses hazards to firefighters from various toxic substances, overhead power lines and the need to protect facilities and evacuate industry personnel. The more acres open to mineral exploration, development, and mining, the greater the probability of human-ignited fire when mineral-related activities occur. Limitations on mineral development may have an indirect effect of decreasing human-caused wildfires. However, as stated previously, constructing roads and removing invasive plants associated with energy and minerals developments may facilitate wildfire response and help limit the size or extent of wildfires. These activities would also create fuel breaks and staging areas for wildfire management.

The development of federal minerals underlying nonfederal surface ownership may impact wildfire management on BLM-administered lands. This would be the case particularly when ownership is in a patchwork pattern because wildfires ignited on nonfederal lands may quickly spread onto and impact BLM-administered lands.

Range grazing management can impact the ability to manage wildfire as a natural process through changes in fine fuels availability, such as grasses. Removing grazing will increase fine fuel loading and does not significantly affect the spread

of invasive plant species. However, removing grazing could also allow for fine fuels such as grasses to build up that could otherwise be consumed by livestock. This could increase the size, extent, or frequency of wildfires (Davies et al. 2010). The influence on fire spread, severity, and intensity would depend on such factors as weather, fuel characteristics, and landscape features. Some evidence suggests that the role of grazing on reducing fire behavior may be limited under extreme burning conditions, such as low fuel moisture and relative humidity, high temperature, and high wind speeds (Strand and Launchbaugh 2013).

Grazing may reduce resistance to invasion from cheatgrass (Reisner et al. 2013). Nevertheless, cessation of overgrazing could relieve these impacts and allow for the recovery of native understory perennials and an increase in sagebrush and herbaceous vegetation cover if invasive plants are not already dominant and sagebrush cover is not excessively high (Strand and Launchbaugh 2013), Recent research indicates that the increase in fine fuel loading, particularly the buildup of litter in bunchgrass crowns, from the removal of grazing can increase bunchgrass mortality in a fire, facilitating the spread of invasive plants. However, livestock grazing also removes herbaceous vegetation that provides side cover for GRSG nests and both insects and forbs needed for brood-rearing. Increasing utilization reduces fine fuel loading but increases the risk that too much side-cover will be removed, reducing GRSG nesting habitat suitability and chick survival. Utilization at too high a level also increases bunchgrass mortality in interspaces and facilitates the spread of invasive plants. Thus, there is a utilization level that reduces the risk of invasive plant spread by promoting healthy bunchgrass plants that can survive a fire and preserves needed side cover for successful GRSG nesting.

Big sagebrush ecosystems of the intermountain west evolved with fewer herbivores than after Euro-American contact, which introduced domestic livestock grazing (Mack & Thompson 1982). These communities are susceptible to invasions by annual grasses even in the absence of fire, and annual grasses can, under some circumstances, dominate the herbaceous understory community (Miller et al. 2011). Once annual grasses sufficiently dominate the understory it creates a continuous, highly flammable fuel that significantly increases the probability of wildfire (Pyke 2011). Once a wildfire occurs, subsequent dominance by invasive annual grasses can increase the frequency of fires. This change in fire regime can transform native shrub-steppe communities into annual grasslands (Miller et al. 2011).

Vegetation and invasive plant treatments that decrease standing vegetation (fuel loading) or alter fuel continuity decrease the intensity or spread rate of wildfires, allowing them to be more easily controlled. For example, reducing the incursion of invasive annual grasses, which increase fuel continuity, would lower the risk of fast-moving wildfire (USGS 2006). Used appropriately, prescribed fire can help control certain invasive plants, either directly or as a preparation for

another type of treatment. However, the presence of invasive plants and the potential of invasives to spread after a prescribed fire would need to be monitored on a site-specific basis. Conversely, management actions that retain or restore a shrub-steppe community and increased sagebrush cover both increase the fuel loading and decrease fuel continuity, thereby increasing potential wildfire intensity but decreasing the potential for large wildfires under all but extreme burning conditions.

Special designations such as ACECs and the management of sensitive resources may restrict fuel treatments on a site-specific basis, depending on the purpose of the individual ACEC. For example, in areas where preservation of particular species or habitats is emphasized, management options and fuel treatments may be limited.

Implementing management for the following resources would have negligible or no additional impact on wildland fire management for all alternatives; therefore, they are not discussed in detail:

- Wild horses and burro
- Special designations
- Special status plants
- Recreation

4.7.3 Impacts Common to All Alternatives

Impacts from Mineral Split-Estate Management

Impacts on wildland fire management from mineral split-estate management are the same as those described for leasable minerals. No additional impacts from mineral split-estate management are expected.

4.7.4 Alternative A

Impacts from Special Status Species—GRSG Management

There would be no additional impacts on wildland fire management resulting from GRSG management under Alternative A. Various BLM directives, such as instruction memoranda, and other policies, such as the National Cohesive Wildland Fire Management Strategy, provide for consideration of GRSG habitat in fuels management and wildfire responses.

Impacts from Vegetation Management

Under Alternative A, the BLM would continue to incorporate vegetation objectives in management actions, which would improve the condition and increase the extent of native vegetation in areas where they are applied. Encouraging the growth of native vegetation under this alternative could

contribute to healthy plant communities and an associated lower risk of high-severity wildfire. Vegetation could also be managed to alter fuel loads.

Impacts from Wildland Fire Management

Under Alternative A, projects and wildfire responses would be designed to prevent the further loss of sagebrush to the extent practicable, potentially retaining native vegetation and reducing wildfire potential. This could reduce the size, extent, and occurrence of wildfires. In addition, prescribed burning may be used in support of resource management objectives, such as restoring grassland or shrubland, reducing conifer encroachment, or increasing sagebrush structural diversity. As a result, alteration of vegetation cover or composition is likely to contribute to a shift in FRCC towards condition class 1. Further, fuel treatment regimens and design would limit the expansion of invasive annual grasses and reduce the potential for wildfires.

Impacts from Livestock Grazing and Range Management

Livestock grazing would continue to occur under Alternative A and 9,982,126 million acres would be available to grazing in PHMA and GHMA on BLM-administered lands. Allowing grazing throughout most of the planning area may decrease wildfire extent and severity due to the reduction in fine fuel buildup in bunchgrasses caused by livestock grazing. Rangelands would continue to be managed to conform to the BLM's Standards for Rangeland Health, so vegetation communities would continue to be maintained and improved to some extent across the planning area. Land treatments for livestock forage could alter fuels and potential fire behavior as described under *Nature and Type of Impacts*.

Impacts from Travel Management

Impacts from OHV use would continue under Alternative A with 2,669,145 acres open to cross-county travel in PPH, 2,940,051 acres in PGH and 1,828,999 acres in PPH and 2.576,796 acres in PGH limited to existing routes. Under Alternative A, most GRSG habitat would be open or limited to existing routes. Impacts described under **Section 4.7.2**, *Nature and Type of Effects*, would continue to occur, particularly in areas open to OHV use.

Impacts from Lands and Realty Management

Under Alternative A, lands and realty management would continue, 257,154 acres would be classified as ROW exclusion areas for new ROW development in PPH and 288,195 acres in PGH and the potential for disturbance from development would be limited in ROW avoidance areas (1,336,146 acres in PP and 1,672,025 in PG). The nature and type of impacts on wildland fire management from ROW avoidance and exclusion areas would be the same as those described under **Section 4.7.2**.

Impacts from Leasable Minerals Management

Under Alternative A, over 9 million acres would be open to leasing, while over 3 million acres would be closed. Stipulations may be applied in certain areas to

reduce impacts from mineral leasing or development, but these stipulations would not be consistent across the planning area. Impacts from leasable mineral development on wildland fire management would continue to occur in areas open to leasing and development. As discussed under Section 4.6.2. The chance of human ignitions under this alternative would continue and could indirectly affect fire management through increased wildfire risk. However, based on the most recent approvals, active mineral leasing or development sites are required to have water storage for wildfire response on-site, increasing the probability that any starts arising from leasable mineral activities could be stopped before burning significant acreage. As described in **Section 4.7.2**, minerals developments could act as staging areas and fuel breaks for wildfire management efforts.

Impacts from Locatable Minerals Management

Under Alternative A, over 900,000 acres would be withdrawn or proposed for withdrawal, while 11,600,814 million acres would remain open. Impacts from locatable mineral development on wildfire management from increased human activity and as described under **Section 4.7.2** would continue to occur in areas open to development.

Impacts from Mineral Materials (Salables) Management

More than 3 million acres would be closed to mineral materials development under Alternative A, while approximately 9 million acres would be open. Impacts from mineral materials development on wildfire management, as described under **Section 4.7.2**, would continue to occur in areas open to development.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative A, approximately 3,134,159 acres within the planning area would be closed to nonenergy leasable mineral leasing. Impacts from nonenergy leasable development on wildfire management, as described under **Section 4.7.2**, would continue to occur in areas open to leasing and development, which is most of the planning area.

Impacts from Special Designations Management

Under Alternative A, the BLM would continue to manage 715,049 acres of ACECs. Existing ACECs may protect vegetation through use restrictions, depending on the specific purpose of the individual ACEC. These impacts are analyzed under each existing RMP within the planning area. As a result, there would be no additional effects from ACEC management on wildland fire management under Alternative A.

4.7.5 Alternative B

Impacts from Special Status Species—GRSG Management

PHMA and GHMA would be designated and would encompass over 4.5 million acres and over 5.5 million acres, respectively. The BLM would apply a 3 percent

human-caused disturbance cap to activities in PHMA. Treatments and restoration activities would not be counted as part of the 3 percent cap. The BLM would also implement numerous conservation measures to reduce impacts from human activities in PHMA, which may reduce the likelihood for human-caused wildfires. Limited vegetation removal under this alternative could lead to increased fuel loads and increased extent of wildfires, as described under **Section 4.7.2**. It also could reduce development-related roads and fuel breaks used for wildfire response.

Impacts from Vegetation Management

Under Alternative B, vegetation management would aim to improve GRSG habitat and prioritize restoration to benefit GRSG habitats. The BLM would require the use of native species when seeding and would consider changes in climate when determining species for restoration. Together, these management actions would alter vegetation communities by promoting increases in sagebrush height, herbaceous cover, and vegetation productivity. Treatments designed to reduce encroachment of conifers and reduce the extent or likelihood of invasive plant species would enhance the condition of native vegetation communities. These management actions could decrease fuel continuity with a subsequent decrease in wildfire size or severity, as discussed under **Section 4.7.2**.

Impacts from Wildland Fire Management

Fuel treatments under Alternative B would be designed to protect sagebrush ecosystems by maintaining sagebrush cover, applying seasonal restrictions and protections for winter range, and requiring use of native species when seeding as a component of restoration. Post-fuels treatments and emergency stabilization and rehabilitation (ES&R) would be designed to ensure long-term persistence of seeded areas and native plant restoration areas.

These management actions would help to retain the extent of sagebrush vegetation and prevent degradation or destruction of sagebrush caused by wildfires. Furthermore, emphasizing the use of native seeds and noninvasive plants would reduce the likelihood for invasion of invasive plants in burned or treated areas. The BLM would also prioritize suppression in PHMA, which would help retain the existing conditions and trends of vegetation in these areas. Impacts from fuels treatments, ES&R, and suppression would be similar to those described under **Section 4.7.2**.

Impacts from Livestock Grazing and Range Management

Under Alternative B, the BLM would not change acres available to livestock grazing. Impacts on wildland fire would be similar to Alternative A. However, the BLM would implement a number of management actions in PHMA to incorporate GRSG habitat objectives into livestock grazing management. Such measures would help to maintain or improve the vegetation condition and could reduce the likelihood of invasive plants introduction or spread, thereby reducing wildfire potential.

Impacts from Travel Management

Under Alternative B, only 2,938,846 acres of BLM-administered lands in GRSG habitat would be open to cross-country use, all within GHMA (a 52 percent decrease from Alternative A for GRSG habitat), Related increases would occur in areas limited to existing routes (approximately 8 million acres in GRSG habitat, a 50 percent increase from Alternative A). Additionally, in PHMA, motorized travel would be limited to existing roads, primitive roads, and trails until travel management planning is complete and the need for additional closures is evaluated. Management actions would also aim to reduce new route construction and restore roads, primitive roads, and trails not designated in travel management plans. These actions would reduce the likelihood of human-caused fires, as discussed under **Section 4.7.2**, but would also reduce access for wildfire response.

Impacts from Lands and Realty Management

Managing the majority of GRSG habitat as ROW exclusion (4.8 million acres, four times more than Alternative A) and as ROW avoidance (6.1 million acres, 77 percent more than Alternative A) would reduce the probability of human-caused wildfires arising from ROW development, as described under **Section 4.7.2**. Decreased development due to exclusion areas could also reduce development-related changes in vegetation and invasive plant removal and construction of roads that would provide fuel breaks and access for wildfire response.

Impacts from Leasable Minerals Management

Over 6 million acres would be closed to fluid mineral leasing, with approximately 4 million acres open under Alternative B (the PHMA would be closed to fluid mineral leasing, while the GHMA would be closed or would require stipulations). Development would be more limited than under Alternative A and would result in fewer development-related roads and fuel breaks that could be used for wildfire management. However, there would also be a reduction in human activities and fewer human-caused ignitions. Over the long term, closures and NSO stipulations would protect vegetation from removal and would reduce invasive plant species introduction or spread from leasable mineral activities. This would result in impacts on wildland fire management, as described under **Section 4.7.2**.

Impacts from Locatable Minerals Management

Under this alternative, approximately 5 million acres, most of the PHMA and GHMA, would be withdrawn or be proposed for withdrawal from locatable minerals. These actions would reduce the likelihood that vegetation would be removed and that invasive plants could be introduced, resulting in impacts on wildland fire management, as discussed under **Section 4.7.2**. The remaining areas (almost 7 million acres) would remain open to locatable minerals and would allow for human activities that may lead to human-caused fires. When compared with other alternatives, this alternative allows for more development

and thus more locatable minerals-related activities that can result in increased wildfire risk.

Impacts from Mineral Materials (Salables) Management

Approximately 6.5 million acres, all of the PHMA, would be closed to mineral material sales. The BLM would restore salable mineral pits no longer in use, which would protect native vegetation from removal and reduce nonnative invasive plant introduction or spread arising from salable mineral activities. Over 4 million acres would remain open to mineral material sales. This may lead to impacts on wildland fire management, such as reduced access, increased fuel loading, and other impacts, as described under **Section 4.7.2**.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative B, 6.5 million acres would be closed to nonenergy leasable mineral leasing; BMPs would be required on existing leases. Approximately 6 million acres would remain open. The increase in open areas, compared with Alternative A, could increase human-caused wildfires from nonenergy leasable mineral-related activities, as described under **Section 4.7.2**.

Impacts from Special Designations Management

Impacts from ACEC management on native vegetation under Alternative B would be the same as described for Alternative A.

4.7.6 Alternative C

Impacts from Special Status Species—GRSG Management

Impacts from designating PHMA would be similar to those described for Alternative B. The disturbance cap would apply to all occupied habitat. Impacts on wildland fire management would be similar to those for Alternative Bas described under **Section 4.7.2**.

Impacts from Vegetation Management

Management under Alternative C would be similar to that described under Alternative A, though with an increased focus on restoration.

Impacts from Wildland Fire Management

Impacts from wildland fire management under Alternative C would be the same as those described for Alternative A.

Impacts from Livestock Grazing and Range Management

Under Alternative C, no PHMA or GHMA areas would be available to livestock grazing. The effects of livestock exclusion would depend on site conditions, including climate, soils, fire history, and disturbance and grazing history (Strand and Launchbaugh 2013). Grazing is associated with indirect impacts on wildland fire management, as described under **Section 4.7.2**. In particular, improper grazing may reduce resistance to invasion from cheat grass and other invasive annual plant species and cessation of overgrazing could allow for the recovery of

native understory perennials and an increase in sagebrush and herbaceous vegetation cover.

However, removing grazing could also allow for grasses and forbs to build up that could otherwise be consumed by livestock. This could increase the size, extent, or frequency of wildland fires. As stated in **Section 4.7.2**, the influence on fire spread, severity, and intensity would depend on such factors as weather, fuel characteristics, and landscape features.

Impacts from Travel Management

As under Alternative B, additional limitations for motorized travel would apply in GRSG habitat, including closure of all cross-county motorized travel in PHMA and GHMA. The areas limited to vehicle use would be more than twice that under Alternative A. Additionally; new road construction would be prohibited. Impacts from travel and transportation management on wildland fire management under Alternative C would be as described under **Section 4.7.2**.

Impacts from Lands and Realty Management

Under Alternative C, managing all occupied habitats and ACECs as ROW exclusion (10,682,124 acres, more than 12 times more than Alternative A) would reduce the amount of human activity and risk from human-ignited fires but would also limit potential fire breaks and staging areas for fire management.

Impacts from Leasable Minerals Management

Impacts from leasable minerals management under Alternative C would be similar to those described for Alternative B; however, an increase in the acres closed to fluid mineral leasing (10,615, 593 acres) would reduce the amount of human activity and risk from human-ignited fires but would also limit the number of water sources and staging areas for fire management.

Impacts from Locatable Minerals Management

Under Alternative C, over 8.8 million acres would be recommended for withdrawal (363 times more acres compared with Alternative A). This would reduce the amount of human activity and risk from human-ignited fires but would also limit the number of water sources and staging areas for fire management.

Impacts from Mineral Materials (Salables) Management

Under Alternative C, over three times more acres would be closed to mineral materials disposal compared with Alternative A. This would reduce the amount of human activity and risk from human-ignited fires but would also limit the number of water sources and staging areas for fire management.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative C, over three times more acres would be closed to nonenergy leasable mineral exploration and development compared with Alternative A. This would reduce the amount of human activity and risk from

human-ignited fires but would also limit the number of water sources and staging areas for fire management.

Impacts from Special Designations Management

Under Alternative C, the BLM would designate all PHMA as new ACECs covering 4.5 million acres. Over 5 million acres, or more than 6 times the area under Alternative A, would be designated as ACECs. New ACEC management plans would be prepared to determine the necessary management in these areas. Impacts from management of ACECs on wildland fire management are as described under **Section 4.7.2**.

4.7.7 Alternative D

Impacts from Special Status Species—GRSG Management

Impacts from GRSG management on wildland fire management under Alternative D would be the same as those described for Alternative B.

Impacts from Vegetation Management

Management under Alternative D would be similar to that described for Alternative B; however, the BLM would conduct sagebrush treatments over 2.5 times more acres and would increase juniper treatments by 40 percent. In addition, the BLM would identify strategic areas to prioritize restoration projects. It would use the most current science when implementing restoration projects. In addition, Alternative D provides guidance and priorities for sagebrush, juniper, and invasive plant treatments. Invasive plant prevention measures would be incorporated during wildfire response and other agency activities. Together, these management actions would improve the likelihood for successful sagebrush restoration and vegetation and invasive plant treatments in GRSG habitat over the long term and thus reduce impacts on wildland fire management.

Impacts from Wildland Fire Management

Wildland fire management under Alternative D would be similar to that described for Alternative B, with additional management flexibility and guidance incorporated to tailor management to specific vegetation communities. The BLM would implement a comprehensive approach with priorities for fuels management, wildfire management, and ES&R within GRSG habitat. This would improve wildland fire management, given the limited resources available, and would target those areas that need most protection. Alternative D also establishes quantifiable objectives that would provide a measurable indication of progress or success. As a result, the likelihood for catastrophic wildfire would be reduced and subsequent impacts from wildland fire, described under **Section 4.7.2**, would also be reduced.

Impacts from Livestock Grazing and Range Management

Under Alternative D, there would be a reduction of 98,446 acres available for authorized grazing (with approximately 9.9 million acres available to grazing,

approximately a 1.0 percent reduction from Alternative A) would occur in GRSG habitat due to the closure of 117, 710 acres of Key RNAs to grazing. In addition, the BLM would prioritize allotments for processing grazing permits and leases and would prioritize land health assessments in GRSG habitat; management would change when the authorized livestock use was the cause for not maintaining or improving GRSG habitat values (43 CFR, Part 4180.2(c) and Standard 5). Alternative D provides more detailed guidance for management during drought conditions. Such measures would potentially improve resistance to invasion and resilience from wildfire through improved ecological condition of rangeland and riparian and wetland areas. Together, these efforts would improve consistency of management across the sub-region and would reduce impacts from grazing on vegetation and the impacts on wildland fire management from grazing, described under **Section 4.7.2**.

Impacts from Travel Management

Impacts on wildland fire management from travel management under Alternative D would be the same as those described for Alternative B.

Impacts from Lands and Realty Management

Impacts on wildland fire management from lands and realty management under Alternative D would be the same as those described for Alternative A. The same acreage would be managed as ROW exclusion areas though nearly 75 percent more acres would be managed as ROW avoidance areas, providing additional protection to sensitive vegetation and decreasing impacts on wildland fire management.

Impacts from Leasable Minerals Management

Impacts from leasable minerals management under Alternative D would be similar to those described for Alternative A. However, nearly 4 times more acres would be open to leasing subject to NSO stipulations, thereby reducing impacts as described in Section 4.7.2.

Impacts from Locatable Minerals Management

Impacts on wildland fire management from locatable minerals management under Alternative D would be the same as those described for Alternative A.

Impacts from Mineral Materials (Salables) Management

Impacts on wildland fire management from mineral materials management under Alternative D would be the same as those described for Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Impacts on wildland fire management from nonenergy leasable minerals management under Alternative D would be the same as those described for Alternative A.

Impacts from Special Designations Management

ACECs managed under Alternative A would continue to be managed under Alternative D. However, under Alternative D, the BLM would change management in some ACECs to reduce or modify vegetation impacts from resource uses and development. As a result, large blocks of vegetation would remain intact and the likelihood of invasive plant invasion and impacts on wildland fire management would be reduced. Additional impacts on wildland fire management associated with such uses and development, as described under **Section 4.7.2**, would also be reduced.

4.7.8 Alternative E

Impacts from Special Status Species—GRSG Management

Management of Core Area and Low Density habitat under Alternative E would have the same impacts as those described for Alternative B.

Impacts from Vegetation Management

Vegetation management under Alternative E emphasizes invasive plant control, avoiding conversion of sagebrush to increase livestock forage, and using the connectivity model and habitat monitoring techniques in the ODFW plan. Some guidance is also provided for conducting vegetation treatments. The same number of acres would be treated as under Alternative A; however, Alternative E would substantially reduce the introduction and spread of invasive plants, compared with Alternative A.

Impacts from Wildland Fire Management

Impacts from wildland fire management under Alternative E would be similar to those described for Alternative D.

Impacts from Livestock Grazing and Range Management

Impacts on wildland fire management from livestock grazing under Alternative E would be similar to those described for Alternative A; however, fewer acres would be available to grazing (8,296,814). This alternative would also include grazing in GRSG habitat outside of Core and Low Density areas and priority for wildland fire management would be concentrated on fewer acres than under other alternatives.

Impacts from Travel Management

Impacts on wildland fire management from travel management under Alternative E would be the same as those described for Alternative B.

Impacts from Lands and Realty Management

Impacts from lands and realty management under Alternative E would be similar to those described for Alternative B. However, fewer ROW avoidance areas would be managed under Alternative E, thus providing fewer protections to vegetation and wildland fire management.

Impacts from Leasable Minerals Management
Impacts from leasable minerals management under Alternative E would be the same as those described for Alternative B.

Impacts from Locatable Minerals Management
Impacts from locatable mineral development under Alternative E would be the same as those described for Alternative B.

Impacts from Mineral Materials (Salables) Management
Impacts on wildland fire management from mineral materials management under Alternative E would be the same as those described for Alternative B.

Impacts from Nonenergy Leasable Minerals Management
Impacts on wildland fire management from nonenergy leasable minerals management under Alternative E would be the same as those described for Alternative B.

Impacts from Special Designations Management
Impacts on wildland fire management from special designations management under Alternative E would be the same as those described for Alternative A.

4.7.9 Alternative F

Impacts from Special Status Species—GRSG Management
Impacts on wildland fire management from GRSG management under Alternative F would be similar to those described for Alternative B. However, Alternative F would provide greater restrictions on allowable uses including a 3 percent disturbance cap that includes fire. This would further reduce the acreage of vegetation that would be removed and could reduce impacts on wildland fire management as a result of disturbance and the introduction of invasive annual plants.

Impacts from Vegetation Management
Impacts on wildland fire management from vegetation management under Alternative F would be the same as those described for Alternative B.

Impacts from Wildland Fire Management
Impacts from wildland fire management under Alternative F would be similar to those described for Alternative B. However, Alternative F would require exclusions of grazing post-fire, which would reduce grazing pressure on and trampling of ES&R seedings. This would improve the likelihood of native vegetation restoration post-fire.

Impacts from Livestock Grazing and Range Management
Impacts from livestock grazing management under Alternative F would be similar to those described for Alternative B. However, Under Alternative F, 25 percent of areas available to grazing in GRSG habitat would be rested per year

(7,506,632 acres open to grazing), and utilization level would be reduced in order to not exceed 25 percent of current use. This could increase fine fuel loading as discussed in **Section 4.7.2** and under certain conditions make wildland fires more difficult to manage. Impacts on wildland fire management, depending on where livestock management is applied could include the need for additional fire management resources in order to manage an increase in fire workload.

Impacts from Travel Management

Impacts from travel and transportation management under Alternative F would be the same as those described for Alternative B.

Impacts from Lands and Realty Management

Impacts from management of ROW avoidance and exclusion areas would be the same as those described under Alternative C.

Impacts from Leasable Minerals Management

Impacts on wildland fire management from leasable minerals management under Alternative F would be the same as those described for Alternative C.

Impacts from Locatable Minerals Management

Impacts on wildland fire management from locatable minerals management under Alternative F would be the same as those described for Alternative B.

Impacts from Mineral Materials (Salables) Management

Impacts on wildland fire management from salable minerals management under Alternative F would be the same as those described for Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Impacts on wildland fire management from nonenergy leasable minerals management under Alternative F would be the same as those described for Alternative B.

Impacts from Special Designations Management

Impacts from management of ACECs would be similar to those described under Alternative C. However, 10 percent fewer acres would be managed as ACECs under Alternative F.

4.7.10 Proposed Plan

Impacts from Special Status Species—GRSG Management

Impacts from GRSG management on wildland fire management under the Proposed Plan would be similar to those described for Alternative B. However, the Proposed Plan would include management of SFA in PHMA, which would provide greater restrictions on allowable uses, including fluid mineral and locatable mineral development. RDFs, buffers, and seasonal restrictions would be applied to leks in PHMA and GHMA. A 3 percent disturbance cap would be

applied, and mitigation would be required for human disturbances. These actions would further reduce the acreage of vegetation, which would be disturbed, removed, or fragmented by human disturbances over the long term.

Impacts from Vegetation Management

Management under the Proposed Plan would be similar to that described for Alternative D. The BLM would implement over twice the sagebrush and juniper treatments and 14 percent more invasive plant species treatments, compared with Alternative A, and also would treat crested wheatgrass. In addition, the Proposed Plan includes management and vegetation treatment objectives and prescriptions that would decrease invasive annual grasses, would reduce conifer encroachment into sagebrush, and would improve wet meadows management. Use of site-specific analyses and tools like the FIAT assessment (**Appendix H**) would help refine the location for specific areas to be treated. Together, these management actions would improve the likelihood for successful sagebrush restoration and vegetation and invasive plant treatments. This would improve vegetation conditions and thus would result in decreased departure from historic reference conditions and improved FRCC.

Impacts from Wildland Fire Management

The Proposed Plan, as in Alternative D, would focus on the cooperative assessment, planning, and implementation of actions to minimize risk of severe wildfire in GRSG habitat. The Proposed Plan would also require a burn plan before prescribed fire in GRSG habitat and would include assessing management needs based on local conditions, as detailed in **Appendix H**.

A comprehensive strategy for wildland fire management would be implemented under the Proposed Plan, including the GRSG Wildfire, Invasive Annual Grasses, and Conifer Expansion Assessment. The assessment would identify priority habitat areas and management strategies to reduce the threats to GRSG from invasive annual grasses, wildfires, and conifer expansion. It would incorporate recent scientific research on resistance and resilience of Great Basin ecosystems as well as interdisciplinary team knowledge. Potential management strategies are proactive measures, such as fuels management, habitat restoration, and recovery, and reactive measures, such as fire operations and post-fire rehabilitation. Together, these actions would improve FFCC, would reduce the size of damaging wildfires, and would target those areas that need most protection. However, these actions would also increase wildland fire management and fuels treatment costs due to the increased emphasis on protection, conservation, and restoration of GRSG habitat.

Impacts from Livestock Grazing and Range Management

Under the Proposed Plan all or portions of key RNAs would be unavailable to grazing. In total, a reduction of 22,765 acres in key RNAs available for authorized grazing (9,956,587 acres available for grazing in GRSG habitat, less than .25 percent reduction from Alternative A) would occur. The BLM would

also implement a number of management actions to meet vegetation objectives in SFA and PHMA, including prioritizing the review and processing of grazing permits and leases in SFA, particularly in areas not meeting rangeland health standards that also contain riparian areas, including wet meadows. Additional management would aim to maintain, enhance, or reestablish riparian areas in GRSG habitat. Such measures would potentially improve resistance to invasion and resilience from wildfire through improved ecological condition of rangeland and riparian and wetland areas. The risk of unintentional damage to vegetation and special status plants remains where lands remain available to grazing. Together, these efforts would improve consistency of management across the sub-region and would reduce impacts from grazing on wildland fire management, described under **Section 4.7.2**.

Impacts from Travel Management

Impacts on wildland fire management from travel management under the Proposed Plan would be similar to those described for Alternative C. Under the Proposed Plan, over 11 million acres (over two times more than Alternative A) would be closed or limited to existing roads, primitive roads, and trails. This would reduce the likelihood of impacts caused by roads, as described under **Section 4.7.2**.

Impacts from Lands and Realty Management

Under the Proposed Plan, the BLM would manage a similar number of ROW exclusions for major and minor ROWs as Alternative A. However, 3 million acres would be ROW exclusion for solar and wind ROWs. In addition PHMA and GHMA (9.9 million acres, nearly three times more than Alternative A) would be ROW avoidance for major and minor ROWs. New ROWs would also be collocated with existing disturbance when possible.

The Proposed Plan would include a cap on human disturbance; the 3 percent disturbance cap on discrete human disturbances would be applied in PHMA at both the Oregon PAC (also known as BSU) and project levels. Human disturbances in PHMA and GHMA would also be mitigated to ensure a net conservation gain to GRSG. In addition, conservation measures would be implemented in PHMA and GHMA, such as adaptive management and defined monitoring protocols (**Appendices D** and **G**), RDFs (**Appendix C**), and lek buffers (**Appendix S**). As a result, lands and realty impacts on wildland fire management would be reduced, as compared with Alternative A.

Impacts from Leasable Minerals Management

Impacts from leasable minerals management under the Proposed Plan are similar to those described for Alternative D. In addition, SFA would be managed as NSO without waiver, exception, or modification, thereby providing additional protections in these areas. This would result in impacts on wildland fire management, as described under **Section 4.7.2**.

Impacts from Locatable Minerals Management

Under the Proposed Plan, over 1.8 million acres would be recommended for withdrawal (74 times more acres, compared with Alternative A). This would result in impacts on wildland fire management, as described under **Section 4.7.2**.

Impacts from Mineral Materials (Salables) Management

Impacts on wildland fire management from mineral materials management under the Proposed Plan are similar to those described for Alternative B, though with more acres (over 30,000) closed to disposal. Mitigation would be required for all human disturbances. This would result in impacts on wildland fire management, as described under **Section 4.7.2**.

Impacts from Nonenergy Leasable Minerals Management

Impacts on wildland fire management from nonenergy leasable minerals management under the Proposed Plan are similar to those described for Alternative B, though with slightly more acres (91) closed to exploration and development. Mitigation would be required for all human disturbances. This would result in impacts on wildland fire management, as described under **Section 4.7.2**.

Impacts from Special Designations Management

Impacts on wildland fire management from the Proposed Plan would be the same as under Alternative D and as described in **Section 4.7.2.**

4.8 LIVESTOCK GRAZING AND RANGE MANAGEMENT

4.8.1 Methods and Assumptions

Indicators

Indicators of impacts on livestock grazing and range management are as follows:

- Changes in permitted AUMs in areas open to livestock grazing
- Changes in the type of livestock permitted on allotments
- Prohibitions on or limitations to the construction or maintenance of structural and nonstructural range improvements
- Modifications to or removal of structural range improvements
- Closure of areas to livestock grazing for the life of the plan
- Changes to the timing, duration, or frequency of permitted use, including temporary closures

Assumptions

The analysis includes the following assumptions:

- This analysis uses PPH and PGH categories for Alternative A only to facilitate comparison across the other alternatives. There are currently no BLM-administered lands formally designated as PPH/PHMA or PGH/GHMA within the sub-regional planning area, and Alternative A would neither result in the designation of PPH/PHMA or PGH/GHMA nor assign additional management actions to PPH/PHMA or PGH/GHMA areas.
- All new and renewed leases and permits would be subject to terms and conditions determined by the BLM Authorized Officer to achieve the management and resource condition objectives for BLM-administered lands and to meet the Oregon and Washington Standards for Rangeland Health and Guidelines for Livestock Grazing.
- Range improvements (e.g., fences, pipeline, water wells, troughs, and reservoirs) could create a localized loss of vegetation cover either directly or indirectly throughout the improvements' useful life.
- The construction and maintenance of range improvements would continue in the decision area as needed. New range improvements would be subject to limitations, as defined in the Oregon GRSG RMPA/EIS. Range improvements are generally intended to better livestock and/or wild horse and burro distribution and management.
- In the Oregon GRSG RMPA/EIS, livestock grazing is not considered a surface-disturbing activity subject to the 3 percent cap.
- Livestock grazing will continue to be an important component of the local economy
- There are currently 169,902 acres unavailable to livestock grazing in PPH and PGH.

4.8.2 Nature and Type of Effects

Impacts on livestock grazing are generally the result of the following:

- Activities that affect forage production
- Areas open to livestock grazing
- The kind of livestock (e.g., cattle, sheep, or goat)
- The season of use and timing
- The ability to construct and maintain range improvements
- Impacts from human disturbance, including disruption of livestock movement or unwanted dispersal.

Key types of impacts are detailed below.

Protecting GRSG habitat would directly affect livestock grazing under the following circumstances:

- If management were to limit areas open to livestock grazing or available AUMs
- If livestock grazing strategies (e.g., season of use and rotation) were modified, which could increase time and cost to permittees and lessees

For example, management actions to enhance habitat for GRSG could affect livestock grazing management options in the short and long term by restricting grazing intensity or season of use, closing some areas to grazing, or changing livestock rotation patterns, in order to maintain residual herbaceous cover in sagebrush habitat (NTT 2011).

However, managing vegetation resources to benefit GRSG may indirectly benefit livestock grazing by increasing vegetation productivity and improving forage quality in the long term. This would be especially true in cases where current conditions are not meeting BLM Standards for Rangeland Health. For example, in allotments with a history of intensive grazing, transitions in the composition of sagebrush communities may have occurred that have reduced cover or forage for GRSG (Cagney et al. 2010) and forage for livestock. However, when livestock grazing management is put into place to promote health and vigor of the herbaceous community, this may also result in sufficient herbaceous cover to meet habitat requirements for breeding GRSG, such as those specified by Connelly et al. (2000b). However, some areas would require additional active restoration, such as reseeding native grasses and forbs or desirable nonnative species and/or controlling invasive plants.

Under 43 CFR, Part 4180, Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration livestock grazing must not impair watershed function, riparian habitat, water quality, or wildlife habitat. The grazing regulations require that the BLM must take appropriate action "as soon as practicable, but not later than the next grazing season," upon making determinations that the BLM's Standards for Rangeland Health are not being met on an allotment and existing livestock grazing is a significant factor (43 CFR, Parts 4180.1 and 4180.2[c]) for failure to achieve standards. Therefore, changes may be required to livestock grazing management in order to meet these standards. Some examples of the nature and type of impacts from management for vegetation, riparian habitat, and water quality are described below.

Vegetation management designed to curb incursion of invasive plant species or encroachment of shrubs could reduce forage availability in the short term.

However, these treatments generally enhance rangeland conditions in the long term (NTT 2011).

Managing riparian habitat can directly impact livestock grazing through excluding livestock at specific sites, increasing herding, adding range improvements (such as cross fences and water gaps), and adjusting season of use and livestock numbers. Managing riparian habitat to maintain proper functioning condition is a goal for BLM-administered lands. This also benefits grazing livestock by indirectly providing cleaner and more reliable water sources and more dependable forage availability.

Protecting water quality and watershed health is one component of BLM's Standards for Rangeland Health. State water and federal quality standards also apply. If it is found that livestock is a significant factor in not meeting water quality standards, additional management needs would be identified and changes could be required in livestock management. Changes include deferring or shortening livestock grazing periods, adding range improvements, excluding livestock grazing from riparian areas, establishing riparian pastures, and increasing livestock herding. In areas requiring exclusion of livestock or other restrictions on livestock management, these limitations could increase costs to permittees and lessees if changes were to reduce AUMs or increase livestock management costs.

Recreation can affect livestock grazing directly through human disturbance and indirectly through rangeland degradation. Direct disturbance can include undesired animal dispersal, which may result in unauthorized use. This would be the result of gates left open and fences cut by recreational users, animal displacement, harassment or injury from collisions or shooting, or from damage to range improvements, particularly from the use of recreational vehicles or from recreational shooting. Disturbance is most likely to occur during the hunting season due to increased presence of people, vehicles, noise and accidental livestock shooting. In addition, OHV use results in indirect impacts, such as increased dust on forage in high use areas, leading to lower forage palatability. Limitations on recreational use in GRSG habitat could indirectly benefit livestock by reducing direct disturbances.

Other direct long-term recreation impacts are disturbance caused by increased levels of human activities. The degree of impacts would vary depending on the following:

- The intensity of recreation; for example, large numbers of people for special recreation permit (SRP) use would likely have a higher level of disturbance, compared with frequent use by a small number of visitors
- The timing of recreation (livestock could be more susceptible to disturbance during the spring when young are present)

- The location of recreation in the allotment (a higher level of disturbance could occur near areas frequented by livestock, such as water sources or salt licks)

As stated above, limitations on recreational use in GRSG habitat could indirectly benefit livestock by reducing direct disturbances.

Limits on construction or use of transportation routes may affect livestock grazing. Road construction may cause loss of forage, harassment, and displacement; thus, reducing these activities may benefit livestock by reducing disturbances. Closing roads or trails not leading to range improvements would also increase forage availability when natural rehabilitation occurs. Limitations on cross-country travel may impact permittees' and lessees' ability to effectively manage livestock if exemptions are not granted for access to allotments. Travel management actions for GRSG protection generally involve increased limitations or restrictions on travel management.

Wildland fire alters sagebrush habitat due to the long time required for sagebrush to regenerate, which may allow for invasion of invasive plants (NTT 2011). Wildland or prescribed fire would remove vegetation and forage over the short term; however, it can increase forage a few years post-fire as herbaceous vegetation increases and woody vegetation is removed or reduced. Impacts on livestock operations could also occur when agency policies or determinations require a rest period following rehabilitation and before livestock grazing is reestablished. These required rest periods may impact the ability of livestock operators to fully use permitted AUMs for a determined period of time. The specific impacts on livestock operators would be short term increased costs to provide alternative forage resources to livestock. The amount of impact on livestock permittees and lessees would depend on the location and intensity of the fire in relation to grazing allotments. Changes in wildland fire suppression and fuels management to protect GRSG habitat would have varying effects on livestock grazing. Measures to protect sagebrush habitat might reduce the spread of wildland fire and the associated disruption to livestock management. Use of livestock to aid in managing fuel loads may provide some increased opportunities for livestock grazing at a site-specific scale. The management of habitat for GRSG using natural disturbance regimes, such as fire, and using vegetation treatments to accomplish biodiversity objectives to improve plant community resilience could also benefit livestock grazing in the long term. This would come about by maintaining a balance of seral stages. In general, removing encroaching junipers may benefits livestock grazing by increasing productivity of forage species and forage quality (Vaitkus and Eddleman 1987; Bates et al. 2000).

Restrictions on ROWs or land transfers may indirectly impact livestock grazing by reducing construction impacts from development of these ROWs (such as dust, displacement, and introduction of invasive plants) in the long term. Lands

and realty actions taken to protect GRSG habitat would involve avoiding or excluding ROWs (e.g., for power lines, pipelines, and other structures) or land transfers in GRSG habitat. They may also slightly decrease disturbance in these areas. However, should development be relocated to areas outside of GRSG habitat these areas may see an increase in construction-related and associated disturbance or displacement of livestock.

Energy and mineral development could impact livestock grazing. During the exploration and testing phase of mineral development, the footprint of disturbance is usually small and localized; therefore, minimal acres available for livestock grazing would be directly impacted. However, during the exploration phase, impacts on livestock dispersal and trespass could occur, increasing time and cost to permittees and lessees. Outside of the exploration and testing phase, surface-disturbing mineral development directly affects areas of grazing in the short term during construction of well pads, roads, pipelines, and other facilities. Potential impacts include an increased potential for the introduction and proliferation of invasive plants that are often unpalatable. Other potential impacts are changes in available forage, reduced forage palatability because of dust on vegetation, limits on livestock movement, harassment, and temporary displacement of livestock. In the long term, a smaller amount of grazing acreage is permanently lost from mining operations following rehabilitation. Improving roads for mineral development could facilitate livestock management by maintaining or improving access to remote locations within allotments. In addition, development may also provide other indirect benefits including but not limited to lower travel costs for livestock transportation and access to nutrient supplements for livestock use. Properly implemented BMPs and reclamation mitigation measures would likely maintain rangeland health and forage levels for livestock. Reducing mineral development in GRSG habitat could reduce potential impacts on grazing, as described above.

Changes in livestock grazing management could impact grazing opportunities in a variety of ways. For example, implementing particular livestock grazing management requirements to benefit GRSG could affect livestock grazing by changing required management actions. Management requirements would increase short-term and long-term costs to permittees and lessees and decrease AUMs, particularly when they require one or more of the following:

- Modification of a grazing strategy
- Change in season-of-use or kind of livestock
- Removal or modification of range improvements, when ability to disperse livestock is impacted

These management requirements could result in direct and indirect economic impacts on individuals, companies, and the local community. For example, if a ranch is dependent seasonally on forage on public lands, reducing or eliminating

AUMs on public lands would affect the entire ranching operation by reducing the total amount of available forage (Torell et al. 2002).

Some management changes may require a short-term output of cost for permittees and lessees but will result in long-term benefits. For example, construction of range improvements to improve livestock distribution and allow use of a larger portion of the rangeland would generally enhance rangeland health in the long term; however, it would have short-term costs which may be borne by the BLM, permittees or lessees, or both. Constructing off-site water sources and fencing riparian and spring sources could keep livestock away from sensitive riparian areas and provide a cleaner more reliable source of water for livestock. However, it would increase costs for permittees and lessees should they be fully or partially responsible for the cost of construction. Other requirements could increase annual operating costs. Examples of this are increased time feeding animals on private land, more complex pasture rotations or herding, requiring increased labor and fuels costs for moving animals.

Where areas are made unavailable for grazing due to a permit or lease is being relinquished, the agency may have to compensate the permittee or lessee for the range improvement projects constructed under a range improvement permit or cooperative agreement, in accordance with 43 CFR, Part 4120.3-6(c).

Implementing GRSG management decisions for special designations, air quality, and special status plants would have negligible or no impact on livestock grazing and range management for all alternatives; therefore, they are not discussed in detail.

4.8.3 Impacts Common to All Alternatives

Impacts from Livestock Grazing and Range ***Management***

Routine maintenance is conducted on livestock grazing infrastructure, such as fences. This would continue under the alternatives that allow livestock grazing to occur. There would be no impacts on livestock grazing from routine maintenance.

Impacts from Travel Management

Access to allotments for authorized use for the BLM and permittees and lessees would be permitted under all alternatives; therefore, travel management restrictions would have limited impacts on ability to manage livestock grazing.

Impacts from Energy and Minerals Management

As described below, for many energy and mineral resources (leasable minerals and nonenergy leasable), there is minimal current development and future development levels are predicted to remain low in the planning area. As a result, impacts on livestock grazing management would be negligible across all Alternatives. In addition, for locatable minerals, potential is unknown, although

some level of development may occur in the future impacts on livestock grazing is likely to be minimal.

Impacts from Locatable Minerals Management

All locatable minerals have the potential to exist within the planning area, but exploration has been minimal and potential is unknown across all alternatives.

Impacts from Leasable Minerals Management

While there is potential for development, there have been no wells developed on the leases issued on occupied GRSG habitat in the planning area. Under all alternatives, the potential for development is estimated to be low; thus, impacts on livestock grazing from development would likely be limited and occur independent of areas available for leasing or stipulations applied.

Impacts from Nonenergy Leasable Minerals Management

There is currently no commercial interest in solid leasables, and potential is unknown. Impacts on livestock grazing are likely to be minimal across all alternatives.

Impacts from Mineral Material Development

While areas open to mineral material extraction vary by alternative, the majority of mineral material extraction sites in the planning area are small in size and result in minimal impacts on livestock grazing.

Impacts from Mineral Split-Estate Management

For the purposes of impacts on livestock, split-estate minerals would be similar to that described above by category of minerals.

4.8.4 Alternative A

Impacts from Vegetation Management

Under Alternative A, management actions for GRSG would be applied in specific RMPs, but actions would not be consistent. BLM's Standards for Rangeland Health would apply across all plans, and livestock grazing practices would be modified should the BLM's Standards for Rangeland Health not be met as a result of livestock grazing.

Under Alternative A, no new priorities are established; existing prioritization is given to projects that benefit multiple resources. Vegetation restoration would directly affect livestock grazing if treatments were to include restrictions on available grazing acreage or changes to permitted AUMs, grazing strategies, or season of use. These could increase costs to permittees. Required rest periods following treatments would impact the ability of livestock operators to fully use permitted AUMs. Management actions for invasive plants would continue under the direction of current RMPs, with the focus on identified infestations using early detection rapid response (EDRR). Impacts of grazing management from

vegetation treatment, as discussed under *Nature and Type of Effects*, would therefore be most likely to occur in these areas.

Impacts from Wild Horse and Burro Management

Overall management direction under Alternative A is to manage for healthy populations of wild horses and burros, while maintaining a healthy ecological balance with other land uses. Horses would continue to be managed within established HMAs and under established AMLs. In the event that periodic removals do not occur, horse populations may be impacted by limitation on gathers; the time between gathers is influenced by limitations in short- and long-term holding facilities, adoptions, and other HMAs outside of Oregon, where emergency situations may mandate adjustments in gather schedules. There would be an increase in competition for available forage by horses as numbers increase above AML.

Impacts from Wildland Fire Management

Under Alterative A, wildfire suppression is not specifically prioritized in PHMA. After firefighter safety, prioritization of suppression would be implemented for multiple resources protection. Mechanical treatments, prescribed fires, and other treatments would be used to treat conifer encroachment and to remove invasive plants. These actions could improve forage in the long term. This would be due to increased herbaceous understory, in turn due to a decline in the cover of shrubs and trees. This would depend on the amount of tree cover removed from the plant community.

On sites where additional sunlight would reach the herbaceous understory, there would also be an increase in forage quality and nutritional content. A minimum rest period from livestock grazing of two growing seasons is generally required on BLM-administered lands after any major vegetation disturbance, including wildfire. Specific timing and the type of rest, as well as any modification to livestock grazing use, would be determined at the site-specific environmental assessment phase. As a result, impacts on costs and time for permittees and lessees would depend on the fire location, relative to grazing allotments.

Impacts from Livestock Grazing and Range Management

Under Alternative A, range management would be based on individual RMPs in the planning area. Approximately 771,773 AUMs would be permitted and 12,317,554 acres would be available to grazing on BLM-administered lands, including 9,982,126 acres in PPH and PGH.

All permits and leases under Alternative A would continue to be required to meet or make progress toward meeting standards defined in the BLM's Standards for Rangeland Health. Evaluations of achievement or significant progress toward achievement would continue to occur. Grazing permits and leases would be renewed approximately every 10 years based on the district specific renewal schedules. Grazing permits, including grazing systems, permitted AUMs, and allotment boundaries, would be modified as necessary to conform to

Standards and Guidelines for Livestock Grazing Management when grazing were determined to be the cause of a standard not being achieved, as required by regulation on BLM-administered lands. In this case, changes to management would be implemented prior to the start of the next grazing season per BLM regulation. As a result, any changes to grazing management would occur on a case-by-case basis at the time of the determination and would most likely change in those allotments found to be not meeting BLM's Rangeland Health Standards.

Management changes designed to address nonattainment of the wildlife habitat standard could reduce permitted AUMs and change current timing, duration, or frequency of permitted use, including temporary closures. Drought management actions would be directed to allotments with resource concerns. This alternative would not direct the BLM to manage certain areas more intensively for GRSG habitat objectives; therefore, impacts on grazing in GRSG habitat would be similar to those throughout the planning area.

Voluntary relinquishment of grazing privileges would remain an option. However, based on past rate of voluntary relinquishment in the planning area, few permittees are likely to use this option (BLM 2013a).

Lands would be maintained and restored to maintain healthy native plant and animal species. Changes to management would be directed first to allotments not meeting BLM's Standards for Rangeland Health where current livestock is a significant factor in non-attainment. Similarly, the focus in riparian areas and wetlands would be to manage, maintain, protect, and restore riparian areas and wetlands toward proper functioning condition.

As described above, managing riparian habitat can directly impact livestock grazing through excluding livestock at specific sites, increasing herding, and adding range improvements, such as cross fences and water gaps. Such changes in grazing management options could increase time or costs for permittees.

In general, structural range improvement construction and modification would be allowed in the decision area when needed to support grazing systems or improve livestock distribution on a case-by-case basis, allowing for options for management for permittees and lessees when needed to alter grazing use to meet Standards for Rangeland Health. Range improvement projects would be designed to maintain or improve GRSG habitats. Consideration of GRSG habitat needs would likely reduce the number of constructed range improvements. In some instances, improvements may be removed to assist in attaining standards.

Examples are fences, water developments, and vegetation treatments. This would allow management options for permittees. Fences would be constructed to as determined necessary for resource and resource use programs under

individual RMPs; however, few specific provisions are included for GRSG, so additional costs could be limited.

Impacts from Recreation Management

Potential for unwanted disbursement and disturbance of livestock from recreation, particularly during the hunting season is possible, as described in **Section 4.8.2**, *Nature and Type of Effects*. Some limited potential for disturbance from large recreation groups could occur due to lack of new restrictions on SRPs in the decision area.

Impacts from Travel Management

Under Alternative A, conflicts are most likely to occur between livestock grazing and OHV use. This would occur in the 2,669,145 acres open to cross-county travel in PPH and 2,940,051 acres in PGH. Impacts would occur where areas open overlap with areas available to grazing. Impacts could occur to some extent on the 1,828,999 acres in PPH and 2,576,796 acres in PGH and limited to existing routes, with impacts concentrated on areas that are also available to grazing. Access to allotments for permittees and lessees would be maintained.

Impacts from Lands and Realty Management

Under Alternative A, approximately 257,154 acres would be classified as ROW exclusion areas for new ROW development in PPH and 288,195 acres in PGH. Disturbance of forage from development activities would be reduced where areas available for livestock grazing overlap these ROW exclusion areas. Similarly, the potential for disturbance from development would be limited in ROW avoidance areas (1,336,146 acres in PPH and 1,672,025 in PGH).

4.8.5 Alternative B

Impacts from Vegetation Management

Under Alternative B, restoration projects in priority habitat would be designed to benefit GRSG and, based on the likelihood of success, with reestablishment of sagebrush cover as the highest priority. Projects to remove nonnative species and improve habitat are often be in line with current grazing management practices and could improve livestock forage in the long term.

Vegetation restoration would directly affect livestock grazing if treatments were to include restrictions on available grazing acreage or changes to permitted AUMs, grazing strategies, or season of use. Any of these could result in increased costs to permittees and lessees. Impacts could occur on range management when objectives for range management do not match with those for GRSG habitat. Post restoration management requirements could also change grazing systems or other range management components, with a potential for increased costs and time for permittees and lessees. As a result, livestock grazing management from vegetation management could be limited in PHMA, particularly in important seasonal habitats and in areas post-restoration.

Actions for invasive plant management would be similar to that described under Alternative A. There would be a greater focus on restoration and potential for impacts on grazing management in priority habitat.

Impacts on livestock management from vegetation treatment would be most likely when timing or specific location of treatment occurs in times of year or allotments where other options for livestock are limited.

Impacts from Wild Horse and Burro Management

Under Alternative B, HMAs in PHMA would be a higher priority for gathers. For the livestock grazing allotments that overlap HMAs in PHMA, wild horse and burro numbers would stay within appropriate management levels, resulting in maintenance of the level of forage permitted for livestock use. HMAs that do not contain PHMA would be categorized as a low priority for future gathers. As a result, forage availability would potentially decrease in the long term due to increased competition with growing populations of wild horses that have not been gathered in those areas.

Impacts from Wildland Fire Management

Under Alternative B, suppression of fire would be prioritized when PHMA was threatened. As a result, disturbance on livestock grazing could be reduced in the long term due to fewer large wildland fires in this area. Fires burning outside of PHMA or GHMA may increase in size when they are prioritized for suppression after fires burning in GRSG habitat. This could slightly increase the disturbance to grazing outside of GRSG habitat.

Management actions to restore post-fire habitat could impact range management. Under Alternative B, management would be adjusted to support successful restoration post rehabilitation as needed, which could temporarily or permanently reduce grazing in areas reseeded post fire. The level of impacts would depend on size, location, and intensity of the fire and the related level of restoration needed.

Fuels management projects to reduce fine fuels could include the use of targeted livestock grazing. This would likely involve high-intensity, short-duration grazing in the fall through spring to target cheatgrass or medusahead . It would involve intensive management, such as increased herding and temporary fencing, in order to concentrate livestock in the desired area. As a result, management costs and time would be high for this use, therefore use in the planning area may be limited.

Impacts from Livestock Grazing and Range Management

Under Alternative B, no management actions would result in direct changes to acres available to grazing and permitted AUMs. The number of AUMs would be the same as Alternative A (771,773 AUMs).

All GRSG habitat objectives and management would be incorporated into permit and lease renewals; therefore, impacts would occur at a site-specific level during the renewal process. Land health assessments would include indicators specific to achieving GRSG habitat objectives for rangeland health standard 5 , including local and state seasonal habitat objectives where available or general recommendations from Connelly et al. (2000b) and Hagen et al. (2007) if not available. As described under **Section 4.8.2**, this could require changes to management of a given allotment. Examples of this are changes in the kind of livestock permitted, changes to livestock rotation, or changed season of grazing permitted in order to meet these standards. Such changes could decrease management options and, therefore, increase the time and costs for permittees and lessees.

However, many of the habitat objectives for GRSG, such as defined in Connelly et al. (2000a) and Hagen et al. (2007) are in line with those currently used to assess land health, as they focus on maintaining or improving land health and grassland vegetation. When fine-scale and site-scale GRSG habitat assessment and monitoring is needed or required, (e.g., as a component of a rangeland health assessment), the GRSG habitat suitability indicators for seasonal habitats identified in the HAF would be measured. Completion of land health assessments and permits and leases would be prioritized in PHMA. The focus would be on allotments that have the best opportunities for conserving, enhancing, or restoring habitat for GRSG. As a result, impacts on range management would be most likely to occur in these areas.

Over all, effects would be similar to Alternative A but focus on PHMA due to the emphasis of management actions in this habitat. In the long term, livestock grazing in priority habitat would be reduced under compared with Alternative A should current grazing practices in in a given allotment be found to be contributing to a failure to meet GRSG habitat objectives; however, impacts would be site specific and likely would occur gradually.

The BLM would work with ranchers so that operations within GRSG habitat could be planned as single units. In this way, the time and costs required to implement these changes could be reduced, although they would still be higher than under current conditions, where no change would be required. Voluntary relinquishment of grazing privileges would remain an option in PHMA as discussed under Alternative A.

Vegetation treatments that benefit livestock forage could be completed only if these treatments would also conserve, enhance, or improve GRSG habitat; therefore, the management options in PHMA could be reduced and AUMs may be adjusted in the long term.

Under drought conditions, as under Alternative A, grazing management changes would be implemented as needed, in accordance with WO IM 2013-094 or subsequent direction. However, under this alternative the focus would be on

adjusting management in PHMA, so impacts would be more likely to occur in this area.

Under Alternative B, riparian areas would be managed with a goal of proper functioning condition within priority habitat, as discussed in Alternative A. Measures to enhance wet meadows and to reduce hot season grazing on riparian and meadow complexes could limit management options for livestock in these areas. These measures also could impact the ability to effectively distribute livestock.

Structural range improvements, such as fences and exclosures, in priority habitat under Alternative B would be permitted only when they would also conserve or enhance GRSG habitat. In addition, some fences would require installation of flight diverter to lessen risk for GRSG impacts, so the cost of building or maintaining these structures would increase, compared with Alternative A.

Similarly, new water developments from diverting springs or seeps would be permitted only when GRSG habitat would also benefit. For this reason, the location of these new improvements could be limited, increasing costs for developments and potentially impacting ability to effectively disperse livestock, increasing time and cost for management.

Overall, water improvements and fences are likely to be removed or modified to some extent under Alternative B, thereby increasing management costs and potentially decreasing grazing or shifting grazing use patterns in the long term.

Impacts from Recreation Management

Impacts would be the same as under Alternative A.

Impacts from Travel Management

As described under Alternative A, limiting travel management could decrease disturbances to livestock. Under Alternative B, only 2,938,846 acres of BLM-administered lands in GRSG habitat would be open to cross-country use, all within GHMA (an 52 percent decrease from Alternative A for GRSG habitat). Similarly, areas limited to existing routes would increase compared with Alternative A (7,075,386 total acres in GRSG habitat, a 60 percent increase from Alternative A). Additionally, in PHMA, motorized travel would be limited to existing roads, primitive roads, and trails until travel management planning is complete and the need for additional closures is evaluated. As a result, disturbance of livestock from recreational vehicles is likely to be reduced, particularly in PHMA. Access to allotments for authorized use would be permitted under this and all alternatives.

Impacts from Lands and Realty Management

Under Alternative B, no new ROW authorizations would be permitted in priority habitat unless the development would occur within the existing developed footprint. Under this alternative, 4,547,043 acres of GRSG habitat

would be managed as ROW exclusion areas (approximately 8 times higher than Alternative A); 5,662,632 acres would be managed as ROW avoidance areas in GRSG habitat (88 percent increase over Alternative A). As a result, indirect impacts on livestock grazing from disturbance would be limited in ROW avoidance areas open to livestock grazing and would decrease, compared with Alternative A.

4.8.6 Alternative C

Under Alternative C, no resource decisions would impact grazing because grazing would be eliminated within GRSG habitat.

Impacts from Vegetation Management

Under Alternative C, prioritization of areas for restoration and vegetation management actions would be similar to that discussed under Alternative B. There would be no impacts on livestock grazing, because livestock grazing would be eliminated.

Impacts from Wild Horse and Burro Management

Management actions for wild horses and burros would be as described for Alternative A. There would be no impacts on livestock grazing, because livestock grazing would be eliminated.

Impacts from Wildland Fire Management

Under Alternative C, management priorities and impacts would be similar to those described under Alternative B. There would be no impacts on livestock grazing, because livestock grazing would be eliminated.

Impacts from Livestock Grazing and Range Management

Alternative C would eliminate livestock grazing from all allotments completely or partially within occupied GRSG habitat. Grazing would continue on approximately 787,139 acres outside of GRSG habitat. There would be 0 AUMs in GRSG habitat. Eliminating grazing from all allotments intersecting occupied habitat would result in economic impacts on permittees and lessees. As discussed under **Section 4.8.2**, permittees and lessees would be faced with reducing livestock numbers for their operations or locating replacement forage, potentially at higher costs and with limited availability. Changes to permitted AUM levels could also impact property values of ranches, which act as base properties for authorized permittees and lessees. Closures would also impact permittees' and lessees' current seasonal rotations or other management strategies on federal and private lands. Due to these factors, the elimination of permitted grazing in PHMA could result in permittees and lessees going out of business, with impacts on them and local communities as a whole. Additional details of the economic impacts are discussed in **Section 4.20**, Social and Economic Impacts (Including Environmental Justice).

No specific management actions related to range infrastructure are in place under Alternative C due to the lack of permitted grazing. Proposed restoration

includes removing water developments. In areas unavailable to grazing, any maintenance requirements for remaining infrastructure and associated costs would likely fall to the BLM. Permittees and lessees who have investments on impacted federal lands in occupied habitat would receive appropriate compensation, based on federal regulations in 43 CFR, Part 4120.3-6(c). Fencing on boundaries between public and private lands in occupied habitat may be necessary to prevent livestock from trespassing on public lands where grazing is excluded. Much of this cost would likely fall on the permittees and lessees for private land fencings to exclude livestock from accessing public lands. However, the BLM may also contribute to the cost of fences if it is beneficial to GRSG. If fences could not be constructed, the cost to the BLM for compliance would increase dramatically.

Lack of ability to use range improvements and water developments on occupied habitat could result in other indirect costs. Permittees and lessees who currently rotate pastures between private and federal lands would need to construct additional water developments or other structural range improvements on private pastures. This would increase time and costs. Removing grazing from occupied habitat could increase conflicts between grazing and other resources and resource uses on lands of other surface ownership. This would be the case should livestock grazing increase on BLM-administered or private lands outside of occupied habitat.

Impacts from Recreation Management

No impacts would occur under Alternative C due to the elimination of grazing from occupied habitat.

Impacts from Travel Management

As under Alternative B, additional limitations for motorized travel would apply in GRSG habitat, including closure of all cross-county motorized travel in PHMA and GHMA. Additionally, new road construction would be prohibited. However, impacts on livestock grazing would not occur due to the elimination of grazing.

Impacts from Lands and Realty Management

Under Alternative C, ROW exclusion areas would be the same as Alternative B for PHMA and increased 18 fold over Alternatives A for GHMA. Avoidance areas would be as described under Alternative B for PHMA and decreased to zero for GHMA. However, due to the elimination of grazing in GRSG habitat, these actions would not impact livestock management.

4.8.7 Alternative D

Impacts from Vegetation Management

Under Alternative D, priority for restoration would be on the focal areas identified as restoration zones, as well as on other habitat important to GRSG. As a result, potential restrictions on grazing management are most likely to

occur in these areas. Impacts would be similar to those described under Alternative B but potentially across a broader area. Restoration is also likely to improve habitat for both livestock and wildlife in the planning area in the long term. Similarly, actions to remove juniper and control the spread of invasive plants may improve habitat conditions for both GRSG and livestock.

Impacts from Wild Horse and Burro Management

Under Alternative D, AMLs may be adjusted in the long term to meet GRSG habitat objectives. Comparable reduction and modification in livestock grazing would occur if livestock are also a significant factor in not meeting GRSG habitat suitability objectives; therefore, changes to wild horse and burro management are not likely to increase livestock forage.

Impacts from Wildland Fire Management

Under Alternative D, management actions would focus on creating fuel breaks and cooperating with other agencies to assess, plan, and implement actions to minimize risk of severe wildfire in GRSG habitat. Treating approximately 3 percent of GRSG habitat per year over the next 10 years could have short-term impacts on grazing should forage become unavailable in treated areas. However, treatments should reduce the intensity and occurrence of wildfire in the long run, although the exact impact is likely to vary by site-specific area. Specific suppression priorities would be applied in PHMA and GHMA, with emphasis on nesting, winter habitat and PHMA. There is therefore potential for reduced risk of fire and associated impacts on grazing in these areas. There also is a potential for increased risk of fire in other parts of the planning area should resources be redirected to GRSG habitat.

Impacts from Livestock Grazing and Range Management

Under Alternative D, there would be slight reduction of 97,725 acres in key RNAs available for authorized grazing (with 12,183,315 acres available to grazing, including 9,923,018 acres in GRSG habitat, an approximately 1 percent reduction from Alternative A). A reduction of 7,948 AUMs in key RNAs (763,825 permitted AUMs, an approximately 1 percent reduction compared with Alternative A) would occur in GRSG habitat due to the closure of 15 key RNAs (two of which are already closed and unavailable to grazing). In the specific areas proposed for closures, permittees and lessees would need to locate alternative forage or reduce AUMs, with economic impacts, as described under Alternative C, albeit at a reduced scale.

Permit renewal and associated land health assessment would be prioritized in occupied habitat for those in category I. As a result, changes to permitted grazing level and grazing systems are more likely to occur in these areas. The goal under Alternative D is to assess all category I, M, and C allotments in GRSG habitat within 10 years and to change permits as needed to make progress toward or achieve all standards. As stated in **Chapter 2**, the emphasis

is on allotments in GRSG habitat, with priority order for land health assessments as follows:

1. Allotments in PHMA that have never been evaluated
2. Allotments in PHMA that have not been reevaluated in 10 or more years
3. Allotments in GHMA that have never been evaluated
4. Allotments containing GHMA that have not been reevaluated in 10 or more years

As a result, changes to grazing management are likely to occur in PHMA first and GHMA second.

In the long term, this action could improve rangeland habitat conditions for livestock as well as wildlife by focusing management on those lands that are in most need of improvement.

When fine-scale and site-scale GRSG habitat assessment and monitoring is needed or required (e.g., as a component of a rangeland health assessment), the GRSG habitat suitability indicators for seasonal habitats identified in the HAF would be measured. This action would result in a more standardized approach to management compared with Alternative A. In addition, this alternative allows for some flexibility in objectives to align with regional habitat conditions, making these objectives more obtainable and reducing potential impacts on grazing management.

Similarly, as described under Alternative B, modifications to grazing systems may be required to meet seasonal habitat requirements. However, under Alternative D, there is increased flexibility in this management approach due to adjustment for regional conditions; therefore, required changes to management and related impacts on permittees and lessees would be reduced.

For allotments not meeting BLM's Standards for Rangeland Health where livestock grazing is determined to be a significant factor, appropriate changes in grazing management will be implemented prior to the start of the next grazing year.

Voluntary relinquishment of grazing privileges would remain an option in PHMA as discussed under Alternative A.

Management for riparian and wetlands areas would be the same as that described under Alternative B.

Under Alternative D, new and existing range improvements would be allowed to enhance their year-round functionality when livestock are absent. Range

improvements would be modified with wildlife escape ramps to prevent danger of GRSG or other wildlife entrapment. In cases where water improvements have population-limiting implications, modifications or removal could occur. New waters, if feasible would be developed, before eliminating existing ones. As a result, some water developments may be modified; however, the ability to distribute livestock should generally be maintained and impacts on permittees and lessees should be limited. Construction of new livestock facilities would be avoided within 1.2 miles of leks.

Forage enhancement treatments would be limited, as described under Alternative B. Structural range improvement could also be limited as under Alternative B, but the emphasis under Alternative D is on improved grazing management relative to GRSG. For this reason, there is a potential for improvement to both livestock and GRSG habitat conditions, especially in the long term.

Alternative D would apply more specific regulations on use of supplements in GRSG habitat on a year round basis as compared with Alternative A. Supplementation of livestock within 1.2 miles of occupied and pending leks would be avoided unless it is part of a plan to improve ecological health or to create mosaics in dense sagebrush stands that are needed for optimum GRSG habitat. Based on the trends the use of supplemental feed is minimal and could reduce or enhance available forage by improvement in vegetation community composition.

Impacts from Recreation Management

Under Alternative D, existing SRPs would be evaluated and would be changed if needed for GRSG protection. Disturbance to livestock from recreation is likely to be reduced in the long term compared with Alternative A, particularly near leks.

Impacts from Travel Management

Under Alternative D, travel management plans would be implemented within 5 years, as described under Alternative B. Area open to cross-county travel would be as described in Alternative B. Monitoring before travel management planning would provide information about ongoing activities that could be utilized to create travel management plans that would reduce the conflict between recreation use and livestock grazing, compared with Alternative A.

Impacts from Lands and Realty Management

Under Alternative D, current ROW exclusion areas in PHMA, as under Alternative A, would be managed as ROW exclusion areas. All other PHMA would be designated as avoidance areas for new ROW authorizations. All new ROWs in GHMA would require the BLM to cooperate with ODFW to determine impacts on occupied, suitable, or potential habitat, and development and associated disturbance to livestock would be avoided in occupied habitat and minimized in suitable or potential habitat compared with Alternative A.

4.8.8 Alternative E

Impacts from Vegetation Management

Under Alterative E, converting sagebrush for livestock grazing is discouraged and additional seasonal vegetation treatment restrictions would be applied. As a result, management options to improve forage for livestock would be restricted. This would result in the potential need to increase management, such as herding, in order to provide sufficient forage for livestock. Actions to remove juniper and to control invasive plants spread may improve habitat conditions for both GRSG and livestock in the long term.

Impacts from Wild Horse and Burro Management

Impacts from wild horse and burro management would be similar to those described under Alternative B.

Impacts from Wildland Fire Management

Under Alternative E, management actions would focus on preventing fire from entering at-risk communities in GRSG habitat, such as cheatgrass in understory and overstory sagebrush, and in reducing the spread of invasive plants. Land within 3 miles of a lek, as well as identified winter range, would be given top priority in fire suppression.

These management actions would likely result in appropriation of funds and suppression efforts in areas most in need of protection for GRSG. In many cases, these actions also would support, maintain, or improve land health conditions. Such treatment as removing juniper would be conducted when necessary but may be limited, compared with Alternative A, especially in lower elevations. As a result some local restrictions may occur on the ability to treat vegetation to improve livestock forage.

Impacts from Livestock Grazing and Range Management

Under Alternative E, AUMs available to grazing would be the same as under Alternative A (771,773 AUMs). Acre available to grazing in GRSG habitat would be reduced compared with Alternative A (8,296,814 acres in GRSG habitat, a 17 percent reduction). The difference in acreage in this alternative is due to the difference an increase in PHMA compared with Low Density habitat (as defined in Alternative E) rather than a change in management direction. No changes to use or management would be required when livestock grazing management would result in a level of forage use consistent with direction and habitat quality meeting BLM's Standards for Rangeland Health. Impacts on livestock grazing, therefore, would be similar to those described under Alternative A for areas meeting standards and objectives and maintaining appropriate levels of use under existing management direction (RMPs).

Structural range improvements would be allowed in order to maintain or enhance habitat quality for GRSG. Springs would be developed to maintain free-flowing nature. If this were to limit livestock use, the ability to distribute

livestock and the costs and time for permittees and lessees would be impacted. Similarly, structural improvements would not be permitted within .6 mile of leks, and distribution would be impacted. Fences would be required to be modified within a mile of leks, with similar increases in time and costs for permittees and lessees.

Supplemental winter feeding policy would be applied with impacts as described under Alternative D.

Impacts from Recreation Management

Under Alternative E, recreation management would be similar to that described under Alternative A, but seasonal restrictions would be imposed to limit disturbance to GRSG. Such restrictions would also reduce disturbance to livestock.

Impacts from Travel Management

Under Alternative E, travel management restrictions on OHV use would be applied to areas within 2 miles of leks. This alternative would impose 2-mile buffers around occupied leks during breeding season. In addition, OHV use should be monitored and information utilized to mitigate potential conflicts with recreation and livestock grazing. As a result, any indirect impacts on livestock from travel near leks would be reduced. Overall, areas open to cross-county travel would be the same as Alternative B for PHMA/Core Area habitat and decreased to 1,610,288 in GHMA/Low Density habitat (45 percent reduction from Alternative A in GHMA). There is a slight increase in the change of disturbance from OHV use in this alternative in Low Density habitat as a result. Permittees and lessees would still be allowed access to allotments for management.

Impacts from Lands and Realty Management

Under Alternative E, all Core Area habitat would be an exclusion area for ROW development, with impacts as described under Alternative B. For Low Density habitat, exclusion areas would be reduced compared with Alternative A (156,523 acres, 45 percent reduction). However, mitigation would be required to avoid, minimize, and apply compensatory mitigation to reduce impacts on GRSG habitat caused by BLM activities. As a result, disturbance from development in Core Area and Low Density habitat would decrease as compared with Alternative A.

4.8.9 Alternative F

Impacts from Vegetation Management

Vegetation management and associated impacts on livestock management would be similar to that described under Alternative B. As under Alternative E, management to avoid sagebrush reduction and treatments to increase livestock or big game forage in occupied habitat may further limit management options for permittees and lessees.

Impacts from Wild Horse and Burro Management

Impacts from wild horse and burro management would be similar to that described under Alternative B. However, under Alternative F, wild horse and burro populations would be reduced 25 percent from current AMLs in GRSG habitat. This would result in reduced competition for forage resources with wild horses and burros.

Impacts from Wildland Fire Management

Under Alternative F, wildland fire management impacts are generally similar to those described under Alternative B. One exception would be measures to protect GRSG habitat post-fire. Livestock grazing would be excluded from burned areas until woody and herbaceous vegetation meet GRSG objectives, which could result in long-term (10 to 50 years or longer) exclusion from burned sites. It would generally take more than a decade to reestablish adequate Wyoming sagebrush cover in low precipitation areas. The level of impacts would depend on locations, size, and intensity of wildfire in GRSG habitat in relation to location and level of authorized grazing. Requirements to include livestock exclosures to monitor fire restoration progress are anticipated to have negligible impacts due to the limited size of exclosures.

Impacts from Livestock Grazing and Range Management

Under Alternative F, 25 percent of areas available to grazing in GRSG habitat would be rested per year (7,506,632 acres available to grazing), and in addition, utilization level would be reduced in order to not exceed 25 percent of current use with permitted AUMs reduced to 289,414 (approximately 62.5 percent reduction as compared with Alternative A). The reduction in authorized grazing in GRSG occupied habitat, while not as complete as under Alternative C, would include 25 percent reduction below permitted use levels. While allotment specific impacts would be determined at implementation, overall, livestock grazing would be reduced in the decision area, potentially requiring permittees to reduce grazing or locate alternative sources of forage, with potential for economic impacts on as discussed in Alternative C.

In areas where grazing would still be permitted, management would be similar to that described in Alternative B, with the addition of other protective measures for GRSG habitat (such as increased restrictions on grazing after fire to facilitate achievement of rehabilitation objectives to benefit GRSG and restriction on all vegetation treatments that benefit livestock grazing). As a result, management options would be limited and time and costs for permittees would be increased compared with Alternative A.

Voluntarily relinquishing grazing privileges would remain an option in PHMA, as discussed under Alternative A.

Alternative F includes increased restriction on the ability to construct new water developments and range improvements. Under Alternative F, all new structural range developments in occupied GRSG habitat would be avoided. The

exception would be if independent peer-reviewed studies show that the range improvement structure benefits GRSG. This would likely lead to the authorization of minimal improvements. Similarly, management actions prohibiting new water development and requiring modification or removal of water developments could limit water sources for livestock. As a result, the ability to distribute livestock effectively would be reduced. Also, a change in grazing systems or permitted use level may be required to maintain GRSG habitat objectives. This could increase time and costs for permittees and lessees.

Impacts from Recreation Management

Impacts under Alternative F would be similar to those described under Alternative B. In addition, seasonal restrictions would be applied to camping and nonmotorized recreation within 4 miles of leks. These restrictions may impose some limitations on permittees' and lessees' ability to access allotments for management.

Impacts from Travel Management

Impacts would be similar to those described under Alternative B. Restrictions on construction of new roads within 4 miles of active leks and to upgrades on existing routes could reduce potential disturbance.

Impacts from Lands and Realty Management

Under Alternative F, GRSG habitat would be an exclusion area for ROW authorizations; PHMA exclusion areas would be as described for Alternative B and GHMA exclusion areas would be the same as described in Alternative C. As a result, impacts on livestock grazing management from development are likely to be reduced across the planning area in the long term compared with Alternative A.

4.8.10 Proposed Plan

Impacts from Vegetation Management

Management under the Proposed Plan would be similar to that described for Alternative D. The BLM would implement over two times more sagebrush and juniper treatments and 14 percent more invasive plant species treatments than Alternative A, as well as crested wheatgrass treatments. In addition, the Proposed Plan includes management and vegetation treatment objectives and prescriptions that would decrease invasive annual grasses, would reduce conifer encroachment into sagebrush, and would improve management of wet meadows. Use of site-specific analysis and tools like the FIAT Assessment (**Appendix H**) would help refine the location for specific areas to be treated. Approximately 1,083,110 acres are targeted for conifer reduction, sagebrush thinning, and invasive plant control in treatment objectives under the Proposed Plan. Impacts, including the need for temporary closures to grazing or modification of grazing systems, could occur should treatments for GRSG not match vegetation objectives for livestock grazing. In most cases, however,

treatments (e.g., conifer removal) would improve forage conditions in the long term.

Impacts from Wild Horse and Burro Management

Impacts from wild horses and burros would be similar to those described under Alternatives B and D. Under the Proposed Plan, prioritizing gathers in HMAs and HAs in priority GRSG habitat to meet established AMLs would reduce any current levels of forage competition between WHBs. It would also reduce livestock on allotments in priority habitat and aid in meeting GRSG habitat objectives.

Impacts from Wildland Fire Management

The Proposed Plan, as in Alternative D, would focus on the cooperative assessment, planning, and implementation of actions to minimize the risk of severe wildfire in GRSG habitat. The Proposed Plan would also require a burn plan before prescribed fire in GRSG habitat and would include an assessment of management needs based on local conditions, as detailed in **Appendix H**. Potential management includes fuels management and habitat restoration and recovery, as well as fire operations and post-fire rehabilitation. These actions may result in temporary, site-specific, limitations on grazing management, including temporary closures to grazing and adjustments to season of use to allow for successful implementation of fuels treatment and post-fire rehabilitation. In the long term, fire management would reduce the likelihood of widespread wildfire in GRSG and subsequent disturbance of livestock and reduction of forage, as compared with Alternative A.

As under Alternative B, fine fuels management projects using livestock grazing could result in site-specific opportunities for short-term increases in grazing in PHMA, requiring intensive management; however, impacts are likely to be minimal overall.

Impacts from Livestock Grazing and Range Management

Under the Proposed Plan all or portions of key RNAs would be unavailable to grazing, which is slightly lower than Alternative D. The Proposed Plan would reduce 22,765 acres in key RNAs available for authorized grazing (12,232,499 acres available to grazing, including 9,956,587 acres in GRSG habitat, less than .5 percent reduction from Alternative A). It also would reduce 2,388 AUMs in key RNAs (769,385 AUMs, less than .5 percent reduction from Alternative A). In the specific areas proposed for closures, permittees and lessees would need to locate alternative forage or reduce AUMs, with the potential for economic impacts as described under Alternative C and D, but at a much reduced scale.

Permit renewal and associated land health assessment would be prioritized in GRSG habitat, with a focus on areas not currently meeting standards for rangeland health. As stated in **Chapter 2**, the emphasis is on allotments in GRSG habitat. There would be priorities for review for land health assessments as allotments in SFA, followed by allotments in PHMA outside of SFA.

Precedence would be given to existing permits and leases in these areas not meeting rangeland health standards, focusing on those containing riparian areas, including wet meadows. Impacts are likely to follow this order. In the long term, this action could improve rangeland habitat conditions for livestock and wildlife by focusing management on those lands that are in most need of improvement.

As under Alternatives B, D, and E, rangeland health assessment would measure the GRSG habitat suitability indicators for seasonal habitats. Under the Proposed Plan, specific indicators for habitat are identified in **Table 2-4**. Site-specific review of seasonal habitat type would be required as part of the land assessment process; quantitative analysis of current GRSG seasonal habitat conditions of allotments is not available and is likely to change over time, based on precipitation level and other factors.

Modifications to grazing systems could be required to meet seasonal habitat objectives, increasing costs to lessees and permittees. Over time, this could also reduce permitted active use AUMs on BLM-administered lands, as discussed under Alternatives B, D, and E. Acres within nesting habitat may be more likely to require changes to grazing management, due to the desired conditions for this habitat type. Impacts would occur on an allotment scale as permit renewal and related management changes were implemented. The level and intensity of impacts would vary on a site-specific basis.

Management for riparian and wetlands areas would be similar to that described under Alternative B, with additional measures to protect or improve habitat potentially requiring changes to grazing system management, at increased time and cost for permittees and lessees.

As discussed under Alternative D, modifications may be required to structural range improvements for GRSG protection. The Proposed Action would require additional fencing, with approximately 39 miles of fence in 13 key RNAs and an additional 800 acres fenced next to 9 key RNAs. Fences could impact the ability to distribute livestock, at additional cost to permittees and leases. Similarly, modifications to existing water improvements and limitations on new water improvements may represent some additional limitations, and costs may occur to permittees and lessees; however, the ability to distribute livestock should generally be maintained, and impacts should be limited from these actions.

Under the Proposed Plan, similar to other alternatives, voluntary relinquishment of grazing permits and leases would be permitted. The BLM may determine if relinquished permits and leases and associated allotments should remain available for livestock grazing or be used for other resource management objectives, in accordance with WO IM 2013-184. This may result in some reduction of overall available AUMs, but relinquishment is likely to remain uncommon.

Impacts from Recreation Management

Impacts from recreation would be the similar to Alternative B. The Proposed Plan also restricts the construction of recreation facilities unless a net conservation gain would result. It requires an assessment of SRMAs for consistency with the Adaptive Management Strategy (**Appendix D**). Restrictions would further limit disturbance to livestock and livestock forage from recreation, as discussed under *Nature and Type of Effects*.

Impacts from Travel Management

Under the Proposed Plan travel management plans would be implemented within 5 years, as described under Alternative B, C, D, and E. Under the Proposed Plan PHMA and GHMA would be designated as limited to existing roads unless already designated as limited or closed, as described in Alternative C. Specific implementation level criteria to protect GRSG would also be applied, further limiting new roads and volume of traffic on new and existing roads. As a result, disturbance of livestock from recreation traffic would be reduced, as compared with Alternative A. Under the Proposed Plan, temporary closures would also be permitted, as necessary for resource protection. Closures would further reduce disturbance to livestock and could increase livestock forage if reclaimed, but the could impact the ability of permittees and lessees to access allotments and livestock.

Impacts from Lands and Realty Management

Under the Proposed Plan, the BLM would manage a similar number of exclusions for major and minor ROWs as Alternative A. However, 3 million acres would be exclusion for solar and wind ROWs. In addition PHMA and GHMA (9.9 million acres, nearly three times more than Alternative A) would be avoidance for major and minor ROWs. New ROWs would be collocated with existing disturbance when possible.

The Proposed Plan would include a cap on human disturbance; the 3 percent disturbance cap on discrete human disturbances would be applied in PHMA at both the Oregon PAC (also known as BSU) and project levels. Human disturbances in PHMA and GHMA would be mitigated to ensure a net conservation gain to GRSG. In addition, conservation measures would be implemented in PHMA and GHMA, such as adaptive management and defined monitoring protocols (**Appendices D** and **G**), RDFs (**Appendix C**), and lek buffers (**Appendix S**). As a result, indirect disturbance of livestock grazing or livestock forage from ROW development could be reduced, as compared with Alternative A.

4.9 RECREATION

4.9.1 Methods and Assumptions

Indicators

Indicators of impacts on recreation are as follows:

- Changes to patterns or levels of visitor use
- Increases in requests for SRPs between March 1 and June 30
- Management actions that result in long-term elimination or reduction of basic recreation and visitor services and resource stewardship needs

Assumptions

The analysis includes the following assumptions:

- The demand for general recreation on BLM-administered and National Forest System lands would continue to increase over the life of the Resource Management Plan and the Land and Resource Management Plan.
- Outdoor recreation will continue to be an important component of the local economy.
- Management actions to preserve GRSG habitat would affect a variety of resources and uses, which would generally improve recreation opportunities and experiences.
- Outside of SRMAs, the BLM will manage for recreation that consists mostly of dispersed activities, where users informally participate in activities individually or in small groups.
- Demand for SRPs will remain steady or gradually increase over time.
- The BLM will continue to issue SRPs on a discretionary basis.

4.9.2 Nature and Type of Effects

This section analyzes potential impacts on recreation resources from proposed management actions of other resources and resource uses. Existing conditions concerning recreation are described in **Section 3.9**, Recreation.

Direct impacts on recreation are those that affect opportunity, including the opportunity for access and to engage in specific activities. Indirect impacts are those that alter the physical, social, or administrative settings. Impacts on settings can either be the achievement of a desired setting or the unwanted shift in setting, such as to either a more primitive or urban environment. Physical, social, and administrative settings are not specifically managed for in areas not designated as Recreation Management Areas, although these areas do still provide intrinsic recreation values and opportunities.

The indicator typically used to describe impacts is the availability of opportunities, as described by either acreage restrictions or specific activity prohibitions. This applies to the SRP program, where an indicator of impacts is any change in how and whether SRPs are issued.

This discussion analyzes the impacts that proposed management decisions would have on managing recreation, recreation opportunities, and the SRP program. Visitor use patterns are difficult to estimate and depend on many factors beyond the scope of management (e.g., recreation trends and economy). For this reason, qualitative language—for example, "increase" or "decrease"—is used to describe anticipated impacts.

Implementing management for the following resources would have negligible or no impact on recreation for all alternatives; therefore, they are not discussed in detail:

- Special Status Species—GRSG
- Vegetation
- Wild horses and burros
- Wildland fire management
- Livestock grazing and range management
- Lands and realty
- Coal
- Leasable minerals
- Locatable minerals
- Mineral materials (salables)
- Nonenergy leasable minerals
- Mineral split-estate
- Special designations
- Air quality and climate change
- Special status plants

4.9.3 Impacts Common to All Alternatives

All alternatives involve controlling major ground disturbances, such as livestock grazing, mining, and ROWs. Due to the limited scale of rockhounding ground disturbing activities, limitations on major surface disturbing activities would not diminish opportunities for rockhounding activities to continue. There would be no impacts on rockhounding.

4.9.4 Alternative A

Impacts from Recreation

Under Alternative A, existing recreation opportunities in the planning area would be maintained over the long term.

Impacts from Travel and Transportation Management

Under Alternative A, existing motorized recreation opportunities in the planning area would be maintained over the long term.

4.9.5 Alternative B

Impacts from Recreation

Restricting issuance of SRPs in PHMA to those activities that have neutral or beneficial impacts on PHMA would likely result in many SRPs being relocated or made subject to conservation measures and seasonal restrictions. This could reduce the types of organized recreation activities allowed via SRPs in PHMA over the long term.

Impacts from Travel and Transportation Management

Limiting motorized travel to existing routes in PHMA and GHMA and establishing seasonal road closures would reduce the areas available for cross-country motorized exploration in the decision area over the long term. Antler hunters using motorized vehicles would not be able to leave existing routes to search for or retrieve antlers in PHMA. Big game hunters would need to retrieve game by foot or mechanized means (e.g., game carts) instead of using OHVs. Seasonal closures in PHMA would restrict motorized travel on specific roads during the GRSG breeding season.

Limits on road construction in PHMA would result in a long-term reduction in new opportunities for motorized recreation. This could result in localized congestion and user conflicts if motorized travel were to increase in popularity.

4.9.6 Alternative C

Impacts from Recreation

Impacts are the same as those under Alternative A.

Impacts from Travel and Transportation Management

Impacts are the same as those under Alternative A.

4.9.7 Alternative D

Impacts from Recreation

Adding stipulations to SRPs to protect GRSG and their habitat would likely result in many SRPs being relocated or made subject to conservation measures and seasonal restrictions. This would result in a long-term shift in the way SRPs are issued in the planning area. SRPs most likely to be affected are those for wilderness therapy, outdoor education, equestrian events, and organized motor vehicle events. It also includes other activities that occur during spring and summer, when they would need to avoid GRSG nesting and lekking. Hunting outfitters may be less affected because there are fewer sensitive concerns for GRSG during the fall hunting season. Likewise, rafting outfitters on rivers, and river corridors may be less affected because core GRSG habitat, and its associated restrictions on SRPs, does not include river use.

Impacts from Travel and Transportation Management
Impacts are the same as those under Alternative B.

4.9.8 Alternative E

Impacts from Recreation
The BLM would attempt to reduce seasonal disturbances to GRSG and their habitat through a variety of means, including implementing conservation measures, establishing seasonal restrictions, and relocating activities subject to SRPs. This would likely result in limited impacts on recreation because activities would not be prohibited. However, if alternative means of protecting GRSG and their habitat were ineffective, the BLM may implement seasonal closures of roads and areas; this would limit recreation opportunities to other parts of the decision area.

Impacts from Travel and Transportation Management
Restricting motorized use near leks during breeding season (approximately March 1 through July 15) would seasonally limit opportunities for motorized recreation in certain parts of the decision area. Hunting would be largely unaffected because the restrictions would not overlap big game hunting season.

4.9.9 Alternative F

Impacts from Recreation
Impacts from SRP management are the same as those under Alternative B. Seasonally prohibiting camping and other nonmotorized recreation within four miles of a lek would force those activities to be moved elsewhere in the decision area.

Impacts from Travel and Transportation Management
Prohibitions on new road construction and road upgrades in occupied GRSG habitat would result in a long-term reduction in new opportunities for motorized recreation.

4.9.10 Proposed Plan

Impacts from Recreation
The BLM would seasonally restrict SRPs in PHMA and GHMA and within 4.0 miles of an occupied or pending lek, depending on the type of SRP. This would seasonally limit different types of organized and group activities in these portions of the planning area over the long term and would force groups and outfitters to look elsewhere for these opportunities.

Diverting concentrated use and recreation facilities away from PHMA would result in a long-term shift in recreation patterns in the planning area. By concentrating use in other areas, there is an increased risk of user conflict and crowding; however, this risk is considered minimal, considering the size of the

planning area and current and projected recreation use trends. Impacts from the 3 percent surface disturbance cap on human disturbances and the net conservation gain requirement would have a similar effect on recreation by limiting the size and placement of recreation facilities in PHMA.

Seasonal restrictions in existing SRMAs in PHMA and GHMA would force users to recreate elsewhere in the planning area during the time of year when restrictions are in place. Effects on users would be similar to those described for outfitters and groups, above.

Impacts from Travel and Transportation Management

Eliminating cross-country OHV travel in PHMA and GHMA would result in a long-term loss of unregulated, cross-country, motorized access on 2,670,351 acres. It would increase the acreage available to existing roads, primitive roads, and trails to 7,996,165 acres. Limiting OHV travel to existing roads, primitive roads, and trails (except where already closed) would preserve access, though users desiring cross-country opportunities may be forced to look elsewhere in the planning area or outside it.

Limiting route construction and realignment in PHMA and GHMA and within 4.0 miles of occupied or pending leks may result in long-term reductions in access and in road, primitive road, and trail quality. This effect would be minimized due to the dispersed travel patterns and density in the planning area.

RDFs and BMPs for roads and travel management would be the same under Alternatives B, C, D, and F and the Proposed Plan and would likely limit the number of routes in GRSG habitat. However, they would enhance the long-term quality of routes available for public and permitted use by requiring design features to ensure routes accommodate their anticipated uses. Best practices for decommissioning routes would likewise direct recreationists to better quality routes that remain open for use.

Seasonal route and area closures implemented via authorities in the Code of Federal Regulations are specifically outlined in the Proposed Plan, but they would also be available to the BLM under all alternatives whenever circumstances dictate. These closures would result in short-term loss of access, but the may improve recreation opportunities over the long term by allowing roads, primitive roads, and trails to return to an improved condition if they are rehabilitated during the closure period. It may also direct users to other routes and areas better equipped to provide desirable opportunities.

4.10 TRAVEL MANAGEMENT

4.10.1 Methods and Assumptions

Indicators

Indicators of impacts on travel management are as follows:

- Change in the types of transportation activities occurring on routes that would impact GRSG or its habitat
- Change in the acreages designated as open, limited, or closed to motorized travel
- Change in the number of acres where new authorized road development would be allowed

Assumptions

The analysis includes the following assumptions:

- The demand for general access to travel routes would continue to increase over the life of the RMP.
- Administration of updated agency travel management policy, rules, and planning and design guidelines will change public land travel systems through planning and design, making them more sustainable and minimizing potential impacts on resources.
- The designation of individual routes is an implementation-level process and is not considered as part of a planning level process.
- Travel management planning can be carried out in conjunction with an RMP process or it can be deferred.
- The BLM has the authority to provide reasonable access for permitted and contracted services and would include acknowledgement of this type of access in the provisions of the permit or contract.
- Decisions in the RMP would not affect traffic and access on roads administered by other entities, including state and federal highways.
- Travel systems are dynamic and will be changed through subsequent implementation level planning efforts in order to respond to the needs of the BLM multiple-use mission.
- Implementation of a travel management plan includes: increased public education, notification by use of signs, enforcement, resource monitoring in regard to travel management, and the designation of roads, primitive roads, and trails

4.10.2 Nature and Type of Effects

This section discusses impacts on travel and transportation management from proposed BLM management actions. (Existing conditions concerning travel and transportation management are described in **Section 3.10**, Travel and Transportation Management.) Travel and transportation management supports and helps achieve the objectives of other resource programs. Consequently, the travel designations would adhere to the management prescriptions included under each alternative, while following the theme of each alternative.

At the resource management planning level, impacts on travel and transportation management are those that restrict travel, such as managing areas as open, closed or limited to motorized travel, more specifically, to off-road vehicles (ORVs), as defined in 43CFR8342.0-5(a), and limiting seasonal travel.

For the purposes if this analysis, the terms ORV and OHV are used synonymously, the OHV being the more preferred term.

New travel and transportation management actions in response to GRSG habitat protection strategies would impact the number of acres where motorized ORV (or OHV) travel is allowed.

Travel management decisions in terms of "areas" as described in 43 CFR, Part 8342.1 address minimization criteria a-d, which include;

> (a) Areas and trails shall be located to minimize damage to soil, watershed, vegetation, air, or other resources of the public lands, and to prevent impairment of wilderness suitability.
>
> (b) Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats.
>
> (c) Areas and trails shall be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.
>
> (d) Areas and trails shall not be located in officially designated wilderness areas or primitive areas. Areas and trails shall be located in natural areas only if the BLM Authorized Officer determines that off-road vehicle use in such locations will not adversely affect their natural, esthetic, scenic, or other values for which such areas are established.

Throughout Chapter 4, the reader will find numerous locations and disciplines where these minimization criteria have been analyzed, including, but not limited to, travel management, recreation, vegetation, wildlife (including GRSG), and invasive plants. In addition, many of the BMPs and RDFs in **Appendix C** have been formulated to minimize impacts where they may occur.

Travel management decisions that benefit GRSG may impact other resources and uses, such as limiting travel to existing routes, or seasonally restricting use near lek sites during GRSG breeding season. As such, impacts of travel management actions on other resources and uses are discussed in the respective resource sections of this chapter. Impacts from travel management

planning do occur and are considered a part of implementation level planning that will be completed during site-specific analysis.

Implementing management for the following resources would have negligible or no impact on travel management for all alternatives; therefore, they are not discussed in detail:

- Vegetation
- Wild horses and burros
- Wildland fire management
- Livestock grazing and range management
- Recreation
- Lands and realty
- Coal
- Leasable minerals
- Locatable minerals
- Mineral materials (salables)
- Nonenergy leasable minerals
- Mineral split-estate
- Special designations
- Air quality and climate change
- Special status plants

4.10.3 Impacts Common to All Alternatives

Impacts from Travel Management

The BLM will complete a travel management plan within 5 years or as funding allows. Until that time the public may access existing routes as described in **Chapter 3**. The decision to create new routes or close existing routes will occur during the travel management plan stage and will be subject to NEPA analysis.

Routine maintenance is conducted on all roads, routes, and trails. This would continue under all of the alternatives. There would be no impacts on travel management from routine maintenance.

All alternatives allocate BLM-administered lands as open, closed, or limited for OHV travel. These allocations are analyzed throughout Chapter 4 in regard to their impact on the resources listed in the minimization criteria found in 43 CFR, Part 8342.1. For example, the impact of OHV allocations on vegetation can be found in Section 4.4, Vegetation.

4.10.4 Alternative A

Impacts from Travel Management

Under Alternative A, existing travel opportunities in the planning area would be maintained over the long term. Approximately 6,811,900 acres in the planning

area would remain open to unrestricted cross-county motorized travel; approximately 5,325,400 acres would remain limited to existing routes; and approximately 300,300 acres would remain closed to motorized use.

ACECs and RNAs currently open to OHV use would remain so, and access would continue to be unaffected.

4.10.5 Alternative B

Impacts from Travel Management

A shift in OHV designations would reduce cross-country motorized travel opportunities. Compared with Alternative A, there would be 2,670,400 fewer acres open to cross-country motorized travel and in these areas motorized travel would be limited to existing routes. However, this is not expected to noticeably increase congestion or conflict over the long term because the existing route network is well dispersed throughout much of the decision area.

There would be no new limits on new road construction in PHMA, meaning the BLM would have more flexibility to respond to any localized congestion and user conflicts if motorized travel were to increase in popularity.

4.10.6 Alternative C

Impacts from Travel Management

Designations of acres open, closed, and limited for motorized travel would be the most restrictive of any alternative. Compared with Alternative A, there would be 5,609,196 fewer acres open to cross-country motorized travel, and motorized travel would be limited to existing routes in these areas. However, this is not expected to noticeably increase congestion or conflict over the long term. This is because the existing route network is well dispersed throughout the decision area.

There would be no new limits on new road construction in PHMA, meaning the BLM would have more flexibility to respond to any localized congestion and user conflicts if motorized travel were to increase in popularity.

4.10.7 Alternative D

Impacts from Travel Management

Impacts are the same as those under Alternative B except that this alternative would reduce, limit to existing and designated roads, or close all OHV use in identified ACECs in GRSG habitat. Alternative D would also close all identified RNAs to OHV use. These actions would result in localized reductions in motorized access that would be most pronounced in larger ACECs and RNAs because entire landscapes could be limited or off-limits for motorized vehicles.

4.10.8 Alternative E

Impacts from Travel Management

Compared with Alternative A, there would be 2,899,200 fewer acres open to cross-country motorized travel. While there would be 25,400 fewer acres closed to motorized travel than under Alternative A, there would also be 2,899,200 fewer acres open to cross-country motorized travel. This would result in more acres where motorized travel is limited to existing routes. This change in motorized travel designations is not expected to noticeably increase congestion or conflict over the long term because the existing route network is well dispersed throughout the decision area.

Prohibiting motorized use within 2 miles of leks during breeding season (approximately March 1 through July 15) would seasonally limit access in certain parts of the decision area. Because the restrictions would be localized and temporary, long-term impacts on travel management would be negligible. Recommending no new development in Core Area habitat where there is evidence of GRSG presence would result in fewer expansions and upgrades to the transportation system in those parts of the decision area. Because the existing route network is well dispersed throughout the decision area, impacts are negligible.

4.10.9 Alternative F

Impacts from Travel Management

Impacts from open, closed, and limited designations for motorized travel would be the same as under Alternative B. Prohibiting new road construction within 4 miles of active GRSG leks could result in localized congestion and user conflicts if motorized travel were to increase in popularity.

4.10.10 Proposed Plan

Impacts from Travel Management

Impacts from open, closed, and limited designations for motorized travel would be the same as under Alternative B. Limitations on route construction and realignment and upgrades to primitive roads mean the BLM would have less flexibility to respond to any localized congestion and user conflicts if motorized travel were to increase in popularity. Eliminating parallel roads travelling to the same destination when the destination can be accessed from the same direction and topography in PHMA and GHMA would have negligible impacts on access because destinations would still be accessible. Impacts from the 3 percent surface disturbance cap on human disturbances and the net conservation gain requirement would have a similar effect on travel management by limiting the placement of routes in PHMA.

RDFs and BMPs for roads and travel management would be the same under Alternatives B, C, D, and F and the Proposed Plan. They would likely limit the number of routes in GRSG habitat. However, they would enhance the long-term condition of routes available for public and permitted use by requiring design features to ensure routes accommodate their anticipated uses. Best practices for decommissioning routes would likewise direct traffic to higher quality routes that remain open for use and will adequately facilitate access over the long term.

4.11 LANDS AND REALTY

BLM-administered lands are used for a variety of purposes. Major focus areas for the lands and realty program include land use authorizations, land tenure adjustments, and land withdrawals.

This section discusses impacts on lands and realty from proposed management actions of other resources and resource uses. Existing conditions concerning lands and realty are described in **Section 3.11**.

4.11.1 Methods and Assumptions

Indicators

Indicators of impacts on lands and realty are as follows:

- Acres of surface ownership, which includes federal surface with private minerals, in the planning area
- Acres of surface ownership affected by ROW restrictions (e.g., avoidance or exclusion areas)
- Number and type of land tenure adjustments (i.e., lands identified as suitable for disposal, withdrawal, or acquisition)
- Number and types of surface-disturbing ROWs and leases, including communication sites

Assumptions

The analysis includes the following assumptions:

- Authorized ROWs and communication sites would be managed to protect valid existing rights, as long as those ROWs are in compliance with the terms and conditions of their grant.
- On renewal, assignment, or amendment of existing ROWs, permits, and leases, additional stipulations could be included in the land use authorization.
- Activities on dispersed private parcels within the planning area would continue to require new or upgraded services for small distribution facilities, including communication sites, roads, and utilities.

- Power lines and other vertical structures located in areas naturally devoid of perching opportunities provide a perch for raptors and subsequently increase the potential for GRSG to abandon leks (Ellis 1984; Howe et al. 2014). However, Walters et al. (2014) found little empirical evidence to isolate the effects of the tallness of structures from other potentially confounding effects. Mitigation in the form of burying lines or including nonperching design features on lines would reduce perching opportunities and subsequent impacts on GRSG (Connelly et al. 2000b; Oles 2007).
- The demand for both energy and nonenergy types of ROWs (including communication sites) is anticipated to remain steady or to gradually increase over time.
- Little to no solar energy ROWs are anticipated due to low solar energy potential.
- The number of ROW authorizations related to geothermal energy is anticipated to be less than those for wind.
- Maintaining and upgrading utilities, communication sites, and other ROWs is preferred before the construction of new facilities, but only if the upgrading can be accommodated within or directly adjacent to the existing ROW.
- Demand for small distribution facilities to extend and upgrade services, such as communication sites and utilities, is anticipated to increase as rural development occurs on dispersed private parcels within the planning area.
- The number of ROW applications for new communication and computer technology, such as fiber optic cable, is anticipated to continue to increase.
- Demand for both regional and interstate transmission lines is anticipated to increase as population and urban areas grow and as new energy generation facilities, such as wind, are developed throughout Oregon.
- Collocation of new infrastructure in existing ROWs is preferred over creating a new ROW. The BLM recognizes that collocation does not eliminate the likelihood for new temporary or permanent surface disturbance.
- The BLM would continue to manage all previously withdrawn lands as withdrawn from entry, appropriation, or disposal under the public land laws. Withdrawals would be reviewed as needed and recommended for extensions, modifications, revocations, or terminations. All existing withdrawals initiated by other agencies, such as the Bureau of Reclamation or the Department of Energy, would be continued consistent with existing terms.

- Any lands that become unencumbered by withdrawals or classifications will be managed according to the decisions made in this RMPA. If the RMPA has not identified management prescriptions for these lands, they will be managed in a manner consistent with adjacent or comparable public lands within the decision area. If the unencumbered lands fall within two or more management scenarios where future planning criteria may not be clear, a plan amendment may be required.
- The existing designated ROW corridors within the decision area include the Western Utility Group updates to the Western Regional Corridor Study, Section 368 Energy Policy Act of 2005, and West-wide Energy Corridor Programmatic EIS. All of these are adopted and carried out under BLM IM-2013-118 (dated April 12, 2013). Designated transportation and utility corridors include linear ROWs, but are not limited to electric transmission facilities, pipelines, communication lines, and transportation systems.

4.11.2 Nature and Type of Effects

Resources and resource uses affect the lands and realty program by prescribing ROW exclusion and avoidance areas and stipulations in order to protect resources. A ROW exclusion area is one that is not available for a new ROW under any conditions. In ROW avoidance areas, ROW applications could be submitted, but a project proposed in these areas would be subject to additional requirements. Examples of the additional requirements are resource surveys and reports, construction and reclamation engineering, long-term monitoring, special design features, special siting requirements, timing limitations, and rerouting. Such requirements could restrict project location, delay availability, limit future access, or increase the cost of energy supply or communications service availability (by delaying or restricting construction of pipelines, transmission lines, communication infrastructure, or renewable energy projects). As a result of special surveys and reports, alternative routes may need to be identified and selected to protect sensitive resources, such as GRSG habitat.

Unless specific management is proposed for renewable energy ROWs, for example in the Proposed Plan, which manages certain counties as open to new wind energy development, the management of GRSG habitat as ROW exclusion and avoidance areas would decrease the BLM's ability to accommodate new wind and solar energy development. Since much of Oregon's wind energy resource potential is in GRSG habitat (NREL 2009a), ROW restrictions that cover the entire decision area would decrease wind energy development potential statewide. Impacts on industrial-scale solar energy development would be less than on wind due to lower solar energy potential in the planning area (NREL 2005). Management of areas as avoidance for new renewable energy development would deter, but not prohibit, future development. New wind

energy development applications in avoidance areas would likely incur added costs, more complex project designs, and longer BLM processing times.

Collocating transmission and mineral development infrastructure in existing ROWs and disturbed areas reduces land use conflicts and additional land disturbance. Collocation policies also clarify the preferred locations for utilities and simplify processing on BLM-administered lands. However, collocating can limit options for mineral development and selection of more preferable locations for ROWs. In addition, collocation may not always be feasible, such as in the situation where the safety clearances needed by previously constructed energy transmission infrastructure are such that no further room is available within the footprint of the existing ROW.

Resource management planning can involve closing areas to motorized or mechanized travel and limiting the construction of new routes. Travel management planning can result in more specific route closures, seasonal restrictions, and travel mode limitations. Area closures and limitations on new route construction would make certain areas impractical for some types of land uses, such as transmission lines or communication sites, where access is necessary to serve the land use.

Land tenure and landownership adjustments are intended to maintain or improve the efficiency of BLM management, including management of GRSG habitat. Land tenure adjustments can result in a more contiguous decision area, thus increasing the efficiency of BLM management. However, while consolidation would be beneficial for certain resources and uses, it would not necessarily reduce effects on GRSG habitat.

Implementing management for the following resources would have negligible or no impact on lands and realty for all alternatives; therefore, they are not discussed in detail:

- Vegetation
- Wild horses and burros
- Wildland fire management
- Livestock grazing and range management
- Coal
- Leasable minerals
- Locatable minerals
- Mineral materials (salables)
- Nonenergy leasable minerals
- Mineral split-estate

4.11.3 Impacts Common to All Alternatives

Impacts from Recreation

Under all alternatives, BLM management goals and objectives would continue to preserve a desired setting and recreation experience for users within special recreation management areas (SRMAs). Land uses in SRMAs and developed recreation sites should not conflict with recreation uses. Under all alternatives, the BLM would continue to evaluate land use authorizations on a case-by-case basis in the special recreation areas and near recreation sites, so as to avoid conflicting uses.

4.11.4 Alternative A

Impacts from Special Status Species—GRSG Management

Existing land use plans do not contain GRSG management actions; therefore, there would be no impacts on lands and realty under Alternative A from GRSG management.

Impacts from Travel Management

Under Alternative A, existing transportation routes would continue to provide motorized access to ROW infrastructure and communication sites for construction and maintenance. Refer to **Section 4.10**, Travel Management, for further analysis.

Impacts from Lands and Realty

Land Use Authorizations

Under Alternative A, 3,445,700 acres in the planning area would continue to be managed as ROW avoidance areas, and 857,600 acres would continue to be designated as ROW exclusion. Within exclusion areas, new ROW development would continue to be prohibited, which would prevent the lands and realty program from approving new applications within these areas. Within avoidance areas, the BLM would require ROW applicants to adhere to special conditions, such as siting criteria and design requirements. These requirements would discourage new ROW development in avoidance areas. All other lands within the planning area would continue to be open for ROW development. Alternative A would allow the BLM to accommodate future demand for ROW development within the planning area over the long term.

BLM-administered lands would continue to be available for multiple-use and single-use communication sites, utilities, and road access ROW authorizations on a case-by-case basis (Title V of FLPMA and 43 CFR, Part 2800). All ROW applications would be reviewed using the criteria of collocating new ROWs within or next to existing ROWs wherever practical to avoid the proliferation of separate ROWs.

Therefore, there would be little to no short- or long-term impacts on ROW development under Alternative A.

Land Tenure

Under Alternative A, the BLM would continue to manage 12,618,000 surface acres in the planning area. This includes 9,170,900 acres in Zone I (areas with high resource values and identified for retention); 3,299,200 acres in Zone II (areas with moderate resource value and areas identified for retention or possible exchange); and 138,800 acres in Zone III (areas identified for possible disposal due to lesser resource values or scattered ownership). Land tenure management under Alternative A would allow the BLM to dispose of lands as necessary to improve management efficiency. Land tenure adjustments would continue to be subject to the disposal and acquisition criteria in the existing resource management plans.

Withdrawals

There would continue to be 550,100 acres of land withdrawals in the planning area.

Impacts from Special Designations

Under Alternative A, 715,049 acres would be managed as ACECs. Those applying for ROWs proposed within ACECs could experience longer processing times, stipulations on available development locations, and additional design standards. Refer to **Section 4.16**, Special Designations, for further analysis.

4.11.5 Alternative B

Impacts from Special Status Species—GRSG Management

Management actions under Alternative B to protect GRSG habitat would impact the lands and realty program. Primary impacts under Alternative B would result from the designation of additional ROW exclusion areas, compared with Alternative A. In exclusion areas, the BLM would be prohibited from approving new ROW development. In avoidance areas, development would be allowed only if certain siting and design requirements could be met. ROW restrictions under Alternative B would substantially reduce the ability of the BLM to accommodate demand for the following:

- Interstate and intrastate gas pipelines and electric transmission lines
- Wind and solar energy development
- Fiber optic lines
- Communication sites
- Local electric distribution and fiber optic and cable lines
- Residential and farm access ROWs

Impacts from Travel Management

Alternative B would limit motorized travel to existing roads and trails in PHMA (4,498,600 acres) and GHMA (2,576,800 acres). This could result in additional time of use or vehicle restrictions on certain routes. The BLM would continue to manage 48,500 acres in PHMA and 143,600 acres in GHMA as closed to motorized travel. Restrictions on travel access could complicate maintenance on existing ROW infrastructure during certain times of the year. Restrictions also could discourage ROW development where access would be limited. Any restrictions would be subject to valid existing rights. The Lands and Realty program could see an increase in ROW applications with road closures. Refer to **Section 4.10**, Travel Management, for further analysis.

Impacts from Lands and Realty Management

Land Use Authorizations

Under Alternative B, PHMA (4,547,000 acres) would be designated as ROW exclusion. The BLM would not authorize new ROWs in PHMA unless the infrastructure could be located entirely within an existing ROW footprint. Additionally, GHMA (5,662,600 acres) would be designated as ROW avoidance areas. As noted in **Section 4.11.2**, *Nature and Type of Effects*, managing GRSG habitat as ROW exclusion would prevent the BLM from accommodating new ROW development in those areas.

There is a continuing demand for new ROWs in the planning area, including major interstate and intrastate electrical transmission, gas pipelines, industrial-scale wind energy development, and communication ROWs. Because of restrictions on BLM-administered lands, developments would be diverted to adjacent nonfederal lands or they would be prevented altogether. Development on adjacent lands could result in long-term direct and indirect impacts on the BLM Lands and Realty program (e.g., increased interest in collocating infrastructure in existing ROWs crossing BLM-administered lands). This would be the case especially if the development were close to GRSG habitat on BLM-administered lands. If new linear ROW development, particularly interstate electrical transmission, fiber optic, and gas pipelines, could not be feasibly developed due to ROW exclusions on BLM-administered lands in the planning area, then energy and communication developers would need to seek alternative routes or technologies.

Within avoidance areas, the BLM would continue to process ROW applications but would apply supplemental design criteria or siting limitations to any new ROW authorizations in these areas. Conditions on new ROW authorizations in avoidance areas would decrease the amount of future ROW development. Conditions and limitations on ROWs in PHMA and GHMA could result in an increase in trespass.

Additionally, under Alternative B, the BLM would take advantage of opportunities to remove, bury, or modify existing power lines. Limitations on new ROWs and aboveground linear features, such as transmission lines and pipelines, could restrict energy or service availability and reliability for communication systems.

Land Tenure

Under Alternative B, the BLM would designate 10,220,400 acres as Zone 1 or as lands identified for retention. Retention lands in PHMA would increase by 1,049,500 acres, compared with Alternative A. The BLM would retain ownership of public lands in PHMA; however, exceptions may occur where land exchanges would result in more contiguous federal ownership patterns or where disposal accompanied by a habitat mitigation agreement or conservation easement would result in more effective management of PHMA lands. Impacts would be consistent with those described in **Section 4.11.2**, *Nature and Type of Effects*.

Withdrawals

Under Alternative B, the BLM would not recommend land withdrawals for reasons other than mineral activity. Impacts on mineral development are described in Sections 4.12-4.15.

Impacts from Special Designations

Impacts from ACECs on lands and realty are the same as those for Alternative A.

4.11.6 Alternative C

Impacts from Special Status Species—GRSG Management

Management actions under Alternative C to protect GRSG habitat would impact lands and realty through the designation of all PHMA and GHMA (10,682,100 acres) as ROW exclusion. Compared with Alternative A, Alternative C would result in a 1,100 percent (9,824,600-acre) increase in ROW exclusion area. It would entail the most ROW restrictions of any alternative, preventing the BLM from accommodating demand for new transmission lines, gas pipelines, communication sites, wind energy facilities, and other types of ROWs. Additional management prescriptions for land tenure and road construction would further constrain BLM lands and realty program functions in GRSG habitat.

Impacts from Travel Management

Impacts from travel and transportation management under Alternative C are the same as those under Alternative A. Refer to **Section 4.10**, Travel and Transportation Management, for further analysis.

Impacts from Lands and Realty Management

Land Use Authorizations

Under Alternative C, 10,682,100 acres in the planning area would be designated as ROW exclusion area. The BLM would not authorize new ROWs in PHMA or GHMA unless the infrastructure could be located in an existing ROW. Alternative C would eliminate opportunities for communication facilities, gas pipelines, fiber optic cables, electrical transmission lines, access roads, wind and solar energy production facilities, and similar ROW development in GRSG habitat. There is a continuing demand for many of these ROWs in the planning area to meet energy and communication needs within and outside the planning area. Alternative C would reduce or eliminate the ability of the BLM lands and realty program to meet those needs. An indirect long-term effect could be an increase in trespass.

Designation of all GRSG habitat as exclusion for wind and solar energy ROWs would eliminate the BLM's ability to accommodate new renewable energy development in the planning area. It would hinder the BLM's ability to meet President Obama's energy goal of 10 gigawatts of new renewable energy permitted on DOI lands by 2020 (The White House 2013). ROW exclusions would also inhibit wind energy development on adjacent nonfederal land where transmission infrastructure would be needed across BLM-administered lands.

Land Tenure

Under Alternative C, all PHMA and GHMA would be designated as Zone I; therefore, the BLM would retain public ownership of 11,757,100 acres in GRSG habitat with no exceptions. While land tenure management under Alternative C would improve management of GRSG habitat, it would prevent the BLM from disposing of lands (e.g., isolated parcels) to improve management efficiency. Designating land as Zone I also eliminates the ability to resolve any trespass on such land by means of a sale by the BLM of the affected land. Impacts would be consistent with those described in **Section 4.11.2**.

Withdrawals

Impacts on lands and realty from land withdrawals are the same as under Alternative A.

Impacts from Special Designations

Under Alternative C, the BLM would manage all PHMA as new ACECs, equivalent to 4,547,000 acres. Management for the ACECs would be tailored to protect the relevant and important values (i.e., GRSG habitat) for which the ACECs would be designated. Since BLM management for lands and realty under Alternative C would exclude ROW development in PHMA and GHMA, the designation of PHMA as ACECs would not add further ROW restrictions. Under Alternative C, infrastructure development and other ROWs would be directed to adjacent BLM-administered lands or to private lands, resulting in an

overall reduction in new land use authorizations. New land use authorizations would be further reduced if ROW applicants could not find suitable alternative development locations outside ACECs. Refer to **Section 4.16**, Special Designations, for further analysis.

4.11.7 Alternative D

Impacts from Special Status Species—GRSG Management

Management proposed under Alternative D would enable the BLM to accommodate ROW development in GHMA. It would allow opportunities for new ROWs in PHMA subject to avoidance criteria. Although the BLM would consider new applications for ROWs in avoidance areas, a 200 percent increase in avoidance areas, when compared with Alternative A, would limit the BLM's ability to grant certain ROWs. This would reduce the total number of ROWs authorized in GRSG habitat over the long term.

Impacts from Travel Management

Impacts from travel and transportation management under Alternative D are the same as those under Alternative B. Refer to **Section 4.10**, Travel Management, for further analysis.

Impacts from Lands and Realty Management

Land Use Authorizations

ROW exclusion areas in PHMA and GHMA under Alternative D would be the same as under Alternative A. In PHMA, 4,289,900 acres, including areas within existing corridors, would be managed as ROW avoidance for all ROW types unless new disturbance falls under the 3 percent disturbance cap or as a result of mitigation results in no net loss of GRSG habitat. Examples of mitigation include burying electrical transmission lines and revegetating a decommissioned roadway. While burying an electrical transmission line creates short-term surface disturbance, the long-term direct (e.g., surface disturbance) and indirect (e.g., vehicle use on adjacent roads for maintenance) effects of a buried line on GRSG habitat and populations are less compared with impacts from an overhead line.

ROW avoidance areas in GHMA would be the same as under Alternative A.

Alternative D would directly impact the lands and realty program by reducing the BLM's ability to authorize new ROWs in PHMA that would not be able to meet specified criteria (e.g., the 3 percent disturbance cap threshold). Within avoidance areas, additional stipulations for the development of electrical transmission lines could result in the denial of projects that cannot meet ROW grant requirements for the protection of GRSG habitat. Limitations on electrical transmission line development and new roadways under Alternative D would be similar to Alternative C and would be consistent with **Section 4.11.2**.

Impacts on other types of ROWs, such as communication sites, fiber optic lines, gas pipelines, wind and solar energy generation facilities, and water infrastructure, would result only in the following cases:

- When a ROW applicant could not find a suitable location outside avoidance or exclusion areas
- When a ROW applicant could not meet the ROW grant requirements if proposed within avoidance areas

For communication facilities, stipulations in avoidance areas could diminish the effectiveness of the communication infrastructure to the point where the development would not be practical. This would result in a direct impact on that type of infrastructure development and would reduce overall communication services. Reducing overall communication services could also have an adverse impact on public health and safety.

Land Tenure
Management and associated impacts would be the same as Alternative B.

Withdrawals
There would be no impacts from withdrawals under Alternative D.

Impacts from Special Designations Management
Management and associated impacts would be the same as Alternative A.

4.11.8 Alternative E

Impacts from Special Status Species—GRSG Management
Impacts on lands and realty under Alternative E from management actions to protect GRSG are the same as Alternative B.

Impacts from Travel Management
Impacts from travel and transportation management under Alternative E are the same as Alternative B, except Alternative E provides more spatial definition of seasonal road closures. Specifically, roads within 2 miles of an active lek would be subject to seasonal closures. Seasonal limitations on access in the 2-mile lek buffer areas would make certain ROW development impractical in those areas. This would reduce new ROW development in or next to buffer areas. Any restrictions would be subject to valid existing rights. Refer to **Section 4.10**, Travel and Transportation Management, for further analysis.

Impacts from Lands and Realty Management

Land Use Authorizations
Under Alternative E, Core Area habitat (4,547,000 acres) would be designated as ROW exclusion. New infrastructure would be prohibited in Core Area habitat unless the infrastructure could be collocated in an existing ROW.

Limitations on new infrastructure outside existing ROWs and ROW stipulations for avoidance areas would prevent the BLM from accommodating additional demand for ROW development within GRSG habitat. With the expected demand for new ROWs in the planning area, particularly interstate and intrastate electrical transmission lines, wind energy facilities, and gas pipelines, new ROW development could be diverted to adjacent nonfederal lands, increasing sagebrush cover loss and habitat fragmentation on nonfederal land within GRSG habitat. The BLM Lands and Realty program would be indirectly impacted by ROW congestion from collocation of ROWs on BLM-administered lands. If new ROW development could not be feasibly developed, there would be a reduction in energy and communication development opportunities needed to meet growing demand.

Land Tenure
Management and associated impacts would be the same as Alternative A.

Withdrawals
Management and associated impacts would be the same as Alternative A.

Impacts from Special Designations Management
Management and associated impacts would be the same as Alternative A.

4.11.9 Alternative F

Impacts from Special Status Species—GRSG Management
Management actions under Alternative F to protect GRSG habitat would be similar to Alternative B and consistent with **Section 4.11.2**. ROW exclusion areas under Alternative F would restrict the BLM from accommodating demand for new transmission lines, gas pipelines, communication sites, wind energy facilities, and other types of ROWs. This could result in ROW applications being denied. With the expected ongoing demand for new ROWs in the planning area, particularly interstate and intrastate electrical transmission and gas pipeline ROW developments, new ROW development could be diverted to adjacent nonfederal lands. If new ROW development could not be feasibly developed, there would be a reduction in energy and communication development opportunities needed to meet growing demand.

Impacts from Travel Management
Impacts from travel and transportation management under Alternative F are similar to Alternative B, except that Alternative F prohibits new road construction within 4 miles of active GRSG leks and avoids any new construction within occupied habitat. Limitations on new road construction within GRSG habitat would make certain ROW development (e.g., communication sites, pipelines, and transmission lines) impractical. This would reduce new ROW development in GRSG habitat. Any restrictions would be subject to valid existing rights and travel management planning would be subject to NEPA. Refer to **Section 4.10**, Travel Management, for further analysis.

Impacts from Lands and Realty Management

Impacts under Alternative F are similar to Alternative C, except that wind energy development would be prohibited within 5 miles of active leks. In areas where the 5 mile lek buffer would extend beyond GRSG habitat areas, ROW exclusion for wind and the associated impacts described under Alternative C would apply to nonhabitat areas. The result of management actions under Alternative F would be an overall decline in energy or service availability and reliability over the long term, compared with Alternative A.

Restrictions on wind energy development would hinder the BLM's ability to meet President Obama's renewable energy goal of 10 gigawatts of new renewable energy permitted on DOI lands by 2020 (The White House 2013). With demand for new ROWs, including wind energy developments, expected to continue and increase, new ROW development would be diverted to adjacent nonfederal lands resulting in indirect impacts on BLM-administered lands (e.g., ROW congestion from collocation of ROWs on BLM-administered lands), or would not occur at all.

Land Tenure

Management and associated impacts would be the same as Alternative B.

Withdrawals

Management and associated impacts would be the same as Alternative B.

Impacts from Special Designations Management

Under Alternative F, the BLM would manage 4,755,200 acres as 17 new ACECs, including 2,760,800 acres in PHMA and 1,492,800 acres in GHMA. Management for the new ACECs would be tailored to protect the relevant and important values (i.e., GRSG habitat) for which the ACECs would be designated. All lands within the ACECs would be managed as ROW exclusion, which would prohibit new ROW development in those areas. Under Alternative F, infrastructure development and other ROWs would be directed to adjacent BLM-administered lands or to private lands. Alternative F would result in an overall reduction in new land use authorizations. New land use authorizations would be further reduced if ROW applicants were not able to find suitable alternative development locations outside ACECs. Any restrictions would be subject to valid existing rights. Refer to **Section 4.16**, Special Designations, for further analysis.

4.11.10 Proposed Plan

Impacts from Special Status Species—GRSG Management

The Proposed Plan would enable the BLM to accommodate future demand for ROW development while conserving and enhancing GRSG habitat, so long as the proposed development incorporates siting and design techniques to avoid impacts on GRSG or its habitat. The most notable impacts on the lands and realty program under the Proposed Plan would occur in PHMA. In addition to

managing PHMA as avoidance areas for major ROWs and exclusion for wind and solar ROWs (with exceptions; see *Wind and Solar* below), the Proposed Plan would require land use authorizations to adhere to the following:

- Comply with GRSG screening criteria
- Incorporate RDFs
- Avoid tall structures within key GRSG habitat areas
- Meet noise requirements
- Abide by lek buffer requirements
- Avoid disturbing more than 3 percent of any Oregon PAC (also known as BSU) and proposed project area

GRSG conservation management actions would increase mitigation requirements for land use authorizations, would result in more complex project designs, could exclude infrastructure placement in the most cost-effective locations, and would result in overall greater development costs. A corresponding effect could be a reduction in the number of authorization applications received for activities in PHMA (and GHMA for major ROWs) and longer, more complicated review periods for those that are proposed in PHMA. Implementing the GRSG habitat conservation management actions listed above would also place NSO stipulations on fluid mineral development in PHMA, which would further reduce the demand for new ROW development in those areas.

Less restrictive management for new minor ROWs in GHMA and all other ROW types outside GRSG habitat would allow for more ROW development, leases, and permits in those areas, compared with PHMA. However, because the Proposed Plan would still require discretionary surface-disturbing land use actions to abide by the GRSG screening criteria and would incorporate RDFs, proposed applications would incur added costs and longer, more complex project review periods. Some applicants could seek less restrictive locations outside GRSG habitat if they were not able to cost effectively meet the screening criteria requirements.

Impacts from Lands and Realty Management

Land Use Authorizations

Exclusion areas for major and minor ROWs in PHMA and GHMA under the Proposed Plan would be the same as under Alternative A. PHMA would be managed as ROW avoidance for major ROW types as long as new disturbance falls under the 3 percent disturbance cap or as a result of mitigation results in the net conservation gain of GRSG habitat. Examples of mitigation are burying an electrical transmission line or revegetating a decommissioned roadway. While burying an electrical transmission line creates short-term surface

disturbance, the long-term direct effects (e.g., surface disturbance) and indirect effects (e.g., vehicle use on adjacent roads for maintenance) of a buried line on GRSG habitat and populations are less compared with impacts from an overhead line.

The Proposed Plan would directly impact the lands and realty program by reducing the BLM's ability to authorize new ROWs in PHMA that would not be able to meet specified screening criteria (e.g., net conservation gain and RDF requirements). Within avoidance areas, additional stipulations for the development of electrical transmission lines could result in the denial of projects that cannot meet ROW grant requirements to protect GRSG habitat. Limitations on electrical transmission line development and new roadways under the Proposed Plan would be similar to Alternative C and would be consistent with **Section 4.11.2**.

The Boardman to Hemmingway transmission line project is not subject to the Proposed Plan decision to designate PHMA and GHMA as an avoidance area for high voltage transmission lines.

The Obama Administration identified this transmission project as a priority project, as part of the President's commitment to job creation and modernizing America's Infrastructure. This transmission project was one of seven projects identified for expedited permit review and federal agency coordination among an interagency Rapid Response Team for Transmission (RRTT) established to foster coordination, expedite simultaneous permitting processes and resolve permitting challenges, while ensuring appropriate environmental reviews.

The BLM is currently processing the application for the Boardman to Hemmingway transmission line project, a high-voltage transmission line, which includes alternatives through this avoidance area and GRSG habitat. The BLM is analyzing conservation measures for GRSG as part of the review process for the Boardman to Hemmingway transmission line project.

The Boardman to Hemmingway transmission line project is analyzed in detail in the cumulative impacts section of this plan.

While the Proposed Plan would impact the communication facilities if GRSG conservation measures were not met, impacts on communication services would result only when a ROW applicant could not find another suitable location or could not meet the stipulations in the avoidance areas, or the stipulations in avoidance areas would diminish the effectiveness of the communication infrastructure to the point where the development would not be practical.

Wind and Solar

BLM management of SFA and PHMA outside of SFA as exclusion areas for wind and solar, with the exception of Lake, Harney, and Malheur Counties, would

prevent the development of new utility-scale wind and solar energy generation facilities in those areas. Within the avoidance areas of Lake, Harney, and Malheur Counties, the Proposed Plan establishes a hierarchy to development opportunities, beginning with nonhabitat as the first preference, followed by poor quality GRSG habitat before considering high quality GRSG habitat.

Due to low solar energy potential in the planning area, there would be negligible to no impacts on solar energy development. Because wind resources in the planning area are sufficient to support utility-scale wind energy development, excluding wind energy ROWs would prevent the BLM from accommodating future demand in exclusion areas. However, allowing future development in Lake, Herney, and Malheur Counties would accommodate future demand since these areas contain the most developable wind resources in the state. Allowing wind energy development in these counties would also increase the BLM's ability to meet President Obama's energy goal of 10 gigawatts of new renewable energy permitted on DOI lands by 2020 (The White House 2013).

Demand for new transmission lines, access roads, and related ancillary features to serve new wind generation projects in Lake, Harney, and Malheur Counties, GHMA, and in nonhabitat or private lands could result in new ROW applications in PHMA. Where transmission lines, access roads, and related ancillary features would cross PHMA, management of those areas as ROW avoidance areas could deter or prevent wind energy development on lands with comparatively fewer restrictions.

Land Tenure

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, as described in *Nature and Type of Effects*. 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.

Withdrawals

Under the Proposed Plan, SFA would be proposed for withdrawal for locatable minerals. Recommending SFA for mineral withdrawal would decrease the overall long-term demand for ROWs to support mineral development. The recommended withdrawal would be for locatable minerals only. The BLM would maintain primary management.

Impacts from Travel Management

Impacts from travel and transportation management under the Proposed Plan are the same as those under Alternative B. Refer to **Section 4.10**, *Travel Management*, for further analysis.

Impacts from Special Designations Management
Management and associated impacts would be the same as Alternative A.

4.12 FLUID LEASABLE MINERALS

4.12.1 Methods and Assumptions

Indicators
Indicators of impacts on fluid leasable minerals are as follows:

- The amount of unleased land identified as closed to fluid mineral exploration and development
- The amount of land open to leasing subject to NSO stipulations
- The amount of land open to leasing subject to CSU or TL stipulations
- Application of COAs on fluid mineral development on leased parcels for the protection of GRSG
- Restrictions on geophysical exploration in GRSG habitat
- The amount of land managed as ROW avoidance areas
- The amount of land managed as ROW exclusion areas

Assumptions
The analysis includes the following assumptions:

- Existing fluid mineral leases would not be affected by the closures proposed under this RMPA.
- Fluid mineral operations on existing federal leases, regardless of surface ownership, would be subject to COAs by the BLM Authorized Officer. The BLM can deny surface occupancy on portions of leases with COAs to avoid or minimize resource conflicts if this action does not eliminate reasonable opportunities to develop the lease or does not affect lease rights.
- Existing leases would be managed under the stipulations in effect when the leases were issued; new stipulations proposed under this RMPA would apply only to new leases. (See the glossary for definitions of stipulations versus COAs.)
- New information may lead to changes in delineated GRSG habitat. New habitat areas, or areas that are no longer habitat, may be identified. This adjustment would typically result in small changes to areas requiring the stipulations or management actions stated in this plan. Existing leases in these areas would not be subject to the new stipulations but could be subject to RDFs. Modifications to GRSG habitat would be updated in the data inventory through plan

maintenance. In areas that are no longer habitat, the waiver/exception/modification process would be used to remove stipulations or management actions that were no longer needed.

- If an area is leased, it could be developed; however, not all leases would be developed within the life of this RMPA.
- As the demand for energy increases, so will the demand for extracting energy resources in areas with potential.
- Technological advancements, such as directional drilling, could lead to changes in levels of fluid mineral development potential throughout the planning area, as additional resources become more easily accessible.
- Stipulations also apply to fluid mineral leasing on all surface lands with federal mineral estate. This includes federal mineral estate with BLM-administered surface lands and other surface lands not administered by the BLM. There are 14,148,100 acres of federal mineral estate within the decision area (12,046,100 acres of BLM-administered surface with federal minerals and 2,102,000 acres of private, state, or other federal surface with federal minerals).
- Oregon is considered a "pioneering" area for oil and gas resources. This means that development is not likely to occur in the planning area until the market for these resources changes. No wells have currently been developed in the planning area, and the current decline in oil and gas leases in Oregon is expected to continue in the near future.
- The 2008 Programmatic EIS for Geothermal Leasing in the Western United States estimated that Oregon could have 1,090 megawatts of geothermal development by 2025.
- Geothermal resource exploration and development in Oregon will continue to rise, particularly with the introduction of new technologies, such as engineered and enhanced geothermal systems.

4.12.2 Nature and Type of Effects

The following analysis describes the nature and type of impacts that could affect fluid minerals in the Oregon planning area. Details on how the occurrence of each impact would vary by alternative are described under the various subheadings.

Closing unleased areas within GRSG habitat to fluid mineral leasing would directly impact the fluid minerals program by removing the possibility of fluid mineral resources in that area to be accessed and extracted or used. Fluid mineral operations may move to nearby private lands if similar geologic conditions exist, thereby reducing the number of operations on federal mineral estate. Existing leases within areas closed to leasing would remain valid through

their term but could not be renewed, unless they were developed. Once these leases expire, the fluid minerals covered by them could not be developed.

Existing oil and gas leases in the Oregon planning area are likely to expire before being developed. However, oil and gas resources in the planning area are unlikely to be developed even in areas open to fluid mineral development. This is due to the lack of anticipated future demand for oil and gas resources in the planning area in the near future.

Unlike oil and gas trends, interest in geothermal resources in the decision area has increased in recent years. Geothermal exploration for commercial production is expected on lands within the planning area over the next 10 to 15 years. Therefore, existing geothermal leases are more likely to be developed within their lease terms than existing oil and gas leases. Additionally, closures or stipulations in unleased areas would have a greater impact on geothermal development than on oil and gas or other fluid mineral development. See **Section 3.12** for more information on fluid mineral trends in the planning area.

Management actions that prohibit or restrict surface occupancy or disturbance overlying federal fluid mineral resources would also directly impact the development of those resources by restricting the availability of mineral resources to be developed or extracted. Examples of these management actions are TLs, NSO and CSU stipulations, and limitations on the total amount of surface disturbance in areas (such as the 3 percent disturbance cap). Surface-disturbing activities could be shifted, additional protective measures would be required, and extraction delays could occur.

Applying the disturbance caps would directly impact fluid minerals by limiting the amount of disturbance from various activities, including fluid mineral development. If total disturbance in GRSG habitat reached the disturbance cap, no additional disturbance from fluid mineral activities could occur. Because fluid mineral exploration and development involves surface disturbance, new exploration and development would essentially be shut down once the disturbance cap was reached.

In areas where NSO stipulations are applied, federal fluid minerals could be leased; however, the leaseholder/operator would have to use off-site methods, such as directional drilling, to access the mineral resource. The area where directional drilling could be effectively used is limited. This means that some minerals would be inaccessible in areas where an NSO stipulation covers a large area or where no leasing is allowed on surrounding lands. Because the Oregon planning area is a pioneering area, where precise locations of fluid mineral resources are unknown, wildcat wells are necessary to identify resource areas. Therefore, applying an NSO stipulation to GRSG habitat in the planning area would effectively preclude development of fluid mineral resources in that habitat.

Applying CSU stipulations allows some use and occupancy of the surface. While less restrictive than an NSO stipulation, a CSU stipulation allows the BLM the following actions:

- To require special operational constraints
- To shift the surface-disturbing activity associated with fluid mineral leasing more than the standard 200 meters (656 feet)
- To require additional protective measures (e.g., restrictions on noise levels) to protect GRSG

For example, a CSU stipulation might apply limitations on noise levels during certain times of day. While not prohibiting surface-disturbing activities, a CSU stipulation can influence the location and level of operations within the subject area.

TL stipulations may be necessary to protect GRSG from impacts of development. These stipulations are necessary if impacts cannot be mitigated within the standard 60-day suspension of operation period afforded by regulation. Areas where TL stipulations are applied would be temporarily closed to fluid mineral exploration and development, surface-disturbing activities, and intensive human activity during identified time frames based on seasons or GRSG breeding times. Some operations would be allowed at all times (e.g., vehicle travel and maintenance); however, construction, drilling, completions, and other operations considered to be intensive would not be allowed during the restricted time frame. Most activities, however, could be initiated and completed outside of the restricted dates specified in the TL stipulation.

Applying COAs to existing leases would directly impact fluid mineral operations. This includes RDFs and conservation measures outlined in **Chapter 2**. These RDFs and conservation measures also include such standards as noise restrictions, height limitations on structures, design requirements, water development standards, and remote monitoring requirements. Additional site-specific planning (i.e., master development plans and unitization) may also be included.

Applying all of these requirements through COAs would impact fluid mineral operations by restricting the development or extraction of mineral resources. To avoid these restrictions, operators may relocate to nearby state or private lands (where resources, geology, and topography permit), thereby decreasing the number of oil, gas, and geothermal operations on federal mineral estate.

Placing limits on geophysical exploration would reduce the availability of data on fluid mineral resources on federal mineral estate. Because there is little existing data on fluid mineral resources in the decision area, the development potential for oil, gas, and geothermal resources in areas where geophysical exploration

was limited could remain unknown. Timing limitations on geophysical exploration could also lead to extraction and utilization delays.

Buying out or cancelling leases in GRSG habitat would prevent future development of existing fluid mineral leases. However, in accordance with 43 CFR, Part 3108.3, leases may only be cancelled by the Secretary of the Interior when (1) the lessee has a nonproducing well and fails to comply with the provisions of the law, regulations, or lease; or (2) the lease was improperly issued. Cancellation of a lease with a producing well requires a judicial proceeding.

Management actions creating ROW exclusion or avoidance areas would indirectly impact fluid mineral extraction by limiting the available means for transporting fluid minerals to processing facilities and markets, for oil and gas, or for transmitting produced geothermal-sourced electricity to the power grid. For example, new natural gas pipelines could not be built in a ROW exclusion area. Oil, gas, and geothermal operations may be moved to nearby private lands where transport and transmission is easier, thereby reducing the number of operations on federal mineral estate. Because ROW avoidance areas would allow for limited ROW development, impacts of avoidance areas would be less severe than those of ROW exclusion areas. Impacts would be mitigated where exceptions were allowed for collocation of new ROWs within existing ROWs to satisfy valid existing rights. Existing leases in areas managed as ROW avoidance or exclusion would also be impacted, as described above.

Closing areas to mineral material disposal would indirectly impact fluid minerals in the areas by reducing the amount of readily available material for road and pipeline construction. This would limit the available means for accessing fluid mineral resources and transporting those resources to processing facilities and markets.

Implementing management for the following resources to protect GRSG would have negligible or no impact on mineral resources under all alternatives; therefore, they not discussed in detail:

- Vegetation
- Wild horses and burros
- Wildland fire management
- Livestock grazing and range management
- Recreation
- Travel management
- Locatable minerals
- Nonenergy leasable minerals
- Special designations
- Special status plants

4.12.3 Impacts Common to All Alternatives

Impacts from Leasable Minerals Management

Under all alternatives, reclamation bonds would be required, pursuant to 43 CFR, Part 3104. The amount of the bond would need to be sufficient to ensure full restoration of lands to the condition in which they were found. In addition, applications for permits to drill, including drilling plans and surface use plans of operations, would be required under all alternatives, in accordance with 43 CFR, Part 3162.

4.12.4 Alternative A

Impacts from Lands and Realty Management

Under Alternative A, 857,600 acres (7 percent of BLM-administered surface in the decision area) would continue to be managed as ROW exclusion areas. Another 3,445,700 acres (27 percent of BLM-administered surface in the decision area) would continue to be managed as ROW avoidance areas. This management would continue to impact the fluid minerals program as described under **Section 4.12.2**, *Nature and Type of Effects*.

Impacts from Leasable Minerals Management

Under Alternative A, fluid mineral resources in the planning area would continue to be managed according to any closures, stipulations, or BMPs in the governing RMPs.

Table 4-39, Fluid Mineral Leasing Categories in the Decision Area, Alternative A, breaks down the acres within the decision area by whether they would be open or closed to leasing and what stipulations would be applied.

Table 4-39
Fluid Mineral Leasing Categories in the Decision Area, Alternative A

Leasing Category	Acres
Closed to Leasing	3,497,100
Leased	*0*
Unleased	*3,497,100*
Open Subject to NSO Stipulations	860,000
Leased	*10,600*
Unleased	*849,400*
Open Subject to CSU/TL Stipulations	4,281,900
Leased	*128,600*
Unleased	*4,153,300*
Open Subject to Standard Terms and Conditions	5,509,100
Leased	*81,000*
Unleased	*5,428,100*

Source: Oregon/Washington BLM 2015.

Under Alternative A, 3,497,100 acres (25 percent) of federal mineral estate within the decision area would remain closed to fluid mineral leasing. All of these acres are unleased. Impacts of closing these areas would be the same type as those described under **Section 4.12.2**. Actions applicable to unleased acres have a greater impact on the fluid minerals program than actions applicable to leased acres because existing leases would not be subject to new stipulations or closures unless the leases expired and were reissued. An additional 860,000 acres (6 percent) of federal mineral estate in the decision area would remain subject to NSO stipulations. Of the acres subject to NSO stipulations, 849,400 acres (99 percent) are unleased.

Geophysical exploration would continue to be allowed throughout the planning area under Alternative A. Existing leases would continue to be subject to any stipulations or COAs that applied at the time the lease was issued.

Impacts from Mineral Materials (Salables) Management

Approximately 10,536,500 acres (74 percent) of federal mineral estate within the decision area would remain open to mineral material disposal under Alternative A. Approximately 3,611,700 acres (26 percent) of federal mineral estate within the decision area would remain closed to mineral material disposal. Closing these areas to mineral material disposal would indirectly impact fluid minerals as described under **Section 4.12.2**.

4.12.5 Alternative B

Impacts from Lands and Realty Management

Under Alternative B, all BLM-administered surface in PHMA (totaling 4,547,000 acres, or approximately 36 percent of BLM-administered surface in the decision area) would be managed as ROW exclusion areas. However, because all PHMA would be closed to fluid mineral leasing under Alternative B, managing PHMA as ROW exclusion areas would have no impact on fluid minerals.

All BLM-administered surface in GHMA not already managed as ROW exclusion (totaling 5,662,600 acres, or 45 percent of BLM-administered surface in the decision area) would be managed as ROW avoidance under Alternative B. Fluid minerals beneath those acres would be impacted by the ROW avoidance area, as described under **Section 4.12.2**. Overall, more acres would be managed as ROW avoidance under Alternative B than under Alternative A; therefore, impacts on the fluid minerals program from these ROW avoidance areas would increase under Alternative B.

Impacts from Leasable Minerals Management

Under Alternative B, 7,317,500 acres (52 percent of the federal mineral estate decision area), including all federal mineral estate within PHMA would be closed to fluid mineral leasing. All acres closed would be unleased; therefore this management would close 52 percent of the 14,147,900 unleased acres in the decision area. Closure of these acres would directly impact the fluid minerals

program in the manner described under **Section 4.12.2**. Because twice as many unleased acres in the federal mineral estate decision area would be closed under Alternative B as under Alternative A, impacts would increase compared with Alternative A.

The 6,127,800 acres of federal mineral estate within GHMA (43 percent of the federal mineral estate decision area), as well as all federal mineral estate outside GRSG habitat in the planning area, would be subject to the same stipulations and management as those under Alternative A.

Table 4-40, Fluid Mineral Leasing Categories in the Decision Area, Alternatives B and E, breaks down the acres within the decision area by whether they would be open or closed to leasing and what stipulations would be applied.

Table 4-40
Fluid Mineral Leasing Categories in the Decision Area, Alternatives B and E

Leasing Category	Acres
Closed to Leasing	7,217,500
Leased	*0*
Unleased	*7,217,500*
Open Subject to NSO Stipulations	586,800
Leased	*20*
Unleased	*586,800*
Open Subject to CSU/TL Stipulations	2,498,300
Leased	*100*
Unleased	*2,498,200*
Open Subject to Standard Terms and Conditions	3,845,500
Leased	*100*
Unleased	*3,845,400*

Source: Oregon/Washington BLM 2013.

A disturbance cap would apply to all human activity in GRSG habitat, including fluid mineral activities. If the cap were reached, it would impact fluid minerals as described under *Nature and Type of Effects*, representing an increase in impacts on fluid minerals compared with Alternative A.

Geophysical exploration would be allowed on the 5,106,900 acres of federal mineral estate within PHMA but would be subject to TLs and other restrictions. Most notably, geophysical exploration within PHMA would be allowed only for gathering information about fluid mineral resources outside PHMA. Because of these limitations and the fact that PHMA would be closed to fluid mineral leasing, geophysical exploration in PHMA would decrease under this alternative. Decreases in geophysical exploration in PHMA would impact the fluid minerals program as described under **Section 4.12.2**.

Under Alternative B, conservation measures in addition to RDFs would be applied as COAs to the 5 existing federal leases in PHMA. These RDFs and conservation measures would include requirements such as surface disturbance limitations, TLs, noise restrictions, structure height limitations, design requirements, water development standards, remote monitoring requirements, and reclamation standards.

Impacts from Mineral Materials (Salables) Management

Under Alternative B, approximately 7,311,600 acres of federal mineral estate (52 percent of the federal mineral estate decision area), including all acres in PHMA would be closed to mineral material disposal. However, because all PHMA would be closed to fluid mineral leasing under this alternative, closing PHMA to mineral material disposal would not impact fluid minerals.

4.12.6 Alternative C

Impacts from Lands and Realty Management

Under Alternative C, 10,682,100 acres (85 percent of BLM-administered surface in the decision area), including all occupied habitat would be managed as ROW exclusion areas. However, because all occupied habitat would be closed to fluid mineral leasing under Alternative C, managing occupied habitat as ROW exclusion would have no impact on fluid minerals.

Impacts from Leasable Minerals Management

Under Alternative C, 11,699,400 acres (83 percent of the federal mineral estate decision area), including all federal mineral estate within occupied habitat would be closed to fluid mineral leasing. This closure would include 11,658,000 acres (82 percent) of unleased federal mineral estate in the decision area. Closing these acres would directly impact the fluid minerals program in the manner described under **Section 4.12.2**. Because three times as many unleased acres in the federal mineral estate decision area would be closed under Alternative C as under Alternative A, impacts would increase compared with Alternative A.

Table 4-41, Fluid Mineral Leasing Categories in the Decision Area, Alternatives C and F, breaks down the acres within the decision area by whether they would be open or closed to leasing and what stipulations would be applied.

Under Alternative C, geophysical exploration would be prohibited on the 11,234,800 acres of federal mineral estate within occupied habitat. This prohibition would impact fluid minerals, as described under **Section 4.12.2**. Because geophysical exploration would be unrestricted under Alternative A, impacts would increase under Alternative C.

Table 4-41
Fluid Mineral Leasing Categories in the Decision Area, Alternatives C and F

Leasing Category	Acres
Closed to Leasing	11,699,400
Leased	*41,400*
Unleased	*11,658,00*
Open Subject to NSO Stipulations	187,800
Leased	*10,500*
Unleased	*177,400*
Open Subject to CSU/TL Stipulations	791,000
Leased	*94,000*
Unleased	*697,000*
Open Subject to Standard Terms and Conditions	1,469,900
Leased	*74,400*
Unleased	*1,395,500*

Source: Oregon/Washington BLM 2013.

The 43 existing oil and gas leases in GRSG habitat would be subject to TLs with the types of impacts described under **Section 4.12.2**. Because these timing limitations would be more restrictive than the existing limitations applied under Alternative A, impacts would increase under Alternative C. In addition, these existing leases could be amended, canceled, bought out, or required to be relinquished. Impacts of these changes to existing leases would be the same type as those described under **Section 4.12.2**.

Impacts from Mineral Materials (Salables) Management

Under Alternative C, approximately 11,753,400 acres of federal mineral estate (83 percent of federal mineral estate in the decision area, including all occupied habitat) would be closed to mineral material disposal. However, because all occupied habitat would be closed to fluid mineral leasing under Alternative C, closing occupied habitat to mineral material disposal would not impact fluid minerals.

4.12.7 Alternative D

Impacts from Lands and Realty Management

Like Alternative A, under Alternative D 857,600 acres (7 percent) of BLM-administered surface in the decision area would be managed as ROW exclusion areas. A total of 5,964,800 acres (47 percent), including all PHMA not already managed as exclusion areas, would be managed as ROW avoidance areas. Where these exclusion or avoidance areas overlapped with areas open to fluid mineral leasing, impacts on the fluid minerals program would occur, as described under **Section 4.12.2**. Because 73 percent more acres would be managed as ROW avoidance under Alternative D compared with Alternative A, the magnitude of impacts would increase.

Impacts from Leasable Minerals Management

Under Alternative D, the BLM would apply a buffer system to manage fluid mineral development in GRSG habitat. Under this system, leks would be surrounded by buffers of varying sizes in which NSO stipulations would apply. In addition, CSU and TL stipulations would apply to all areas within occupied habitat that are outside a lek buffer. The CSU stipulations would include noise and tall structure limitations, a site-specific plan of development to limit habitat fragmentation and, in PHMA, a disturbance limit and 640-acre spacing requirements. The stipulations that would apply can be summarized as follows:

- Within PHMA, apply a 4-mile NSO buffer from active leks.
- Within PHMA, beyond 4 miles of active leks, apply CSU/TL stipulations.
- Within GHMA, apply a 1-mile NSO buffer from active leks.
- Within GHMA, beyond 1 mile of active leks, apply CSU/TL stipulations.
- Where the 4-mile lek buffer extends outside PHMA to GHMA, apply NSO stipulations for 1 mile and CSU stipulations beyond.

Application of these surface-disturbance restrictions, TLs, and other operating standards would limit the siting, design, and operations of fluid mineral development projects. This would impact the fluid minerals program in the manner described under **Section 4.12.2**. Because these restrictions and standards would be applied throughout occupied habitat under Alternative D, the magnitude of the impacts would increase, compared with Alternative A.

Table 4-42, Fluid Mineral Leasing Categories in the Decision Area, Alternative D, breaks down the acres within the decision area by whether they would be open or closed to leasing and what stipulations would be applied.

Acres closed under Alternative D would be the same as under Alternative A. However, 3,819,800 acres, or 27 percent of the federal mineral estate decision area would be subject to NSO stipulations. These stipulations would cover 3,808,200 acres (27 percent) of unleased federal mineral estate in the decision area. Applying NSO stipulations to these areas would directly impact the fluid minerals program in the manner described under **Section 4.12.2**. Because four times more unleased acres would be subject to NSO stipulations under Alternative D than under Alternative A, the magnitude of the impacts would increase under Alternative D.

Table 4-42
Fluid Mineral Leasing Categories in the Decision Area, Alternative D

Leasing Category	Acres
Closed to Leasing	3,497,100
Leased	*0*
Unleased	*3,497,100*
Open Subject to NSO Stipulations	3,819,800
Leased	*11,600*
Unleased	*3,808,200*
Open Subject to CSU/TL Stipulations	5,361,400
Leased	*134,200*
Unleased	*5,227,100*
Open Subject to Standard Terms and Conditions	1,469,900
Leased	*74,400*
Unleased	*1,395,500*

Source: Oregon/Washington BLM 2013.

Like under Alternative B, a 3 percent disturbance cap would apply to all human activity in GRSG habitat with the same impacts on fluid minerals.

Geophysical exploration would be allowed on the 11,234,800 acres of federal mineral estate within PHMA and GHMA, but it would be subject to TLs. The impact of these TLs would be the same type as that described under **Section 4.11.2**. Because no TLs would be applied to geophysical exploration under Alternative A, impacts of these limitations would increase under Alternative D.

In addition to RDFs, conservation measures would be applied as COAs to 5 existing leases overlying federal mineral estate in PHMA. These RDFs and conservation measures would include such requirements as surface disturbance limitations, TLs, noise restrictions, structure height limitations, design requirements, water development standards, remote monitoring requirements, and reclamation standards. The types of impacts from these COAs would be the same as those described under **Section 4.12.2**, although the impacts would occur only if operators were to develop these leases.

In addition to the requirements described above, the COAs would require or encourage unitization when necessary to minimize harm to GRSG. They also would call for completion of master plans for developing fluid mineral resources instead of processing individual applications for permit to drill. Requiring these plans would result in the impacts described under **Section 4.12.2**.

The BLM could not apply COAs that would eliminate reasonable opportunities to develop the lease. Therefore, although restrictions on development would increase where COAs were applied, fluid mineral development would still be allowed.

Impacts from Mineral Materials (Salable Minerals) Management

Like Alternative B, under Alternative D, the BLM would close all PHMA to mineral materials disposal. Fluid mineral development on the 720,500 acres within PHMA that would not be closed or subject to NSO stipulations (i.e., areas beyond 4 miles from leks) would be impacted as described under **Section 4.12.2**. Because more areas within PHMA where fluid mineral development might occur would be closed to mineral material disposal under Alternative D than under Alternative A, impacts on fluid minerals from closing these areas to mineral material disposal would increase under Alternative D.

4.12.8 Alternative E

Impacts from Lands and Realty Management

Similar to Alternative B, under Alternative E, all BLM-administered surface in Core Area habitat (totaling 4,547,000 acres, or approximately 36 percent of BLM-administered surface in the decision area) would be managed as ROW exclusion areas. However, because all Core Area habitat would be closed to fluid mineral leasing under Alternative E, managing Core Area habitat as ROW exclusion would have no impact on fluid minerals.

Management of BLM-administered surface in the decision area outside Core Area habitat would be the same as that under Alternative A, with the same impacts on fluid minerals.

Impacts from Leasable Minerals Management

Similar to Alternative B, under Alternative E, all Core Area habitat would be closed to fluid mineral leasing. Impacts would be the same as those under Alternative B.

Fluid mineral management of all federal mineral estate in the decision area outside Core Area habitat would be the same as that under Alternative A, with the same impacts. Management of geophysical exploration under Alternative E would also be the same as that under Alternative A, with the same impacts.

Impacts of fluid mineral management on existing fluid mineral leases in the planning area under Alternative E would be the same as those under Alternative A.

Impacts from Mineral Materials (Salables) Management

Like Alternative B, under Alternative E, all Core Area habitat would be closed to mineral material disposal. However, because all Core Area habitat would be closed to fluid mineral leasing under Alternative E, closing Core Area habitat to mineral material disposal would not impact fluid minerals.

4.12.9 Alternative F

Impacts from Lands and Realty Management

Management of ROW avoidance and exclusion areas would be the same as that under Alternative C. Like Alternative C, all occupied habitat would be closed to fluid mineral leasing under Alternative F. Therefore, ROW management would have no impacts on fluid minerals.

Impacts from Leasable Minerals Management

Like Alternative C, all occupied habitat would be closed to fluid mineral leasing under Alternative F. Impacts of this closure would be the same as those under Alternative C.

A 3 percent disturbance cap would apply to fire disturbance as well as all human activity in GRSG habitat, including fluid mineral activities. If the cap were reached, it would impact fluid minerals as described under *Nature and Type of Effects*, representing an increase in impacts on fluid minerals compared with Alternative A. Because fire would be included in the disturbance cap under Alternative F, the 3 percent cap is more likely to be reached, and fluid minerals are more likely to be impacted.

Geophysical exploration would be allowed on the 10,489,400 acres of federal mineral estate within occupied habitat but would be subject to TLs and other restrictions. Most notably, geophysical exploration within occupied habitat would be allowed only for gathering information about fluid mineral resources outside occupied habitat. Because of these limitations and the fact that occupied habitat would be closed to fluid mineral leasing, geophysical exploration in occupied habitat would decrease under this alternative. Decreases in geophysical exploration in occupied habitat would impact the fluid minerals program, as described under **Section 4.12.2**.

Under Alternative F, the 5 existing leases in PHMA would be subject to management similar to that under Alternative B. However, under Alternative F, TLs would prohibit human presence and surface-disturbing activities during the nesting and brood-rearing season. This management would be the most restrictive of all the alternatives.

Impacts from Mineral Materials (Salable Minerals) Management

Like Alternative B, under Alternative F, all PHMA would be closed to mineral material disposal. However, because all PHMA would be closed to fluid mineral leasing under Alternative E, closing PHMA to mineral material disposal would not impact fluid minerals.

4.12.10 Proposed Plan

Impacts from Lands and Realty Management

Under the Proposed Plan, all BLM-administered surface in PHMA (totaling 4,547,000 acres, or approximately 36 percent of BLM-administered surface in the decision area) would be managed as ROW avoidance areas for fluid mineral-related activities. However, because all PHMA would be subject to NSO stipulations on fluid mineral leases, no fluid mineral activities on future leases within these areas would require new ROWs. Therefore, managing PHMA as ROW avoidance areas would have no impact on fluid minerals.

All BLM-administered surface in GHMA (totaling 5,662,600 acres, or 45 percent of BLM-administered surface in the decision area) would be managed as ROW avoidance for high voltage transmission lines and major pipelines but open to other fluid mineral-related ROW location under the Proposed Plan. Fluid minerals beneath those acres would be impacted by the ROW avoidance area, as described under **Section 4.12.2**. Overall, more acres in GHMA would be managed as ROW avoidance under the Proposed Plan than under Alternative A; therefore, impacts on the fluid minerals program from these ROW avoidance areas would increase under the Proposed Plan.

Impacts from Leasable Minerals Management

Under the Proposed Plan, 4,333,700 acres (31 percent of the federal mineral estate decision area), including all federal mineral estate in PHMA, would be subject to NSO stipulations; 4,319,800 acres subject to NSO stipulations would be unleased, so this management would apply NSO stipulations to 31 percent of the 14,147,900 unleased acres in the decision area. Application of NSO stipulations to leases on these acres would directly impact the fluid minerals program in the manner described under **Section 4.12.2**. The lack of waivers and modifications combined with the limited exceptions for NSO stipulations under the Proposed Plan would further restrict oil and gas activities. Impacts would increase on the 1,205,900 acres in the SFA that would be subject to NSO stipulations with no waivers, exceptions, or modifications. Because five times as many unleased acres in the federal mineral estate decision area would be subject to NSO stipulations under the Proposed Plan as under Alternative A, impacts would increase, compared with Alternative A.

Approximately 4,847,400 acres of federal mineral estate would be subject to CSU and TL stipulations. This includes all federal mineral estate in GHMA not subject to other existing stipulations, or 34 percent of the federal mineral estate decision area; 4,715,500 of these acres (33 percent of the unleased acres in the federal mineral estate decision area) would be unleased. Application of CSU and TL stipulations to leases on these acres would directly impact the fluid minerals program in the manner described under **Section 4.12.2**. Because 14 percent more unleased acres in the federal mineral estate decision area would be

subject to CSU and TL stipulations under the Proposed Plan as under Alternative A, impacts would increase compared with Alternative A.

Table 4-43 breaks down the acres in the decision area into the categories of open or closed to leasing and what stipulations would be applied.

Table 4-43
Fluid Mineral Leasing Categories in the Decision Area, Proposed Plan

Leasing Category	Acres
Closed to leasing	3,497,100
Leased	*0*
Unleased	*3,497,100*
Open subject to NSO stipulations	4,333,700
Leased	*14,000*
Unleased	*4,319,800*
Open subject to CSU/TL stipulations	4,847,400
Leased	*131,800*
Unleased	*4,715,500*
Open subject to standard terms and conditions	1,469,900
Leased	*74,400*
Unleased	*1,395,500*

Source: Oregon/Washington BLM 2013

Under the Proposed Plan, the BLM would apply the same RDFs to the same acreage as under Alternative B. However, the only conservation measures applied would relate to master development plans and unitization. Impacts of these restrictions would be the same type as those described under **Section 4.12.2**.

Application of the 3 percent disturbance cap in PHMA and lek buffers in GHMA could impact both new and existing fluid mineral activities by preventing or restricting new surface development. New fluid mineral activities could be precluded if the cap were exceeded in an Oregon PAC (also known as BSU) and the proposed project area. New surface development on existing leases could be restricted if the cap were exceeded. However, the BLM would not apply the disturbance cap in a manner that would eliminate reasonable opportunities to develop an existing lease. Applying lek buffer distances when approving actions could also restrict development of infrastructure related to fluid mineral development.

Geophysical exploration would be allowed on the 11,234,800 acres of federal mineral estate within GRSG habitat but would be subject to seasonal restrictions. Because of these limitations, geophysical exploration in GRSG habitat would decrease under this alternative. Decreases in geophysical

exploration in GRSG habitat would impact the fluid minerals program, as described under **Section 4.12.2**.

Under the Proposed Plan, conservation measures in addition to RDFs would be applied as COAs to the five federal leases in PHMA. These RDFs and conservation measures would include such requirements as surface disturbance limitations, TLs, noise restrictions, structure height limitations, design requirements, water development standards, remote monitoring requirements, and reclamation standards.

Impacts from Mineral Materials (Salables) Management

Under the Proposed Plan, approximately 7,343,300 acres of federal mineral estate, including all federal mineral estate in PHMA (52 percent of the federal mineral estate decision area) would be closed to mineral material disposal (with exceptions for free use permits and expansions of existing pits). However, because all PHMA would be subject to NSO stipulations on fluid mineral leases, no fluid mineral activities on future leases within these areas would require materials for construction of new surface facilities. Therefore, managing PHMA as ROW avoidance areas would have no impact on fluid minerals.

4.13 LOCATABLE MINERALS

4.13.1 Methods and Assumptions

Analysis of impacts on locatable minerals from this RMPA focuses on the impacts of conservation measures to protect GRSG. These impacts may be direct or indirect. For example, a direct impact on locatable minerals would result from withdrawing an area from locatable mineral entry. Additional actions or conditions that would cause direct or indirect impacts on locatable minerals are described below.

Indicators

Indicators of impacts on locatable minerals are as follows:

- The amount of land withdrawn from locatable mineral entry
- The amount of land petitioned for withdrawal from locatable mineral entry
- The amount of land under claim and subject to buyout or validity exam
- Application of restrictions, such as required design features (RDFs) and conservation measures, that can be placed on locatable mineral development to prevent unnecessary or undue degradation of GRSG habitat, as the law allows

Assumptions

The analysis includes the following assumptions:

- New information may lead to changes in delineated GRSG habitat. New habitat areas, or areas that are no longer habitat, may be identified. This adjustment would typically result in small changes to areas requiring the stipulations or management actions stated in this plan. Specifically for locatable minerals, this would mean new habitat areas could be proposed for withdrawal through the withdrawal procedures, and areas that are no longer habitat could go through the withdrawal termination process. Modifications to GRSG habitat would be updated in the data inventory through plan maintenance. In areas that are no longer habitat, the recommended BMPs to protect GRSG would no longer apply.
- Management actions to withdraw areas from locatable mineral entry may also apply to locatable mineral activity on lands overlying federal mineral estate. This includes federal mineral estate underlying BLM-administered lands and lands not administered by the BLM. There are 14,148,100 acres of federal mineral estate within the decision area (12,046,100 acres of BLM-administered surface with federal minerals and 2,102,000 acres of private, state, or other federal surface with federal minerals).
- This analysis assumes that areas recommended for withdrawal would be withdrawn through a Public Land Order issued by the Secretary of the Interior or by Act of Congress.
- Increasing precious metals values are expected to increase interest in location, exploration, and development of locatable minerals claims in the planning area.

4.13.2 Nature and Type of Effects

Withdrawing an area to mining development removes the possibility of mineral resources not under a valid claim in that area from being accessed and extracted. This represents an impact on the potential discovery, development, and use of those resources by decreasing the availability of mineral resources on federal mineral estate.

Within areas withdrawn from locatable mineral entry, BLM will not approve a plan of operations or allow notice-level operations to proceed until a mineral examination report has been completed to determine whether the mining claim was valid before the withdrawal. If claims were found to be invalid, they could not be developed. These exams would also delay mineral extraction. Finally, developers may choose to relocate outside the decision area, where there are similar geology and available resources, including outside the continental United States, where there are fewer requirements.

A validity exam determines whether a valid existing right exists, which must be recognized even in a withdrawn area. In order to have a valid existing right, a claim holder must demonstrate that, as of the date of the withdrawal and at the date of the determination, the claim contained a discovery of a valuable mineral deposit and that the claim was used and occupied properly under the Mining Law of 1872, as amended.

Existing notices or plans of operations would also have to undergo a validity exam before acceptance (for notice) or approval (for plan of operations) of any material change to the operation.

Management actions creating ROW exclusion or avoidance areas would indirectly impact locatable mineral extraction by possibly limiting the available means and requiring additional mitigation actions for accessing mineral resources and transporting locatable minerals to processing facilities and markets.

Designating areas as special management areas, such as ACECs, would trigger requirement of a plan of operation (including NEPA analysis) for any surface-disturbing activities in those areas greater than casual use, regardless of the acreage involved, in accordance with 43 CFR, 3809. The requirement for plans of operations within a special management area would result in longer delays than would be expected if the operation were permitted under a mining notice. Additionally, mitigation measures could be required through the plans of operations, which would further restrict locatable mineral development activities. This would be true even when the Plan of Operation surface disturbance proposed is on fewer than 5 acres.

Implementing management for the following resources to protect GRSG would have negligible or no impact on locatable minerals under all alternatives; therefore, they are not discussed in detail:

- Vegetation
- Wild horses and burros
- Wildland fire management
- Livestock grazing and range management
- Recreation
- Travel management
- Coal
- Leasable minerals
- Mineral materials (salables)
- Nonenergy leasable minerals
- Air quality and climate change
- Special status plants

4.13.3 Impacts Common to All Alternatives

Impacts from Locatable Minerals Management

Under all alternatives, approximately 996,800 acres (7 percent) of the total federal mineral estate for locatable minerals would remain withdrawn from locating mining claims; new exploration and mining would be precluded. **Table 4-44**, Quantitative Impacts on Locatable Minerals, illustrates the change in acres open to locatable mineral entry and to be petitioned for withdrawal from locatable mineral entry across the alternatives.

The management actions being considered in this RMPA could affect both existing and future mining claims. Developers would continue to submit a notice to the BLM for exploration and development on mining claims with a cumulative surface disturbance of 5 or fewer acres. Additionally, they would continue to submit a plan of operations for exploration and development for areas of greater than 5 acres, commercial development, or for any development (regardless of size) within special management areas, as outlined in 43 CFR, Part 3809.

4.13.4 Alternative A

Impacts from Lands and Realty Management

Under Alternative A, 857,600 acres (7 percent of BLM-administered surface in the decision area) would continue to be managed as ROW exclusion areas. Another 3,445,700 acres (27 percent of BLM-administered surface in the decision area) would continue to be managed as ROW avoidance areas. This management would continue to impact the locatable minerals program as described under **Section 4.13.2**, *Nature and Type of Effects*.

Impacts from Locatable Minerals Management

Under Alternative A, 24,400 acres (less than one percent) of federal mineral estate in the decision area would continue to be petitioned for withdrawal from locatable mineral entry. This would be in addition to the 1,435,900 acres currently withdrawn (see **Section 4.13.3**, Impacts Common to All Alternatives). If the Secretary of the Interior were to issue a Public Land Order to formally withdraw these lands, subject to valid existing rights, new mining claims would be forbidden, under the Mining Law of 1872. Mining would be allowed on existing, valid mining claims. Impacts on existing and future mining claims are similar to those described under **Section 4.13.2**, *Nature and Type of Effects*.

There are 547 locatable mining claims in occupied habitat, 13 plans of operations, and 49 notices in occupied habitat. One plan of operation is in an area petitioned for withdrawal.

No additional BMPs to protect GRSG are identified under Alternative A.

Table 4-44
Quantitative Impacts on Locatable Minerals

Locatable Minerals	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Total federal mineral estate for locatable minerals	14,720,100	14,720,100	14,720,100	14,720,100	14,720,100	14,720,100	14,720,100
Total acreage withdrawn from locatable mineral entry	1,435,900	1,435,900	1,435,900	1,435,900	1,435,900	1,435,900	1,435,900
Total acreage petitioned for withdrawal from locatable mineral entry	24,400	4,612,200	9,987,900	24,400	4,612,200	4,612,200	1,835,800
Increase from Alternative A	N/A	4,587,800	9,963,500	0	4,587,800	4,587,800	1,815,300
Total acreage open to locatable mineral exploration or development	12,687,900	8,124,600	2,724,500	12,687,900	8,124,600	8,124,600	10,876,600

Source: Oregon/Washington BLM 2013

Impacts from Special Designations Management

Under Alternative A, 715,049 acres of BLM-administered surface within the decision area would continue to be designated ACECs. A plan of operation would be required for locatable mineral operations within these ACECs, with the type of impacts described under **Section 4.13.2**.

4.13.5 Alternative B

Impacts from Lands and Realty Management

Under Alternative B, all BLM-administered surface in PHMA (totaling 4,547,000 acres, or approximately 36 percent of BLM-administered surface in the decision area) would be managed as ROW exclusion areas. However, because all PHMA would be recommended for withdrawal from locatable mineral entry under Alternative B, managing PHMA as ROW exclusion areas would have no impact on locatable minerals.

Impacts from Locatable Minerals Management

Under Alternative B, 4,612,200 acres of federal mineral estate in the decision area (including all PHMA) would be recommended for withdrawal from locatable mineral entry under the Mining Law of 1872. Combined with the additional 1,435,900 acres previously withdrawn (see **Section 4.13.3**), the availability of locatable minerals would be limited on 6,048,100 acres. This represents 43 percent of the federal mineral estate decision area, or four times the acreage under Alternative A. The types of impacts would be the same as those described under **Section 4.13.2**.

Under this alternative, 276 claims, 5 plans of operations, and 27 notices would be within PHMA. As such, all would be within the area to be petitioned for withdrawal. This represents 45 percent of the 609 claims, plans, and notices within occupied habitat. The types of impacts on these claims, plans of operations, and notices would be the same as those described under **Section 4.13.2**. Because the number of claims, plans, and notices within areas recommended for withdrawal would increase, impacts of validity exam requirements would increase under Alternative B.

Operators' ability to access and extract locatable minerals on federal mineral estate would not be impacted by applying RDFs (to the extent consistent w/ applicable law) listed in **Appendix C**. However, mining operations and practices could be affected if an operator were to agree to apply any of the RDFs on a project-specific basis. Mitigation measures and other mandatory restrictions subject to applicable laws and regulations, such as the 1872 Mining Law, as amended, could be applied through a separate NEPA process for a specific plan of operations.

Impacts from Special Designations Management

Like Alternative A, under Alternative B, 715,049 acres of BLM-administered surface within the decision area would be designated ACECs. A plan of

operation would be required for locatable mineral operations within these ACECs, with the type of impacts described under **Section 4.13.2**. However, if all PHMA were withdrawn as recommended under Alternative B, no new locatable mineral operations would be allowed in these areas; therefore, ACEC designation in PHMA would not impact locatable minerals.

4.13.6 Alternative C

Impacts from Lands and Realty Management

Under Alternative C, 10,682,100 acres (85 percent of BLM-administered surface in the decision area), including all occupied habitat would be managed as ROW exclusion areas. However, because all occupied habitat would be recommended for withdrawal from locatable mineral entry under Alternative C, managing occupied habitat as ROW exclusion would have no impact on locatable minerals.

Impacts from Locatable Minerals Management

Under Alternative C, areas within GRSG habitat would be petitioned for withdrawal in a manner similar to that under Alternative B; however, a larger number of acres would be petitioned for withdrawal under Alternative C. Under this Alternative, 9,987,900 acres would be petitioned for withdrawal. Combined with the additional 1,435,900 acres previously withdrawn (see **Section 4.13.3**), the availability of locatable minerals would be limited on 11,423,800 acres. This represents 81 percent of the federal mineral estate decision area, or eight times the acreage under Alternative A. The types of impacts would be the same as those described under **Section 4.13.2**.

Under this alternative, all of the 547 claims, 13 plans of operations, and 49 notices within occupied habitat would be within the area to be petitioned for withdrawal. The types of impacts on these claims, plans of operations, and notices would be the same as those described under **Section 4.13.2**. Because the number of claims, plans, and notices within areas recommended for withdrawal would increase, impacts of validity exam requirements would increase under Alternative C.

Impacts from Special Designations Management

Under Alternative C, 4,348,399 acres of BLM-administered surface within the decision area (all within PHMA) would be designated as new ACECs, in addition to the 200,399 acres of PHMA in existing ACECs. A plan of operation would be required for locatable mineral operations within these ACECs, with the type of impacts described under **Section 4.13.2**. However, if all occupied habitat were withdrawn as recommended under Alternative C, new locatable mineral operations would only be allowed on valid existing mining claims after a determination is made by BLM; therefore, ACEC designation in PHMA would not impact locatable minerals.

4.13.7 Alternative D

Impacts from Lands and Realty Management

Like Alternative A, under Alternative D 857,600 acres (7 percent) of BLM-administered surface in the decision area would be managed as ROW exclusion areas. A total of 5,964,800 acres (47 percent), including all PHMA not already managed as exclusion areas, would be managed as ROW avoidance areas. Where these exclusion or avoidance areas overlapped with areas open to locatable mineral entry, impacts on the locatable minerals program would occur, as described under **Section 4.13.2**. Because 73 percent more acres would be managed as ROW avoidance under Alternative D compared with Alternative A, the magnitude of impacts would increase.

Impacts from Locatable Minerals Management

Locatable mineral management under Alternative D would be similar to that under Alternative A. The exception is that the new and existing claims, operations, and notices in PHMA would be requested to change mining operations and practices to limit surface disturbance to 3 percent of PHMA and to mitigate impacts on GRSG. Because these actions would not be mandatory, operators' ability to access and extract locatable minerals on federal mineral estate would not be impacted. Mitigation measures and other mandatory restrictions could be applied through a separate NEPA process for a specific plan of operations.

Impacts from Special Designations Management

Special designation management under Alternative D would be the same as that under Alternative A, with the same impacts.

4.13.8 Alternative E

Impacts from Lands and Realty Management

Similar to Alternative B, under Alternative E, all BLM-administered surface in Core Area habitat (totaling 4,547,000 acres, or approximately 36 percent of BLM-administered surface in the decision area) would be managed as ROW exclusion areas. However, because all Core Area habitat would be petitioned for withdrawal from locatable mineral entry under Alternative E, managing Core Area habitat as ROW exclusion would have no impact on locatable minerals.

Management of BLM-administered surface in the decision area outside Core Area habitat would be the same as that under Alternative A, with the same impacts on locatable minerals.

Impacts from Locatable Minerals Management

Similar to Alternative B, 4,612,200 acres of federal mineral estate in the decision area (including all Core Area habitat) would be petitioned for withdrawal from locatable mineral entry under Alternative E. This petitioning for withdrawal

would impact locatable minerals, as described under Alternative B and under **Section 4.13.2**.

No additional BMPs to protect GRSG are identified under this alternative.

Impacts from Special Designations Management

Like Alternative A, under Alternative D, 715,049 acres of BLM-administered surface within the decision area would be designated ACECs. A plan of operation would be required for locatable mineral operations within these ACECs, with the type of impacts described under **Section 4.13.2**. However, if all Core Area habitat were withdrawn as recommended under Alternative B, no new locatable mineral operations would be allowed in these areas; therefore, ACEC designation in Core Area habitat would not impact locatable minerals.

4.13.9 Alternative F

Impacts from Lands and Realty Management

Like Alternative C, under Alternative F, all occupied habitat would be managed as ROW exclusion areas. However, under Alternative F, PHMA would be recommended for withdrawal from locatable mineral entry; therefore, management of PHMA as ROW exclusion areas would have no impact on locatable minerals.

Locatable mineral operations outside PHMA would be impacted as described under **Section 4.13.2**. Because more areas would be managed as ROW exclusion areas under Alternative F, impacts would increase compared with Alternative A.

Impacts from Locatable Minerals Management

Locatable mineral management under Alternative F would be the same as that under Alternative B, with the same impacts.

Impacts from Special Designations Management

Under Alternative C, 4,040,200 acres of BLM-administered surface within the decision area would be designated ACECs in addition to the existing ACECs. A plan of operation would be required for locatable mineral operations within these ACECs, with the type of impacts described under **Section 4.13.2**. However, if all PHMA were withdrawn as recommended under Alternative F, no new locatable mineral operations would be allowed in these areas.

4.13.10 Proposed Plan

Impacts from Lands and Realty Management

Under the Proposed Plan, all BLM-administered surface in PHMA (totaling 4,547,000 acres, or approximately 36 percent of BLM-administered surface in the decision area) would be managed as ROW avoidance areas. Where these avoidance areas overlapped with areas open to locatable mineral entry, impacts

on the locatable minerals program would occur, as described under **Section 4.13.2**.

All BLM-administered surface in GHMA (totaling 5,662,600 acres, or 45 percent of BLM-administered surface in the decision area) would be managed as ROW avoidance for high voltage transmission lines and major pipelines but open to minor ROWs under the Proposed Plan. Impacts on the locatable minerals program could be impacted by the ROW avoidance area, as described under **Section 4.13.2**. Overall, more acres in GHMA would be managed as ROW avoidance under the Proposed Plan than under Alternative A; therefore, impacts on the locatable minerals program from these ROW avoidance areas could increase under the Proposed Plan.

Impacts from Locatable Minerals Management

Under the Proposed Plan, 1,835,800 acres of federal mineral estate in the decision area, specifically land designated as SFA, would be recommended for withdrawal from locatable mineral entry under the Mining Law of 1872. Combined with the additional 1,435,900 acres previously withdrawn (see **Section 4.13.3**), the availability of locatable minerals would be limited on 3,271,700 acres. This represents 23 percent of the federal mineral estate decision area, or twice the acreage under Alternative A. The types of impacts would be the same as those described under **Section 4.13.2**.

Under this alternative, 117 claims, 1 plan of operation, and 9 notices would be in the SFA. As such, all would be in the area to be recommended for withdrawal. This represents 21 percent of the 609 claims, plans, and notices in occupied GRSG habitat. The types of impacts on these claims, plans of operation, and notices would be the same as those described under **Section 4.13.2**.

Operators' ability to access and extract locatable minerals on federal mineral estate would not be impacted by applying RDFs (to the extent consistent w/ applicable law) listed in **Appendix C**. However, mining operations and practices could be affected if an operator were to agree to apply any of the RDFs on a project-specific basis. Mitigation measures and other mandatory restrictions could be applied through a separate NEPA process for a specific plan of operations.

Impacts from Special Designations Management

Like Alternative A, under the Proposed Plan, 715,049 acres of BLM-administered surface in the decision area would be designated as ACECs. A plan of operation would be required for locatable mineral operations in these ACECs, with the type of impacts described under **Section 4.13.2**.

4.14 MINERAL MATERIALS (SALABLE MINERALS)

4.14.1 Methods and Assumptions

Indicators

Indicators of impacts on mineral resources are as follows:

- The amount of land closed to (salable) mineral material disposal
- The amount of land managed as ROW avoidance areas
- The amount of land managed as ROW exclusion areas

Assumptions

The analysis includes the following assumptions:

- New information may lead to changes in delineated GRSG habitat. New habitat areas or areas that are no longer habitat may be identified. This adjustment would typically result in small changes to areas requiring the restrictions or management actions stated in this plan. Modifications to GRSG habitat would be updated in the data inventory through plan maintenance.
- Management actions may also apply to mineral material development on all surface lands with federal mineral estate, which includes federal mineral estate with BLM-administered surface lands and other surface lands not administered by the BLM. There are 14,148,100 acres of federal mineral estate within the decision area (12,046,100 acres of BLM-administered surface with federal minerals and 2,102,000 acres of private, state, or other federal surface with federal minerals).
- It is assumed that areas designated as ACECs under this RMPA would be subject to management plans that would match the actions analyzed in this RMPA for the protection of GRSG.
- As the current recession ends, construction activity is expected to increase and economic conditions to improve, increasing the demand for construction materials, including gravel from areas within the Sage-Grouse planning area. Federal, state, and local governments, along with non-profits and private construction firms, may increasingly look to BLM-administered lands for aggregate sources during the life of this plan. Demand for aggregate sources within the planning area may also increase to support renewable energy development due to promotion of this development in federal policies.

4.14.2 Nature and Type of Effects

The predominant mining methods for mineral materials in the planning area are surface mining of building stone and engineering materials, such as aggregate; therefore, any restrictions on surface-disturbing activities effectively close the subject areas to mineral material mining.

Closing areas to mineral material disposal would directly impact mineral materials by removing the possibility of mineral resources in that area from being accessed and extracted. Where areas are closed, new pits would relocate to nearby open areas if feasible. If demand for mineral materials could not be met by pits operated on federal lands, pits could be moved onto private or state lands where resources exist. If no mineral materials were to occur near closed areas, developers would have to transport them to construction sites from farther away. This would alter the location of mineral materials development. Closing existing mineral materials pits would exacerbate these impacts by causing more immediate relocation or reduction in mineral materials production.

Applying the 3 percent disturbance cap would directly impact mineral materials by limiting the amount of disturbance from various activities, including mineral material development. If total disturbance in GRSG habitat reached 3 percent, no additional disturbance from mineral material activities would be permitted. Because mineral material development involves surface disturbance, new development would essentially be shut down once the 3 percent cap was reached.

Managing areas as ROW avoidance or exclusion would decrease new construction (e.g., roads) and thereby decrease demand for mineral materials in those areas. This, in turn, could decrease the number of mineral material pits on federal mineral estate. In addition, new mineral material pits may not be able to be developed in areas managed as ROW avoidance or exclusion because new roads to these pits could not be constructed in exclusion areas and would be difficult to construct in avoidance areas.

Implementing management for the following resources to protect GRSG would have negligible or no impact on mineral resources for all alternatives; therefore, these resources are not discussed in detail:

- Vegetation
- Wild horses and burros
- Wildland fire management
- Livestock grazing and range management
- Recreation
- Travel management
- Coal
- Leasable minerals
- Locatable minerals

- Nonenergy leasable minerals
- Special designations
- Air quality and climate change
- Special status plants

4.14.3 Alternative A

Impacts from Lands and Realty Management

Under Alternative A, construction of new roads would likely decrease on the BLM-administered surface in the decision area that would continue to be managed as ROW avoidance or exclusion under this alternative (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). Impacts of this management would be the same type as those described under **Section 4.14.2**, *Nature and Type of Effects*. Impacts from this decrease in demand would be mitigated where new ROWs could be collocated within existing ROWs to satisfy valid existing rights.

Impacts from Mineral Materials (Salables) Management

Under Alternative A, mineral materials in the planning area would continue to be managed according to the allocations in the governing RMPs. A total of 3,611,700 acres (26 percent) of federal mineral estate in the decision area would continue to be closed to mineral material disposal. Impacts of these closures would be the same type as those described under **Section 4.14.2**. The remainder of the decision area (10,536,400 acres, or 74 percent) would remain open to mineral material disposal.

4.14.4 Alternative B

Impacts from Lands and Realty Management

Under Alternative B, all BLM-administered surface in PHMA would be managed as ROW exclusion areas (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, because all PHMA would be closed to mineral materials disposal under Alternative B, managing PHMA as ROW exclusion would have no impact on mineral materials.

All BLM-administered surface in GHMA would be managed as ROW avoidance under Alternative B. Mineral materials beneath those acres of BLM-administered surface in GHMA would be impacted by the ROW avoidance area described under **Section 4.14.2**. More acres would be managed as ROW avoidance under Alternative B than under Alternative A, so impacts on the mineral materials program from these ROW avoidance areas would increase under Alternative B.

Impacts from Mineral Materials (Salables) Management

Under Alternative B, approximately 7,311,600 acres of federal mineral estate in PHMA (52 percent of the federal mineral estate decision area) would be closed to mineral material disposal. Existing mineral materials pits in PHMA would also be closed to new sales. The types of impacts from these closures are the same as those discussed under **Section 4.14.2**. Because twice as many acres of federal mineral estate would be closed under Alternative B compared with Alternative A, the magnitude of these impacts would increase.

Management of mineral materials on federal mineral estate outside of PHMA would be the same as that under Alternative A except that a 3 percent disturbance cap would apply to all human activity in GRSG habitat, including mineral material activities. If the cap were reached, it would impact mineral materials in GRSG habitat as described under *Nature and Type of Effects*, resulting in an increase in impacts on mineral materials compared with Alternative A.

4.14.5 Alternative C

Impacts from Lands and Realty Management

Under Alternative C, all BLM-administered surface in occupied habitat would be managed as ROW exclusion areas (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). These areas would impact mineral materials as described under **Section 4.14.2**. Because approximately 12 times more acres would be managed as ROW exclusion under Alternative C compared with Alternative A, impacts on mineral materials would greatly increase.

Impacts from Mineral Materials (Salables) Management

Under Alternative C, approximately 11,753,400 acres (83 percent) of federal mineral estate in the decision area (including all occupied habitat) would be closed to mineral material disposal. Existing mineral materials pits in occupied habitat would also be closed to new sales. The types of impacts from these closures are the same as those discussed under **Section 4.14.2**. Because three times more acres of federal mineral estate would be closed under Alternative C compared with Alternative A, the magnitude of these impacts would increase.

4.14.6 Alternative D

Impacts from Lands and Realty Management

ROW exclusion areas would cover the same area under Alternative D as under Alternative A (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). All PHMA not already managed as exclusion areas, would be managed as ROW avoidance areas. However, because all PHMA would be closed to mineral materials disposal under Alternative D, management of ROW

exclusion or avoidance areas within PHMA would not impact new mineral materials disposal. Existing permitted sites would be impacted by decreases in demand as described under **Section 4.14.2**. These impacts on existing sites would increase compared with Alternative A because more acres would be managed as ROW avoidance under Alternative D.

Management of areas outside PHMA would be the same as that under Alternative A. Where ROW exclusion or avoidance areas outside PHMA were to overlap with areas open to mineral materials disposal, impacts would be the same type as those described under **Section 4.14.2**.

Impacts from Mineral Materials (Salables) Management

Impacts from mineral materials management under Alternative D would be similar to those under Alternative B except that, under Alternative D, existing mineral materials pits would be allowed to remain open to serve existing and planned projects in areas closed to mineral materials disposal. Existing pits would not be allowed to expand in areas closed to mineral materials disposal under Alternative D. Impacts of closing areas to mineral materials disposal are described under **Section 4.14.2**.

4.14.7 Alternative E

Impacts from Lands and Realty Management

Similar to Alternative B, under Alternative E, all BLM-administered surface in Core Area habitat would be managed as ROW exclusion areas (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, because all Core Area habitat would be closed to mineral material disposal under Alternative E, managing Core Area habitat as ROW exclusion would have no impact on mineral materials.

Management of BLM-administered surface in the decision area outside Core Area habitat would be the same as that under Alternative A, with the same impacts on mineral materials.

Impacts from Mineral Materials (Salables) Management

Under Alternative E, all Core Area habitat would be closed to mineral materials disposal. Existing mineral materials pits in Core Area habitat would also be closed to new sales. The acres impacted by these closures, and the impacts themselves, would be the same as those under Alternative B.

4.14.8 Alternative F

Impacts from Lands and Realty Management

Like Alternative C, under Alternative F, all occupied habitat would be managed as ROW exclusion areas. However, because GHMA would be open to mineral materials disposal under Alternative F, these areas would be impacted by ROW

exclusion areas as described under **Section 4.14.2**. Demand for mineral materials in GHMA would greatly decrease because all GHMA would be managed as ROW exclusion.

Impacts from Mineral Materials (Salables) Management

Management of mineral materials under Alternative F would be the same as that under Alternative B, with the same impacts, except that the 3 percent disturbance cap would apply to fire disturbance as well as all human activity in GRSG habitat, including mineral material activities. If the cap were reached, it would impact mineral materials as described under *Nature and Type of Effects*, resulting in an increase in impacts on mineral materials compared with Alternative A. Because fire would be included in the disturbance cap under Alternative F, the 3 percent disturbance cap is more likely to be reached, and mineral materials are more likely to be impacted.

4.14.9 Proposed Plan

Impacts from Lands and Realty Management

Under the Proposed Plan, all BLM-administered surface in PHMA would be managed as ROW avoidance areas (exclusion areas for wind and solar; see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, because all PHMA would be closed to new mineral material disposal, mineral material activity in PHMA would already be decreased. ROW avoidance areas would have less of an independent impact on mineral materials.

All BLM-administered surface in GHMA would be managed as ROW avoidance for high voltage transmission lines, major pipelines, and wind and solar energy, but they would be open to other ROW location under the Proposed Plan. Mineral materials beneath those acres would be impacted by the ROW avoidance area, as described under **Section 4.14.2**. Overall, more acres in GHMA would be managed as ROW avoidance under the Proposed Plan than under Alternative A; therefore, impacts on the mineral materials program from these ROW avoidance areas would increase under the Proposed Plan.

Impacts from Mineral Materials (Salables) Management

Under the Proposed Plan, approximately 7,343,300 acres of federal mineral estate in PHMA (52 percent of the federal mineral estate decision area) would be closed to mineral material disposal except new free use permits and expansion of existing pits would be allowed. Impacts would increase compared with Alternative A and would be the same type as those described under **Section 4.14.2**. Because twice as many acres of federal mineral estate would be closed under the Proposed Plan compared with Alternative A, the magnitude of these impacts would increase.

Application of the 3 percent disturbance cap and in PHMA and lek buffers in PHMA and GHMA could impact mineral material activities by preventing new

surface development. New mineral material pits or expansion of existing pits could be precluded if the cap were exceeded in an Oregon PAC (also known as BSU) and proposed project area. In cases where development was allowed, mitigation requirements would increase the cost of development. Applying lek buffer distances when approving actions would also restrict mineral material development.

4.15 NONENERGY LEASABLE MINERALS

4.15.1 Methods and Assumptions

Indicators

Indicators of impacts on nonenergy leasable minerals are as follows:

- The amount of land closed to nonenergy solid mineral leasing
- The amount of land subject to NSO stipulations on nonenergy solid mineral leasing

Assumptions

The analysis includes the following assumptions:

- New information may lead to changes in delineated GRSG habitat. New habitat areas, or areas that are no longer habitat, may be identified. This adjustment would typically result in small changes to areas, requiring the stipulations or management actions stated in this plan. Modifications to GRSG habitat would be updated in the existing data inventory through plan maintenance. In areas that are no longer habitat, the waiver/exception/modification process would be used to remove stipulations or management actions that were no longer needed.
- Management actions and conservation measures also apply to nonenergy solid leasable mineral activity on lands overlying federal mineral estate. This includes federal mineral estate underlying BLM-administered lands and lands not administered by the BLM. There are 14,148,100 acres of federal mineral estate within the decision area (12,046,100 acres of BLM-administered surface with federal minerals and 2,102,000 acres of private, state, or other federal surface with federal minerals).
- Development of traditional solid leasable minerals within the planning area is unlikely. There are no existing nonenergy solid mineral leases in the decision area. However, hardrock minerals exist beneath acquired lands in the planning area. Similar to locatable minerals, interest in developing these leasable minerals is expected to increase as precious metal values increase.

- The acreage calculations used in this analysis is the entire federal mineral estate decision area. This includes acquired lands and other lands overlying federal mineral estate. Although interest in nonenergy leasable minerals is expected only on hardrock minerals beneath acquired lands, it is possible that sodium or similar evaporate deposits could be discovered and developed in the future on other federal mineral estate.

4.15.2 Nature and Type of Effects

Closing an area to nonenergy solid mineral leasing would directly impact nonenergy leasable minerals. This would be the result of removing the possibility of minerals resources in that area from being accessed and extracted. Mining operations may move to nearby private lands, thereby reducing the number of operations on federal mineral estate. In areas open to leasing, applying NSO stipulations would restrict the ability of nonenergy leasable mineral resources to be developed or extracted. To avoid these restrictions, operators may relocate to nearby state or private minerals, which would reduce nonenergy leasable mineral development on federal mineral estate.

Applying the 3 percent disturbance cap would directly impact nonenergy leasable minerals by limiting the amount of disturbance from various activities, including nonenergy leasable mineral development. If total disturbance in GRSG habitat reached 3 percent, no additional disturbance from nonenergy leasable mineral activities would be permitted. Because nonenergy leasable mineral development involves surface disturbance, new development would essentially be shut down once the 3 percent cap was reached.

Management actions creating ROW exclusion or avoidance areas would indirectly impact nonenergy solid leasable mineral extraction by limiting the available means for accessing mineral resources and transporting nonenergy solid leasable minerals to processing facilities and markets. For example, new roads to access a mine could not be built in a ROW exclusion area. Nonenergy solid leasable mineral operations may be moved to nearby private lands where access is easier, thereby reducing the number of operations on federal mineral estate. Because ROW avoidance areas could allow for limited ROW development, impacts of avoidance areas would be less severe than those of ROW exclusion areas. Impacts would be mitigated where exceptions were allowed for collocation of new ROWs within existing ROWs to satisfy valid existing rights.

Implementing management for the following resources to protect GRSG would have negligible or no impact on nonenergy leasable minerals for all alternatives; therefore, they are not discussed in detail:

- Vegetation
- Wild horses and burros
- Wildland fire management

- Livestock grazing and range management
- Recreation
- Travel management
- Coal
- Leasable minerals
- Locatable minerals
- Mineral materials (salables)
- Special designations
- Air quality and climate change
- Special status plants

4.15.3 Alternative A

Impacts from Lands and Realty Management

Access to mineral resources would continue to be limited in areas managed as ROW exclusion areas and avoidance areas under Alternative A (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). This management would continue to impact the nonenergy solid leasable minerals program as described under **Section 4.15.2**, *Nature and Type of Effects*.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative A, 3,073,600 acres (22 percent) of federal mineral estate in the decision area would remain closed to prospecting and leasing. These closures would impact nonenergy leasable minerals as described under **Section 4.15.2**, *Nature and Type of Effects*.

4.15.4 Alternative B

Impacts from Lands and Realty Management

Under Alternative B, all BLM-administered surface in PHMA would be managed as ROW exclusion areas (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, because all PHMA would be closed to nonenergy solid mineral leasing under Alternative B, managing PHMA as ROW exclusion areas would have no impact on nonenergy solid leasable minerals.

Impacts from Nonenergy Leasable Minerals Management

The BLM would close all PHMA to nonenergy solid mineral leasing under Alternative B. This would result in 7,217,500 acres (51 percent) of federal mineral estate in the decision area being closed to prospecting and leasing. Alternative B would close twice the acreage, compared with Alternative A. The types of impacts from these closures described under **Section 4.15.2** would increase under Alternative B.

A 3 percent disturbance cap would apply to all human activity in GRSG habitat, including nonenergy leasable mineral activities. If the cap were reached, it would

impact nonenergy leasable minerals in GRSG habitat as described under *Nature and Type of Effects*, resulting in an increase in impacts on nonenergy leasable minerals compared with Alternative A.

4.15.5 Alternative C

Impacts from Lands and Realty Management

Under Alternative C all occupied habitat would be managed as ROW exclusion areas (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, because all occupied habitat would be closed to nonenergy solid mineral leasing under Alternative C, managing occupied habitat as ROW exclusion would have no impact on nonenergy solid leasable minerals.

Impacts from Nonenergy Leasable Minerals Management

The BLM would close all occupied habitat to nonenergy solid mineral leasing under Alternative C. This would result in 11,699,400 acres (83 percent) of federal mineral estate in the decision area being closed to prospecting and leasing. Alternative C would close four times the acreage, compared with Alternative A. The types of impacts from these closures described under **Section 4.15.2** would increase under Alternative C.

4.15.6 Alternative D

Impacts from Lands and Realty Management

ROW exclusion areas would cover the same area under Alternative D as under Alternative A (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). All PHMA not already managed as exclusion areas, would be managed as ROW avoidance areas. Where these exclusion or avoidance areas overlapped with areas open to nonenergy solid mineral leasing, impacts on the nonenergy solid leasable minerals program would occur, as described under **Section 4.15.2**. Because 73 percent more acres would be managed as ROW avoidance under Alternative D compared with Alternative A, the magnitude of impacts would increase.

GHMA would be open to new ROWs with each individual application being analyzed to avoid impacts on occupied habitat and minimize impacts on potential or suitable habitat within GHMA. This could increase stipulations and mitigation that applicants have to apply to ROWs located within GHMA, making them less likely to locate ROWs in GHMA. Impacts on nonenergy leasable minerals would increase compared with Alternative A; however, this management of GHMA would be less restrictive than that for other action alternatives that designate GHMA avoidance areas.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative D, the BLM would apply NSO stipulations to nonenergy solid mineral leases in PHMA. These stipulations would apply on 3,270,400 acres (23 percent) of the federal mineral estate decision area. Like Alternative A, 3,073,600 acres (22 percent) of the decision area would remain closed to nonenergy solid mineral leasing. The remaining federal mineral estate in the decision area would remain open to nonenergy solid mineral leasing. Because acres would be subject to NSO stipulations under Alternative D but not under Alternative A, the impacts described under **Section 4.15.2** would increase under Alternative D.

Like under Alternative B, a 3 percent disturbance cap would apply to all human activity in GRSG habitat with the same impacts on nonenergy leasable minerals.

4.15.7 Alternative E

Impacts from Lands and Realty Management

Similar to Alternative B, under Alternative E, all BLM-administered surface in Core Area habitat would be managed as ROW exclusion areas (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, because all Core Area habitat would be closed to nonenergy solid mineral leasing under Alternative E, managing Core Area habitat as ROW exclusion would have no impact on nonenergy solid leasable minerals.

Management of BLM-administered surface in the decision area outside Core Area habitat would be the same as that under Alternative A, with the same impacts on nonenergy leasable minerals.

Impacts from Nonenergy Leasable Minerals Management

Management of nonenergy leasable minerals under Alternative E would be the same as that under Alternative B and with the same impacts.

4.15.8 Alternative F

Impacts from Lands and Realty Management

Like Alternative C, under Alternative F, all occupied habitat would be managed as ROW exclusion areas (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, under Alternative F, PHMA would be closed to nonenergy solid mineral leasing; therefore, management of PHMA as ROW exclusion areas would have no impact on nonenergy solid leasable minerals.

Nonenergy solid leasable mineral operations outside PHMA would be impacted as described under **Section 4.15.2**. Because more areas would be managed as ROW exclusion areas under Alternative F, impacts would increase compared with Alternative A.

Impacts from Nonenergy Leasable Minerals Management

Management of nonenergy leasable minerals under Alternative F would be the same as that under Alternative B and with the same impacts, except that the 3 percent disturbance cap would apply to fire disturbance as well as all human activity in GRSG habitat, including nonenergy leasable mineral activities. If the cap were reached, it would impact nonenergy leasable minerals as described under *Nature and Type of Effects*, resulting in an increase in impacts on nonenergy leasable minerals compared with Alternative A. Because fire would be included in the disturbance cap under Alternative F, the 3 percent disturbance cap is more likely to be reached, and nonenergy leasable minerals are more likely to be impacted.

4.15.9 Proposed Plan

Impacts from Lands and Realty Management

Under the Proposed Plan, all BLM-administered surface in PHMA would be managed as ROW avoidance areas for nonenergy leasable-related activities (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, because all PHMA would be closed to new leases and prospecting permits, managing PHMA as ROW avoidance areas would have no impact on nonenergy leasable minerals.

All BLM-administered surface in GHMA would be managed as ROW avoidance for high voltage transmission lines, major pipelines, but open to other nonenergy leasable mineral-related ROW location under the Proposed Plan. Nonenergy leasable minerals beneath those acres would be impacted by the ROW avoidance area, as described under **Section 4.15.2**. Overall, more acres in GHMA would be managed as ROW avoidance under the Proposed Plan than under Alternative A; therefore, impacts on the nonenergy leasable minerals program from these ROW avoidance areas would increase under the Proposed Plan.

Impacts from Nonenergy Leasable Minerals Management

The BLM would close all PHMA to nonenergy solid mineral leasing under the Proposed Plan. This would result in 7,247,900 acres (51 percent) of federal mineral estate in the decision area being closed to prospecting and leasing. The Proposed Plan would close twice the acreage as Alternative A. The types of impacts from these closures described under **Section 4.15.2** would increase under the Proposed Plan.

Application of the 3 percent disturbance cap and in PHMA and lek buffers in PHMA and GHMA could impact nonenergy solid leasable mineral activities by preventing new surface development. New surface development on existing leases in PHMA could be restricted if the cap were exceeded. However, the BLM would not apply the disturbance cap in a manner that would eliminate

reasonable opportunities to develop an existing lease. In cases where development were allowed for existing leases, mitigation requirements would increase the cost of development. Applying lek buffer distances when approving actions could also restrict development of infrastructure related to nonenergy solid leasable mineral development, as could application of RDFs.

4.16 SPECIAL DESIGNATIONS

4.16.1 Methods and Assumptions

Indicators

Indicators of impacts on special designations are as follows:

Wilderness Areas

- Potential changes in wilderness characteristics (untrammeled, natural, undeveloped outstanding opportunities for solitude or primitive and unconfined recreation, and unique or supplemental values) within the wilderness (Landres et al. 2008)
  - Untrammeled—Number of authorized actions and persistent structures designed to manipulate plants, animals, pathogens, soil, water, or fire; percent of natural fire starts that are manipulated within the boundaries of the wilderness; number of unauthorized actions by agencies, citizen groups, or individuals that manipulate plants, animals, pathogens, soil, water, or fire
  - Natural—Status of native biological communities (defined by priority habitat indicators and standards); abundance and distribution of nonindigenous species; presence of structures and development related to livestock grazing
  - Undeveloped—Index of physical development for authorized or designated structures and developments (e.g., buildings, fences, and livestock water developments); existing or potential impact of inholdings; type and amount of administrative use of motor vehicles
  - Outstanding opportunities for solitude or primitive and unconfined recreation—Level of visitor use; area of wilderness affected by travel routes; type and number of agency-provided and user-created recreation facilities; type and extent of management restrictions
  - Unique and supplemental values—Severity of disturbances of cultural resources; status of indigenous species that are listed, or are candidates for listing, as threatened or endangered

Wilderness Study Areas

- Potential changes in the inventoried wilderness characteristics (naturally appearing, opportunities for solitude or primitive and unconfined recreation, and unique or supplemental values) within the WSA
  - Naturally appearing—Status of native biological communities (defined by priority habitat indicators and standards) and abundance and distribution of nonindigenous species.
  - Opportunities for solitude or primitive and unconfined recreation—Level of visitor use; area of WSA affected by travel routes; type and number of agency-provided and user-created recreation facilities; type and extent of management restrictions
  - Unique and supplemental values—Severity of disturbances of cultural resources; status of indigenous species that are listed, or are candidates for listing, as threatened or endangered

Cooperative Management and Protection Areas

- Substantial interference of the values for which the Cooperative Management and Protection Area was designated

National Trails

- Substantial interference of the values for which the components of the National Trail System were designated

Areas of Critical Environmental Concern

- ACECs, including RNAs and ONAs, within GRSG PHMA, GHMA, and nonhabitat

Wild and Scenic Rivers

- For eligible and suitable rivers, any potential change to the ORVs, tentative classification (i.e., wild, scenic, recreational), water quality, or free-flowing condition of the river segment or corridor area from its current state
- For designated rivers, any potential change to the free-flowing river that would fail to protect and enhance the values that caused it to be designated, including its aesthetic, scenic, historic, archaeological, and scientific features

Assumptions

The analysis includes the following assumptions:

Wilderness Areas

- Wilderness Areas would continue to be managed according to the following:
  - Wilderness Act of 1964, the legislation designating them as Wilderness
  - 43 CFR, Part 6300, Management of Designated Wilderness Areas
  - Appendix A of the Committee on Interior and Insular Affairs of the House of Representatives accompanying HR 2570 of the 101st Congress (commonly called the Congressional Wilderness Grazing Guidelines)
  - BLM Manual 6340, Management of Designated Wilderness Areas (BLM 2012p)
  - Any subsequent wilderness legislation
  - As such, implementing management proposed in the various alternatives would not impair wilderness characteristics.

Wilderness Study Areas

- The WSAs in the planning area would continue to be managed according to Section 603(c) of FLPMA, BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012c), and any applicable land use plan until Congress either designates or releases all or portions of the WSAs from further consideration.
- Managing the WSAs according to BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012c), would protect their wilderness characteristics in a manner that would not "impair the suitability of WSAs for preservation as wilderness" (FLPMA, Section 603[c]). This is known as the nonimpairment standard.
- Actions that would "impair the suitability of WSAs for preservation as wilderness" would not be permitted unless they were to meet one of the exception criteria described in BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012c) and listed in Chapter 3.
- As a grandfathered use, livestock grazing managed in accordance with BLM regulations does not impact wilderness characteristics. However, new grazing management is not a grandfathered use and in all cases may only be established if it meets the nonimpairment standard or one of the exception criteria described in BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012c) and listed in Chapter 3.

Cooperative Management and Protection Areas

- The Cooperative Management and Protection Area in the planning area would continue to be managed according to BLM Manual 6220, National Monuments, National Conservation Areas, and Similar Designations (BLM 2012t). This policy will be adhered to during any site-specific project NEPA analyses that are conducted in the planning area.

National Trails

- The Oregon National Historic Trail in the planning area would continue to be managed according to BLM Manual 6280, Management of National Scenic and Historic Trails and Trails under Study or Recommended as Suitable for Congressional Designation (BLM 2012s). This policy will be adhered to during any site-specific project NEPA analyses that are conducted in the planning area.

Areas of Critical Environmental Concern

- Management of existing ACECs, including RNAs and ONAs, was determined in the applicable RMPs to be adequate to support the relevant and important values at the time of their designation. Impacts on these ACECs are not further discussed because the BLM would continue to manage these ACECs to protect their relevant and important values.
- Although management actions for most resources and resource uses have decision area-wide application, ACEC management prescriptions apply only to those lands within each specific ACEC.
- Permitted activities would not be allowed to impair the relevant and important values for which the ACECs are designated. Locatable mineral development in ACECs is regulated through 43 CFR, Part 3809.11. Mineral development would require a plan of operations aimed at reducing impacts on ACECs. Impacts from new locatable mineral development in ACECs would be eliminated if these areas were withdrawn.
- ACEC designation provides protection and focused management for relevant values beyond that provided through general management of the relevant and important values elsewhere in the decision area.

Wild and Scenic Rivers

- All eligible and suitable stream segments under consideration for WSR designation would be managed under interim protective measures required by the WSR Act and BLM Manual 6400, Wild and Scenic Rivers—Policy and Program Direction for Identification, Evaluation, Planning, and Management (BLM 2012q). This policy will be adhered to during any site-specific project NEPA analyses that are conducted in the planning area. This procedure and the interim

protective measures would ensure that the values for which these river segments were found eligible or suitable are not compromised until Congress makes a decision regarding WSR designation.

- The BLM would not permit any actions that would adversely affect the free-flowing condition, water quality, ORVs, or tentative classification of any eligible or suitable segments. As such, implementing management actions in this RMPA/EIS would not adversely impact these segments; adverse impacts are not discussed for any of the alternatives.

4.16.2 Nature and Type of Effects

Implementing management to protect GRSG generally involves reducing or otherwise restricting land uses and activities that disturb the surface or could otherwise threaten the values for which special designations are managed. Energy development, livestock grazing, travel, mineral extraction, wildland fires, and construction within ROW grants are all actions that could reduce the quality of the values for which special designations are managed.

Protecting areas from these activities to protect GRSG would also protect special designations from disturbance.

Wilderness Areas

Implementing management proposed in the various alternatives would not impair wilderness characteristics. This is because these wilderness characteristics are protected and managed according to the legislation, regulation, and policy listed under **Section 4.16.1**, Methods and Assumptions. Management to protect GRSG could enhance naturalness, or, at a minimum, be complementary to management in Wilderness Areas.

Wilderness Study Areas

Due to the requirement that any activity in WSAs meet the nonimpairment standard described in BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012c), implementing management proposed in the various alternatives would not impair wilderness characteristics. Management to protect GRSG could enhance naturalness, or, at a minimum, be complementary to management in WSAs.

Cooperative Management and Protection Areas

Implementing management proposed in the various alternatives would have no or negligible effects on the Steens Mountain Cooperative Management and Protection Area. This is because the area is managed according to the policy listed under **Section 4.16.1**, Methods and Assumptions.

National Trails

Implementing management proposed in the various alternatives would have no or negligible effects on Oregon National Historic Trail resources, qualities,

values, and associated settings, and the primary use or uses. This is because the Oregon National Historic Trail is managed according to the policy listed under **Section 4.16.1**, Methods and Assumptions.

ACECs

Impacts on the relevant and important values of ACECs would mainly be from surface-disturbing activities and wildfires. Specifically, these are the activities that cause direct damage to the values, introduce modifications to the landscape that affect the area's scenic quality or historical or cultural context, or that result in erosion, sedimentation, or increased runoff.

Special status species management objectives would prevent degradation of, and could improve, relevant and important values where an ACEC is designated to protect such values. The BLM management could protect the relevant and important values in ACECs independent of an ACEC designation. Refer to **Section 4.3**, Special Status Species—GRSG, for a discussion of impacts on GRSG habitat.

In general, management actions that protect resources (such as surface-disturbance restrictions, management for desired habitats, travel restrictions and closures, and recreation restrictions) would help maintain and improve the important and relevant values within ACECs. Management actions that create the potential for resource degradation (such as mineral development, livestock grazing, and infrastructure development) could impact the relevant and important values for which an ACEC is designated. Recreation and travel within ACECs could impact their values. Limiting motorized travel to existing routes and trails would reduce surface disturbance and the potential for related GRSG habitat loss. Restrictions on uses could also impact ACECs, particularly RNAs. RNAs could be impacted by management actions that prohibit natural processes to proceed to the detriment of the plant communities for which the RNAs were created. Management actions that do not promote the maintenance of plant communities could also impact RNAs.

Identifying ACECs as ROW exclusion or avoidance areas would protect relevant and important values by reducing (for avoidance areas) or eliminating (for exclusion areas) impacts from development requiring a ROW permit. Such developments include utilities, access roads, and renewable energy projects. Impacts from ROW development on GRSG habitat include compaction, erosion, and potentially habitat fragmentation

Energy and mineral development could impact ACEC values by increasing soil erosion potential and by removing or disrupting unique vegetation. Where GRSG habitat exists, energy and mineral development could degrade and fragment habitat. Construction, operation, and maintenance could disturb GRSG populations. However, the protections and limitations needed to maintain the relevant and important values of each ACEC are included in the plans that manage those ACECs. Additionally, closing ACECs to fluid mineral leasing or

applying NSO stipulations would help protect relevant and important values by eliminating surface-disturbance associated with such development.

Depending on their extent, location, and severity, wildfires could cause short- and long-term damage to ACEC values, particularly by removing important sagebrush habitats. Emergency stabilization and restoration would be applied to minimize impacts where special values are at risk. If these techniques are successful, wildfires could also improve ACEC values in the long term by maintaining natural vegetation ecosystem cycles. Additionally, prescribed fuels treatments could protect ACEC values if these treatments were to reduce the risk of future wildfire damage to ACEC values.

Livestock grazing above moderate levels of utilization could impact ACEC values, depending on what the values are for each ACEC, by increasing the potential for soil erosion, increasing annual grasses, reducing understory plant species, and affecting the plant communities that are the values for which the ACEC was designated. Closing ACECs to livestock grazing could help protect relevant and important values by eliminating soil and vegetation disturbance associated with livestock grazing; however, this could also increase the risk for fire due to increased fuel loads. Closing ACECs to livestock grazing could especially impact RNAs. Closing portions of RNAs that contain plant communities important to GRSG could provide the BLM with areas for baseline vegetation monitoring without the influence of BLM-permitted activities. This could allow natural succession processes to proceed, enabling the BLM to use these areas as comparative controls to treated areas. In addition, the BLM could research the impacts of climate change on plant communities within these undisturbed vegetation communities. Management to protect GRSG under the various alternatives would likely provide additional protections for existing ACECs and, at a minimum, would provide complementary management. This would be particularly true in ACECs where GRSG conservation was identified as a value. Additionally, RNAs would not experience impacts due to the restrictions and limitations on uses in place to protect RNAs. Impacts would not be expected to vary greatly between the alternatives.

Wild and Scenic Rivers

Stream segments eligible or suitable for inclusion in the National Wild and Scenic Rivers System are contained within an interim boundary within which resources are managed to protect the segments' free-flowing condition, water quality, ORVs, and tentative classification. Unless a detailed river boundary is established, the interim boundary of the WSRs is one quarter-mile from the ordinary high water mark on either side of the river (BLM 2012q). GRSG could use wet meadows within the interim boundary of these rivers during the summer; however, management for the species will not adversely impact the free-flowing condition, water quality, ORVs, or tentative classifications of the segments.

Implementing management for the following resources would have negligible or no impact on special designations for all alternatives; therefore, they are not discussed in detail:

- Special status species—GRSG
- Vegetation
- Wild horses and burros
- Wildland fire management
- Travel Management
- Leasable minerals
- Locatable minerals
- Mineral materials (salables)
- Nonenergy leasable minerals
- Mineral split-estate
- Special status plants

4.16.3 Impacts Common to All Alternatives

All of the action alternatives and the Proposed Plan would result in greater restrictions on resource uses and surface-disturbing activities than would Alternative A. These restrictions could result in impacts on special designations by providing additional protection of the values for which the special designations are managed. All special designations would likely be enhanced by or would not experience impacts from GRSG management and restrictions.

Implementing management proposed in the various alternatives would have no or negligible effects on Wilderness Areas, WSAs, Cooperative Management and Protection Areas, National Historic Trails, and Wild and Scenic Rivers. This is because the BLM will adhere to the applicable laws, regulations, policy, and guidance for those areas, as described in **Section 4.16.2**, *Nature and Type of Effects*.

Under all alternatives, the 91 existing ACECs and RNAs would continue to be managed for the values for which they were designated. Of those 91 existing ACECs, 76 ACECs occur wholly or partially within GRSG habitat (See **Section 3.16**, Areas of Critical Environmental Concern, and **Appendix J**, Areas of Critical Environmental Concern Evaluation for Greater Sage-Grouse). The 76 ACECs occurring in GRSG habitat would likely experience indirect protections from GRSG management actions. Additionally, 33 of these ACECs and RNAs have been identified as having a majority of their total acres in PHMA. These ACECs, as well as other ACECs that contain occupied GRSG leks or large amounts of GRSG habitat, would receive special management protection under all alternatives and the Proposed Plan. This special management attention is described in **Section 3.16,** Areas of Critical Environmental Concern. Under all alternatives, the 91 existing ACECs would be managed to protect the relevant and important values from irreparable damage.

ACECs would experience some variation in impacts across alternatives due to impacts from the management of other resources. Some alternatives would also designate additional ACECs, or change the degree of protection placed on existing ACECs, which would result in variation in impacts across the alternatives.

These variations are described below.

4.16.4 Alternative A

The existing ACECs experience varying degrees of protection under the current management. Most of the existing ACECs are identified as ROW avoidance areas, most are recommended for withdrawal for locatable minerals, and most are closed or withdrawn from salable and leasable mineral development.

These actions under the current management provide protection to the 91 existing ACECs. The seven ACECs in PPH or PGH that include GRSG among the relevant and important values for which they were designated are included within the 76 ACECs identified in **Chapter 3** and would be most likely to experience supplementary protection under the action alternatives from management actions related to GRSG protection. However, all of the ACECs that contain PPH or PGH are likely to experience some degree of supplemental protection under the action alternatives. The action alternatives would be more restrictive than Alternative A in dealing with resources such as livestock grazing and ROW management.

There are more acres of PPH and PGH open to livestock grazing (9,982,126acres) under Alternatives A and B than under any of the other alternatives. Therefore, compared with the other alternatives, ACECs would experience fewer of the incidental protections resulting from closing acres to livestock grazing under these alternatives. Additionally, Alternatives A and D have fewer acres of ROW exclusion areas (545,349 acres) in PPH and PGH than the other alternatives. This would likely result in fewer indirect protections of ACECs.

Alternative A is the only alternative that allows cross-country motorized travel in PPH other than the Proposed Plan, which allows less than 50 acres. It also manages more acres (2,940,051) as open to cross-country motorized travel in PGH than any of the other alternatives. ACECs are least likely to experience protection from the impacts of motorized travel under Alternative A.

The effects of having more acres open to livestock grazing and motorized travel, and fewer ROW exclusion areas are described in **Section 4.16.2**, *Nature and Type of Effects*.

4.16.5 Alternative B

The same number of acres is open to livestock grazing under Alternative B as under Alternative A; thus, impacts on ACECs are similar.

More than eight times more acres of PHMA and GHMA would be ROW exclusion areas under Alternative B (4,547,043 acres) than under Alternative A (545,349 acres). Where ACECs overlap ROW exclusion areas, this would likely result in more indirect protection of ACECs than under Alternative A, as described in *Nature and Type of Effects*.

Under Alternative B, cross-country motorized travel would not be permitted in PHMA. This would result in indirect protections to ACECs that contain PHMA. These ACECs would experience protections from the types of impacts caused by motorized travel that are described in **Section 4.16.2**, *Nature and Type of Effects*.

4.16.6 Alternative C

Under Alternative C the most acres are closed to livestock grazing (10,218,545 acres) out of all the alternatives. This would likely result in more indirect protections of ACECs than under the other alternatives. The effects of closing acres to livestock grazing on ACECs are described in **Section 4.16.2**, *Nature and Type of Effects*.

The same amount of PHMA would be ROW exclusion areas under Alternative C as under Alternative B. In addition, 5,669,422 acres of GHMA would be ROW exclusion areas. Where ACECs overlap ROW exclusion and avoidance areas, this would likely result in more indirect protection of ACECs than under Alternative A, as described in *Nature and Type of Effects*.

All PHMA would be closed to cross-country motorized travel. Impacts would be the same as those described under Alternative B.

Under Alternative C all PHMA would be designated as new ACECs designated for GRSG conservation. Information on the additional ACECs under Alternative C is available in **Appendix J**, Areas of Critical Environmental Concern Evaluation for Greater Sage-Grouse.

4.16.7 Alternative D

Alternative D has the same number of acres of ROW exclusion areas (545,349 acres) in PHMA and GHMA as Alternative A. Therefore, impacts on ACECs are similar as those described under Alternative A. All PHMA under this alternative would be closed to cross-country motorized travel. Impacts would be the same as those described under Alternative B.

Under Alternative D, 9,923,018 acres would be open to livestock grazing, which is 59,108 fewer acres than would be open under Alternative A. Due to the smaller number of acres open to grazing, as well as to additional measures that would be in place under this alternative to protect RNAs, ACECs would likely experience fewer impacts from livestock grazing under Alternative D than under Alternative A.

Additionally, under Alternative D, ACECs and RNAs with large proportions of GRSG habitat (ACECs and RNAs occurring in over 30 percent PHMA and 50 percent GHMA) would be managed for GRSG conservation. The ACECs also would be managed for the existing values for which they were designated. This would likely increase resource use restrictions and surface-disturbance within those ACECs; consequently, it would provide the ACECs with more protections, such as those discussed under **Section 4.16.2**, *Nature and Type of Effects*.

Unlike the other action alternatives, Alternative D includes specific management actions for RNAs, a unique type of ACEC managed for minimum human disturbance. This would result in increased protections to RNAs through management actions that would prohibit OHV use in identified RNAs, work with livestock grazing permit holders to reduce livestock grazing, remove unnecessary infrastructure, work with public holders of existing valid rights and ROW holders to address RNA plant community protection, and use minimally disturbing fire suppression tactics. Additionally, under Alternative D, RNAs can be closed to public use if the BLM determines public use is incompatible with the values of the RNA.

These management actions could enhance the values of the RNAs.

4.16.8 Alternative E

Under Alternative E, 125,776 acres of Core and Low Density and Currently Occupied Habitat would be closed to livestock grazing. This is the fewest acres out of all the alternatives and would likely result in fewer incidental protections of ACECs. The effects of keeping acres open to livestock grazing are described in **Section 4.16.2**, *Nature and Type of Effects*.

The same amount of core habitat (PHMA under the other action alternatives) would be ROW exclusion areas under Alternative E as under Alternative B. In addition, 156,523 acres of low density habitat and currently occupied habitat would be ROW exclusion areas. Impacts on ACECs would be similar to those described under Alternative B.

Additionally, all Core Habitat would be closed to cross-country motorized travel, resulting in indirect protections to ACECs that contain Core Habitat. Impacts would be the same as those described under Alternative B.

4.16.9 Alternative F

Alternative F would designate 17 new ACECs to conserve GRSG. Additional information on these ACECs and the values for which they would be designated is available in **Appendix J**, Areas of Critical Environmental Concern Evaluation for Greater Sage-Grouse.

Under Alternative F, 7,506,632 acres of PHMA and GHMA would be open to livestock grazing. This is 2,475,494 fewer acres than under Alternative A. It

would result in fewer impacts from livestock grazing on ACECs than under Alternative A.

The most acres of PHMA and GHMA would be designated as ROW exclusion under Alternatives F and C. Impacts would be the same as those described under Alternative C.

All PHMA would be closed to cross-country motorized travel under this alternative, resulting in indirect protections to ACECs that contain PHMA. Impacts would be the same as those described under Alternative B.

4.16.10 Proposed Plan

Impacts from livestock grazing on ACECs would be less under the Proposed Plan than under Alternative A. Under the Proposed Plan, 25,573 more acres of PHMA and GHMA would be closed to livestock grazing than under Alternative A (169,902 acres would be closed under Alternative A, and 195,475 acres would be closed under the Proposed Plan). This would result in more incidental benefits to ACECs where acres closed to livestock grazing under the Proposed Plan overlap with or are next to ACECs. Around 10 percent of the acres (22,765 acres) closed to grazing under the Proposed Plan are within key RNAs. Closing these acres to livestock grazing would allow natural succession to proceed without interference from BLM-permitted activities, such as grazing, and would result in the types of impacts discussed under *Nature and Type of Effects*.

Under the Proposed Plan, 558,923 more acres would be managed as ROW exclusion, and 12,435,558 more acres would be managed as ROW avoidance than under Alternative A. This would likely result in more incidental protection of ACECs containing PHMA and GHMA.

Less than 50 acres (and 5,609,165 fewer acres than under Alternative A) of PHMA and GHMA would be open to cross-county travel under the Proposed Plan, which would likely result in incidental protection of ACECs containing PHMA and GHMA.

Under the Proposed Plan, no new ACECs or RNAs would be designated; however, the BLM would identify 3 existing ACECs and 15 existing RNAs as key for GRSG conservation. Two of the three key ACECs already identify GRSG as a value for which the ACEC was designated. For the third ACEC, Abert Rim, for which GRSG is not an identified value, GRSG would be added as a value. In 13 of the 15 key RNAs, 22,765 acres would be closed to livestock grazing, and RNAs would be fenced to allow plant communities to undergo natural succession and be available for future research needs. An additional 800 acres next to RNAs would also be fenced to minimize impacts on existing leks. All other RNAs that are open to livestock grazing would continue to be open. The RNAs that would be closed to livestock grazing would experience impacts similar to those described under *Nature and Type of Effects*.

4.17 SOIL RESOURCES

4.17.1 Methods and Assumptions

Indicators

Indicators of impacts on soil resources are as follows:

- Declining soil surface health, as expressed through physical or chemical degradation, either with soils that are unable to support vegetation or soils that are not up to the potential for a particular ecological site (e.g., vegetation type, diversity, density, and vigor)
- Acres of BLM-administered land added to or removed from specific grazing practices
- Acres of BLM-administered land protected from or open to surface-disturbing activities
- Acres of invasive plant species that intrude during ground disturbing activities or after instances of fire

Land uses strive to conform to Standards for Public Land Health (described in Section 3.17, Soil Resources), which describe conditions needed to sustain public land health and relate to all uses of the public lands.

Assumptions

The analysis includes the following assumptions:

- Soils on BLM-administered lands will be managed to maintain inherent productivity and promote sustained yields, while keeping erosional mechanism at minimal and acceptable levels thus preventing physical or chemical degradation. Proposed surface-disturbing projects will be analyzed to determine suitability of soils to support or sustain such projects and will be designed to minimize soil loss.
- Achieving or maintaining Standards for Rangeland Health and Guidelines for Livestock Grazing Management (described in **Section 3.8**, Livestock Grazing and Range Management) generally are effective in managing the effects on soils from livestock grazing when properly implemented and monitored. Grazing authorizations will be adjusted on a case-by-case basis when site-specific studies indicate changes in management are needed.
- BLM management actions and objectives will be consistent with soil resource capabilities.
- Fuels projects and planned or unplanned fires that contribute to establishing a more natural fire regime would have long-term benefits to soil health.

4.17.2 Nature and Type of Effects

Activities that displace or mix soil horizons, compact, or contaminate soils, or that remove vegetation from soils are generally considered to negatively affect soil quality or soil health. These impacts on soil resources from surface disturbing activities result from a number of causes, including unmanaged livestock grazing, some allowed forms of recreation, mineral resource activities, and road improvement or construction. The intensity and extent of these impacts are determined in part by the type and location of the surface-disturbing activities and surface occupancy. Impacts on soil resources can also be affected by any applicable stipulations and plans of operation. Examples are those that address site-specific environmental concerns and require mitigation to stabilize soil, to prevent unnecessary erosion, and to revegetate disturbed surfaces. Land management actions that prohibit surfaces disturbance, such as areas closed to mineral entry, are more protective of soil resources than land management that allows surface disturbing activities.

Management to protect GRSG involves reducing or otherwise restricting land uses and activities that remove vegetation or biological crusts, disturb the upper soil horizons, or that may compact the soil surface and thus allow erosion of the soil. Livestock grazing, mineral extraction, recreation, and construction within ROW grants have all been identified as having compaction and erosion effects on soils. Designations such as ROW exclusion and avoidance areas and stipulations such as NSO and CSU mitigate compaction and erosion effects on soils. Protecting areas from these activities for the benefit GRSG would also protect soils from disturbance, compaction, and the removal of vegetation or biological crusts.

Surface-disturbing activities and surface occupancy can impact soil resources by compacting soil. In some cases, on very sandy soils, soil compaction aids in water retention and thus plant establishment and growth. However, too much compaction decreases water infiltration rates and gas exchange rates reducing soil health. Decreased gas exchange rates can cause aeration problems, induce nitrogen and potassium deficiency, and negatively impact root development, which is a key component of soil stabilization. As soil compaction increases, the soil's ability to support vegetation diminishes. This is because the resulting increase in soil strength and change in soil structure (loss of porosity) inhibit root system growth and reduce water infiltration. As vegetation cover, water infiltration, and soil stabilizing crusts are diminished or disrupted, the surface water runoff rates increase, further accelerating rates of soil erosion.

Travel across land by most means can result in vegetation loss, loss of biotic crusts, soil compaction, or soil erosion. Management approaches that designate travel to specified routes can result in more predictable, localized and manageable impacts. Selectively locating travel routes away from areas of sensitive soil conditions can minimize the extent of these effects, ideally limiting them to the footprint of the trail itself.

Recreation on BLM-administered lands may result in vegetation loss, soil compaction, and soil erosion. The effects of recreation on soil resources are determined by the severity and intensity of the recreation taking place. Areas with large number of visitors and/or mechanized recreation have a greater chance of resulting in some of the detrimental effects than lower impact, lower number recreation areas. There are a number of activities that have minimal impacts.

Lands and realty management decisions affect where ground-disturbing activities can and cannot occur. Ground-disturbing activities could result in the compaction and/or, the erosion of soils, or vegetation loss, all of which reduce soil stability. In areas with NSO stipulations and managed as ROW exclusion, soil quality would be protected since ground disturbance would be prohibited and soil erosion would be limited to natural processes. In areas managed as ROW avoidance, soil quality would receive some protection since ground disturbance would often be limited. ROW avoidance areas would generally result in lower impacts on soil resources due to more restrictive conditions of use associated with ROW authorization compared with areas not managed as ROW avoidance.

Improper livestock and wild horse and burro management can affect soil resources, especially in wet areas, around springs and troughs, and near salt blocks. Wild horses and burros and domesticated livestock often use riparian and wetland areas for water and shade, and may congregate around water developments which results in compacted soil and trampled nearby vegetation. Unmanaged livestock grazing and wild horse and burro populations above AML can lead to patchy loss of vegetation cover, reduced water infiltration rates and nutrient cycling, decreased plant litter, degraded water quality, increased bare ground, and soil erosion (Manier et al. 2013). Land health evaluations, appropriate management levels, rangeland monitoring studies, and rangeland health standards are used to assess rangeland condition and help to identify where a change in livestock grazing or wild horse and burro management would be beneficial.

Fluid mineral development generally requires both permanent and temporary roads, drilled wells, and associated well pads. In addition, fluid mineral development may require associated pipelines and transmission lines, along with the construction of necessary service roads for these facilities. Local soil health and characteristics within project footprints are typically impacted by compaction and vegetation clearing for road or structural development. Effects or impacts from mineral activity is regulated and mitigated through federal and state laws, as well as handbooks, stipulations, and conditions of approval which have reduced the amount of soil disturbance on a case-by-case basis.

Locatable minerals, mineral materials, and nonenergy leasable mineral activities require road construction and large areas of soil excavation. Local soil health

and characteristics within project footprints are typically negatively impacted by excavation, compaction, erosion, and vegetation clearing. Restoration and restoring vegetation may return a lower level of soil health over the long term, once mineral extraction is complete; however, landscapes are changed permanently as areas of prior soil cover are often permanently altered through such features as open pits.

Implementing management for the following resources would have negligible or no impact on soil resources for all alternatives; therefore, they are not discussed in detail:

- Special status species—GRSG
- Recreation
- Coal
- Special designations
- Air quality and climate change
- Special status plants

4.17.3 Impacts Common to All Alternatives

Impacts from Vegetation Management

Habitat restoration would occur under all alternatives and would be implemented based on environmental variables that indicate areas most likely to succeed in restoration and therefore benefit GRSG. Restoring habitat has a beneficial effect on soils over the long term. Vegetation management is initially disturbing to soils as undesirable vegetation is removed through cutting or burning, and as desirable seed is planted, at times using heavy equipment. Success of vegetation management may not result in soil health improvements for years after initial disturbance. Soils that have a high restoration potential value would tend to support restorative vegetation activities due to proper soil conditions, such as low salt content, adequate water retention, and available rooting depth. High potential restoration soil must combine with favorable environmental conditions such as precipitation and temperatures to be successful. If success is not obtained then reintroducing plantings or seeding must reoccur for success to occur.

Vegetation management would also aim to reduce and prevent the spread of invasive plants under all alternatives. Displacement of native plants by invasive plants results in changes in the soil properties, such as soil temperatures and soil water distribution, which may result in bare ground or the inability to support the ecological site. Quick growing invasive plants like cheatgrass and medusahead increase the likelihood of wildfires by drying out earlier and remaining dry longer than other plants in the vegetation community, resulting in an excessive buildup of extremely flammable standing cheatgrass and litter. Areas dominated by invasive annual grasses typically have a much shorter fire return interval than other types of vegetation. An increased fire frequency

pattern results in further changes to soil properties and increased soil erosion rates.

Impacts from Leasable Minerals Management

While there is potential for development, there have been no wells developed on the leases issued on occupied GRSG habitat in the planning area. Under all alternatives, the potential for development is estimated to be low; therefore, impacts on soil resources from development as described in **Section 4.17.2** would be limited.

Impacts from Locatable Minerals Management

Locatable minerals could exist in the planning area, but exploration has been minimal and the potential is unknown across all alternatives. The difference in potential management effects on soil resources from locatable mineral entry and mineral material disposal under each alternative is the number of acres that would be recommended for withdrawal or closed from mineral entry. The greater the amount of land withdrawn from locatable mineral entry, the more protective of soil resources the alternative is, due to eliminating the potential for impacts, as described in **Section 4.17.2**.

Impacts from Nonenergy Leasable Minerals Management

While there is potential for development, there have been no wells developed on the leases issued on occupied GRSG habitat in the planning area. Under all alternatives, the potential for development is estimated to be low; thus, impacts on soil resources from development as described in **Section 4.17.2** would likely be limited and occur independent of areas available for leasing or stipulations applied.

Impacts from Mineral Split-Estate Management

For the purposes of impacts on soil resources, split-estate minerals would be similar to that described above by category of minerals.

Wild Horses and Burros

Under all alternatives, wild horse and burro populations above AML results in impacts on soil resources through overgrazing, trampling or removing vegetation and compaction of soils resulting in bare ground in upland areas and near water resources around which wild horses may congregate for water and shade. AMLs of wild horse and burro populations and land health evaluations to assess rangeland health would be utilized under all alternatives to reduce and minimize these impacts.

Wildland Fire Management

Under all alternatives, wildland or prescribed fire will affect soil resources depending on the severity, intensity, and regime of the fire and on how much heat is transferred to the soil during a fire event. Short term effects after a fire include the loss of vegetation cover resulting in increased susceptibility of soil erosion. Long term effects of fire result from the process of soil heating, which

can cause significant changes in the physical, chemical, and biological properties that are relevant to the future productivity and sustainability of wildland sites. Such degradation may increase the soils susceptibility to invasive plants, if seed sources are present, until native vegetation reestablishes (Forest Service 2005). Conversely, managing for the suppression of wildfires results in soil disturbance and compaction during the removal of excess vegetation.

4.17.4 Alternative A

Impacts from Wild Horses and Burros

Alternative A would continue to manage HMAs at the current AML and to evaluate AMLs based on existing management. Alternative A would continue to manage water resources and range improvements in the current manner, which would continue to support the current disbursement of wild horses and burros on the landscape. Appropriate distribution reduces the occurrence of concentrated soil compaction and vegetation trampling and resulting soil erosion from wild horse or burro congregation.

Impacts from Livestock Grazing and Range Management

Under Alternative A, 12,258,337 acres, or 98 percent of the planning area would continue to be managed as open to livestock grazing; 253,504 acres or 2 percent of the planning area is closed to livestock grazing. Of the acres open to livestock grazing, 4,470,799 acres (36 percent) are within PPH and 5,511,327 acres (44 percent) are within PGH on BLM-administered lands.

All permits and leases under Alternative A would continue to be required to meet or make progress toward meeting standards defined in the Oregon and Washington Public Land Health Standards (described in **Section 3.8**, Livestock Grazing and Range Management). Grazing permits, including grazing systems, permitted AUMs, and allotment boundaries would be modified as necessary to conform to Standards and Guidelines for Livestock Grazing Management. Changes to rangeland management would be directed first to allotments not meeting land health standards, which may include changes in number of permitted AUMs, or current timing, duration, or frequency of permitted used, including temporary closures.

Alternatives A, B, and E have the same amount of acreage managed as open to livestock grazing. These alternatives would subject the greatest acreage of soil resources to the short-term impacts on vegetation and the long-term impact on biological soil crusts due to livestock grazing as outline in **Section 4.17.2**. Impacts that include potential loss of vegetation cover or biological crusts would lead to increased bare ground, invasive plants, and potential soil erosion.

Impacts from Travel Management

Alternative A would manage 6,811,890 acres (54 percent) of the planning area as open to cross-country motorized travel, 300,328 acres (2 percent) of the planning area as closed to cross-country motorized travel, and 5,325,377 acres

(42 percent) as limited to existing roads and trails, with possible additional seasonal or vehicle type restrictions. Alternative A would manage the most acres as open to cross-country motorized travel, which subjects the most acres of soil resources to the possible impacts caused by overland travel as described in **Section 4.17.2**. The potential effects of travel management on soil resources are vegetation loss, loss of biotic crusts, soil compaction, and soil erosion.

Impacts from Lands and Realty Management

Under Alternative A, 857,564 acres (7 percent of the planning area) would continue to be managed as ROW exclusion areas, and 3,445,685 acres (27 percent) would continue to be managed as ROW avoidance areas. Alternative A would manage 8,314,779 acres (66 percent) of the planning area as open to potential ROW authorizations. Of the acres managed as ROW exclusion areas, 257,154 acres are located within PPH and 288,195 acres are located within PGH. Of the acres managed as ROW avoidance areas, 1,336,146 acres are located within PPH and 1,672,025 acres are managed within PGH. Alternative A would manage the least amount of exclusion and avoidance areas, and would leave the largest acreage open to ROW authorizations, which could result more surface disturbance from ROW development than the other Alternatives.

Within exclusion areas new ROW development would continue to be prohibited, which would prevent surface disturbance from ROW development. Within avoidance areas, the BLM would require ROW applicants to observe additional conditions, such as siting criteria and design requirements. This could discourage new ROW development in these areas. Within areas open to ROW authorization, soil resources may be affected by ROW development, including potential vegetation loss and soil compaction. However, any effects on soil resources from ROW authorizations would be limited to the footprint of the disturbance area within the ROW. The BLM would analyze impacts from individual ROW authorizations upon receipt of applications and as part of subsequent implementation-level environmental analyses.

Impacts from Energy and Mineral Development

Alternative A is the least restrictive on energy and mineral development of all the alternatives. As a result, the indirect impacts of development on soil resources as discussed in **Section 4.17.2** (including soil compaction and excavation, and the clearing of vegetation) would be the greatest under this alternative.

Locatable Minerals

Under Alternative A, 1,435,911 acres (10 percent) would be managed as withdrawn from locatable mineral entry, 12,687,910 acres (90 percent) would be managed as open to mineral entry, and 24,443 (less than 1 percent) would be recommended for withdrawal. Alternative A would manage the most acres as open to locatable mineral entry, which could open soil resources to possible

impacts caused by locatable mineral exploration or development, as described in **Section 4.17.2**.

Mineral Materials

Alternative A would manage 3,611,745 acres (26 percent) as closed to mineral material disposal and 10,536,510 acres (74 percent) as open to mineral material disposal. This alternative would manage the most acres for mineral material disposal, which could open soil resources to possible impacts caused by mineral material disposal, as described in **Section 4.17.2**.

Nonenergy Leasable Minerals

Alternative A would manage 3,073,567 acres (21 percent) as closed to nonenergy leasables and 10,648,648 acres (75 percent) as open to nonenergy leasables. This alternative and Alternative D would manage the most acres as open for nonenergy leasable mineral exploration and development, which could open soil resources to possible impacts as described in **Section 4.17.2**.

Fluid Minerals

Fluid minerals are managed with progressive restrictions that result in greater protection from surface-disturbing activities that can result in soil compaction and other impacts as described Section 4.17.2. Fluid minerals are managed as open to fluid mineral exploration and development, open with conditional use restrictions, or CSU, open with NSO or closed to fluid mineral entry. Under Alternative A, 5,509,091 acres (38 percent) of the planning area would be managed as open, 4,281,931 acres (30 percent) would be managed with CSU, 860,017 acres (6 percent) would be managed with NSO, and 3,497,102 acres (25 percent) would be managed as closed. Under Alternative A, fluid mineral resources in the planning area would continue to be managed according to any closures, stipulations, or BMPs in the governing RMPs. Alternative A would have the most acres open to fluid mineral entry and the fewest managed as open with restrictions, resulting in the greatest potential for impacts on soil resources, as described under **Section 4.17.2**.

4.17.5 Alternative B

Impacts from Wild Horse and Burro Management

Alternative B would amend HMAPs to incorporate GRSG habitat objectives and would prioritize the evaluation of all AMLs based on indicators that address the structure, condition, and composition of vegetation and measurements specific to achieving GRSG habitat objectives. GRSG habitat objectives are conservation based and are aimed at improving vegetation composition, which would result in healthier soils.

Impacts from Livestock Grazing and Range Management

Under Alternative B, management actions would not result in direct changes to the number of acres open or closed to livestock grazing. GRSG habitat objectives and management considerations would be incorporated into all BLM

grazing allotments through AMPs or permit renewals, and land health assessments would be prioritized to permits in PHMA. GRSG habitat objectives are conservation based and are aimed at improving vegetation composition, which would result in healthier soils due to appropriate vegetation composition and cover. This would reduce cases of soil compaction or erosion.

Impacts from Travel Management

Under Alternative B, 4,141,539 acres (33 percent of BLM-administered surface land) would be managed as open to unrestricted cross-country motorized travel, 300,328 acres (2 percent) would be managed as closed to cross-country motorized travel, and 7,996,165 acres (63 percent) would be limited to existing roads and trails. This equates to a 21 percent reduction in lands open to cross-country motorized travel and a 21 percent increase in lands managed as limited to existing roads and trails. This would be more protective of soil resources from the potential effects of cross-country motorized travel (described **Section 4.17.2)** than Alternative A. Additionally, new route construction would be limited to realigning existing routes, new roads would be built to the absolute minimum standard necessary. Any roads and trails not designated in travel management plans would be restored using appropriate seed mixes. Restoration of roads would benefit soil resources by reducing total overall acres of soils affected by travel management through replacement of cleared vegetation, and correcting areas where soils are compacted or eroding above natural levels.

Impacts from Lands and Realty Management

Alternative B would manage 4,866,030 acres (39 percent) as ROW exclusion, 6,106,923 acres (48 percent) as ROW avoidance, and 1,645,075 acres (13 percent) as open to ROW authorizations. GHMA would be managed as a ROW avoidance area on 5,662,623 acres and PHMA would be managed as a ROW exclusion area on 4,547,043 acres. Compared with Alternative A, Alternative B would be more protective of soil resources from potential impacts from ROW authorizations due to greater acreage of exclusion areas. Alternative B would increase the acreage managed as ROW exclusion areas by 4,008,466 acres or 32 percent, would increase the acreage managed as ROW avoidance areas by 2,661,238 acres or 21 percent, and would decrease the acreage open to ROW authorizations by 6,669,7040 acres, or 53 percent compared with Alternative A. Additionally, Alternative B would implement a 3 percent disturbance cap on all human activity in GRSG habitat, including ROW leasing which would limit ROW leasing in the open areas within habitat.

Alternative B would increase the protection of soil health because ROW avoidance and exclusion designations have more restrictive conditions of use than areas open to ROW authorization. This reduces the amount of vegetation clearing and soil compaction occurring compared with a ROW authorization, if one is authorized. Regardless of ROW designation, any authorized ROW effects on soil resources would be limited to the footprint of the disturbance area within the ROW. The BLM would analyze impacts from individual ROW

authorizations upon receipt of applications and as part of subsequent implementation-level environmental analyses.

Alternative B would also remove power lines and reclaim ROW sites that are no longer in use, which would restore the surrounding habitat and reverse the vegetation clearing and soil compaction effects of ROW authorizations.

Impacts from Energy and Mineral Development

Alternative B would be more protective of soil resources from vegetation clearing, soil compaction, and soil excavation than Alternative A due to more restrictions on energy and mineral developments. Specific acreage differences under the various mineral resources are detailed below. Additionally, a 3 percent disturbance cap would apply to all human activity in GRSG habitat, including energy and mineral development where this land is open to such uses within GRSG habitat.

Locatables

Alternative B would manage 1,435,911 acres (10 percent) as withdrawn from locatable mineral entry and would recommend an additional 4,587,713 acres (32 percent) in PHMA and GHMA for withdrawal from locatable mineral entry. The remaining 8,124,640 acres, or 57 percent of the planning area, would be managed as open to locatable mineral entry with appropriate RDFs (to the extent consistent w/ applicable law) as outlined in **Appendix C**. Areas recommended for withdrawal would be considered based on risk to GRSG and its habitat.

Mineral Materials

Alternative B would manage 7,311,595 acres (52 percent) as closed to mineral materials disposal and 6,836,659 acres (48 percent) as open to mineral materials disposal. This is a reduction in 3,699,851 acres open to mineral materials disposal from Alternative A. Alternative B would also mandate the restoration of mineral pits no longer in use within PHMA and would return these areas to land that meets GRSG habitat conservation objectives. The reduction in acreage, 3 percent disturbance cap, and mandate for restoration would provide for less disturbance to soil resources than Alternative A.

Nonenergy Leasable Materials

Nonenergy solid leasables would be managed as closed to mineral exploration and development on 7,217,528 acres (51 percent) and open to mineral entry exploration and development on 6,928,382 acres (49 percent). This is a 3,720,266 acre reduction in areas open to nonenergy solid leasable exploration and development compared with Alternative A. Alternative B would implement BMPs and RDFs as outlined in **Appendices C**, **D**, and **E** in order to further protect GRSG habitat, as well as implement a 3 percent disturbance cap, which would result in healthier soil resources.

Fluid Mineral Leasing

Under Alternative B, 3,845,517 acres (27 percent) of the planning area would be managed as open to fluid mineral leasing, 2,498,324 acres (17 percent) would be managed with CSU, 586,771 acres (4 percent) would be managed with NSO, and 7,217,528 acres (51 percent) would be managed as closed to fluid mineral leasing. Under Alternative B, conservation measures in addition to RDFs would be applied as COAs to the existing federal leases in PHMA. These RDFs and conservation measures would include such requirements as surface disturbance limitations, design requirements, and reclamation standards. This, in addition to the 3 percent surface disturbance cap, would result in lower impacts on soil resources than Alternative A.

4.17.6 Alternative C

Impacts from Wild Horse and Burro Management

Alternative C would manage wild horses and burros similarly to Alternative A, except that under Alternative C, water developments are proposed for removal. This would modify the distribution of wild horses and burros on the landscape and may result in intensified use of riparian areas year around, which would increase trampling, vegetation removal, and soil compaction in these areas.

Impacts from Livestock Grazing and Range Management

Alternative C would close all acres to livestock grazing and would remove all allotments from the planning area. This would include any allotments completely or partially within occupied GRSG habitat. This would eliminate the possibility of the short-term, site-specific impacts from livestock grazing and the associated impacts on soil resources, including vegetation removal, and soil trampling or compaction. Alternative C would be the most protective of soil resources from impacts related to livestock grazing compared with all others.

Impacts from Travel Management

Under Alternative C, 1,202,694 acres (9 percent of the planning area) would be managed as open to cross-country motorized travel, 300,328 acres (3 percent) would be managed as closed to cross-country motorized travel, and 10,937,171 acres (87 percent) would be managed as limited to existing roads and trails.

Alternative C would managed the same amount of acreages as closed to cross-county motorized travel as Alternative A, would manage 5,609,196 fewer acres as open to travel management than Alternative A, and 5,611,794 more acres as limited to existing roads and trails. This equates to a 45 percent reduction in lands open to cross-country motorized travel and managed as limited to existing roads and trails, which would be more protective of soil resources from the potential effects of cross-country motorized travel than Alternative A or B.

Impacts from Lands and Realty Management

Alternative C would manage 10,682,124 acres (85 percent) as ROW exclusion, 292,671 acres (2 percent) as ROW avoidance, and 1,643,233 acres (13 percent) as open to ROW authorizations. This includes managing 4,547,043 acres of PHMA and 5,669,422 acres of GHMA as ROW exclusion areas. Compared with the other Alternatives, Alternative C would be more protective of soil resources from potential impacts from ROW authorizations due to a greater amount of acreage designated as ROW exclusion areas, which is the most restrictive ROW designation.

Alternative C would increase the acreage managed as ROW exclusion areas by 9,824,560 acres (78 percent), but would decrease the acreage managed as ROW avoidance areas by 3,153,014 acres (25 percent), and would decrease the acreage open to ROW authorizations by 6,671,546 acres (52 percent) compared with Alternative A. ROW avoidance and exclusion designations have more restrictive conditions of use than areas open to ROW authorization which reduces the amount of vegetation clearing and soil compaction occurring within a ROW authorization. Regardless of ROW designation, any authorized ROW effects on soil resources would be limited to the footprint of the disturbance area within the ROW. The BLM would analyze impacts from individual ROW authorizations upon receipt of applications and as part of subsequent implementation-level environmental analyses.

Impacts from Mineral and Energy Development

Alternative C has the most acres closed to mineral exploration and development and is the most restrictive of mineral exploration and development of all the alternatives. However, a 3 percent disturbance cap would not apply to all human activity in GRSG habitat, including energy and mineral development where this land is open to such uses within GRSG habitat. As such, due to the number of acres closed, Alternative C would provide the most protection for soil resources from disturbance from mineral exploration and development, as described in **Section 4.17.2.**

Locatable Minerals

Availability for locatable mineral entry would be withdrawn on 1,435,941 acres (10 percent) of the planning area and would be open for exploration or development on 2,724,488 acres (19 percent). All occupied habitat, 9,987,864 acres (70 percent) would be recommended for withdrawal, which would protect soil resources from potential effects of locatable mineral development in these areas once the petition is complete. Approved mineral entry would require RDFs (to the extent consistent w/ applicable law) as outlined in **Appendix C**. Alternative C would decrease the acreage open to locatable mineral entry by 9,963,422 acres from Alternative A. Alternative C would prevent the most potential soil impacts from locatable mineral management of all the alternatives.

Mineral Materials

Alternative C would manage 11,753,430 acres (83 percent) as closed to mineral material disposal and 2,394,826 acres (17 percent) as open to mineral material disposal. This is a reduction in acres open to mineral material disposal of 8,141,684 from Alternative A. Other than the increase in acres closed to mineral material disposal, management under Alternative C would be the same as Alternative B. Alternative C would prevent the most potential soil impacts from mineral material disposal of all the alternatives.

Nonenergy Leasable Minerals

Nonenergy solid leasables would be managed as closed to mineral exploration and development on 11,699,429 acres (83 percent) and open to mineral entry exploration and development on 2,446,636 acres (17 percent). This is an 8,625,862-acre increase in areas closed to nonenergy solid leasable exploration and development from Alterative A. Alternative C would prevent the most potential soil impacts from nonenergy solid leasables of all the alternatives.

Fluid Mineral Leasables

Under Alternative C, 1,469,897 acres (10 percent) of the planning area would be managed as open, 790,987 acres (6 percent) would be managed with CSU, 187,826 acres (1 percent) would be managed with NSO, and 11,699,429 acres (82 percent) would be managed as closed. No acres in PHMA and GHMA would be open to fluid mineral leasing. Alternative C would prevent the most potential soil impacts from fluid mineral leasing of all the alternatives.

4.17.7 Alternative D

Impacts from Wild Horse and Burro Management

Alternative D would evaluate HMAs in PHMA based on HAF indicators or with values adjusted for regional conditions. It may modify AMLs, based on rangeland health analysis and monitoring data, if GRSG habitat objectives were not being met. GRSG habitat objectives are conservation based and are aimed at improving vegetation composition, which would result in healthier soils due to appropriate vegetation composition and cover. This would reduce cases of soil compaction or erosion.

Impacts from Livestock Grazing and Range Management

Under Alternative D, 12,183,315 acres or 97 percent of the planning area would be managed as open to livestock grazing and 335,588 acres or 3 percent of the planning area would be managed as closed to livestock grazing. Of the acres open to livestock grazing, 4,408,539 acres (29 percent) are located within PHMA and 5,514,479 acres (44 percent) are located within GHMA. This is a 62,260 acre reduction in acres open to livestock grazing within PHMA, and a 3,152 acre reduction in acres open to livestock grazing within GHMA in comparison with Alternative A. Of the 335,588 acres closed to livestock grazing, 269,823 acres are located within PHMA or GHMA, and the remaining acres were either already closed to livestock grazing under existing management, or

are priority RNAs which would be closed regardless of meeting land health standards. Alternative D would be slightly more protective of soil resources from the potential effects of livestock grazing than Alterative A due to the reduction of acres open to livestock grazing in PHMA and GHMA.

Impacts from Travel Management

Alternative D would manage the same number of acres as open, limited, or closed to cross-country motorized travel as Alternative B, and would therefore have similar effects on soil resources as Alternative B. However, Alternative D would provide fewer restrictions on route construction and maintenance, which may lead to more dispersed construction and therefore more dispersed impacts on soil resources.

Alternative D would managed the same amount of acreage as closed to cross-county motorized travel as Alternative A, would managed 2,670,351 fewer acres as open to travel management than Alternative A which equates to a 21 percent reduction in lands open to cross-country motorized travel. This would be more protective of soil resources from the potential effects of cross-country motorized travel than Alternative A.

Impacts from Lands and Realty Management

Alternative D would manage 857,564 acres (6 percent) as ROW exclusion areas and 5,965,000 (47 percent) acres as ROW avoidance areas. This includes managing 257,154 acres of PHMA and 288,195 acres of GHMA as ROW exclusion areas and managing 4,289,889 acres of PHMA and 1,672,025 acres of GHMA as ROW avoidance areas. ROW exclusion areas under Alternative D would be the same as Alternative A, and ROW avoidance areas would increase by 2,519,129 acres. Overall effects of lands and realty management would be very similar to Alternative A as an increase in ROW avoidance areas does not restrict ROW authorizations. However, Alternative D would implement a 3 percent disturbance cap on human disturbances, which includes ROW authorizations, and includes ROW avoidance and open ROW areas. Exceptions could be made for some development, so disturbance from ROW development could still affect soil resources.

Impacts from Mineral and Energy Development

Under Alternative D, mineral and energy development management would be similar to that described under Alternative B, including the 3 percent disturbance cap.

Locatable Minerals

Acres withdrawn from, open to and recommended for withdrawal from locatable mineral entry under Alternative D are the same as under Alternative A. Alternative D would require proponents of approved mineral entry to consider implementing BMPs and RDFs through the NEPA process if the project were located in PHMA or GHMA.

Mineral Material Disposal
Mineral material disposal management under Alternative D would be the same as Alternative B.

Nonenergy Leasable Minerals
Alternative D would close 3,497,102 acres (24 percent) to nonenergy leasables and would manage 10,648,963 acres (75 percent) as open to nonenergy leasables. Nonenergy leasables would be subject to NSO stipulations in PHMA. Underground development options with entry locations outside of PHMA and GHMA would be considered to disrupt less GRSG habitat. BMPs and RDFs would be applied to existing leases. Alternative D would provide for more protection from the potential effects on soil resources from mineral development than Alternative A due to NSO restrictions.

Fluid Mineral Leasing
Under Alternative D, 1,469,897 acres (10 percent) of the planning area would be managed as open, 5,361,356 acres (37 percent) would be managed with CSU, 3,549,784 acres (25 percent) would be managed with NSO, and 3,497,102 acres (24 percent) would be managed as closed. Under Alternative D, the BLM would apply a buffer system to manage fluid mineral development in GRSG habitat. Under this system, leks would be surrounded by buffers of varying sizes in which NSO stipulations would apply. In addition, CSU stipulations would apply to all areas in occupied habitat that are outside a lek buffer. The CSU stipulations would limit habitat fragmentation and, in PHMA, a 3 percent disturbance limit and 640-acre spacing requirements. Application of these surface-disturbance restrictions and other operating standards would limit the siting, design, and operations of fluid mineral development projects, which would be more protective of soil resources than Alternative A.

4.17.8 Alternative E

Impacts from Wild Horse and Burro Management
Alternative E would be managed similarly to Alternatives A and C. The HMAs would be managed at a total AML of 1,340-2,655 horses and burros, which is similar to current management. Wild horse roundups would be prioritized in GRSG areas that are over AML, and additional measures may be warranted to conserve GRSG habitat if sagebrush habitat is being impacted in HMAs.

Impacts from Livestock Grazing and Range Management
Alternative E would have the same amount of acreage open and closed to livestock grazing as Alternative A. Alternative E would also manage the same amount of acreage of GRSG Core Area habitat as open or closed to livestock grazing as Alternative A. Alternative E would manage 3,826,015 acres (30 percent) as open to livestock grazing in Low Density habitat compared with 5,511,327 acres (44 percent) under Alternative A. Effects of livestock grazing on soil resources under Alternative E would be the similar to those expected

under Alternative A, with a slight reduction in potential impacts in Low Density habitat due to the 14 percent change of closure to livestock grazing.

Impacts from Travel Management

Alternative E would manage 3,913,675 acres (31 percent) of the planning area as open to cross-country motorized travel, 275,965 acres (2 percent) as closed to cross-country motorized travel, and 6,043,851 acres (48 percent) as limited to existing road and trails. This would be a 2,898,215 acre or 23 percent reduction in acres open to cross-country travel, a 25,363 acre or 0.2 reduction in acres closed to cross-county travel, and a 720,344 acre or 6 percent increase in acres managed as limited to existing roads and trails. Due to the reduction in acres open to cross county travel, and slight increased use of roads and trails, Alternative E would be more protective of soil resources than Alternative A, due to less acreage open and available for soil compaction caused by overland travel. Alternative E would also seasonally restrict OHV use to areas greater than 2 miles from leks during the GRSG breeding season (approximately March 1 through July 15), which would reduce the potential for effects on soil resources from overland travel during this seasonally wet time.

Impacts from Lands and Realty Management

Under Alternative E, 4,866,030 acres (39 percent) would be managed as ROW exclusion and 1,821,721 acres (14 percent) would be managed as ROW avoidance. Of these acres, 4,547,043 of ROW exclusion area would be in core area habitat and 156,523 acres of exclusion area would be in low density habitat. Additionally 1,384,208 of ROW avoidance acres would be in low density habitat.

Alternative E would manage the same number of acres as ROW exclusion as Alternative B, which is more than A and D and less that C and F. However, Alternative E would manage fewer acres as ROW avoidance than Alternatives A, B, or D. In conclusion, Alternative E would be less protective of soil resources than Alternatives C and F due to their greater acreage of exclusion areas, and less protective than Alternative B due to its equal amount of exclusion areas and higher amounts of avoidance area. While Alternative E would manage fewer acres as ROW avoidance than Alternative A, it would exclude ROW development on more acres, which would be more protective of soil resources.

Impacts from Energy and Mineral Development

Management of energy and mineral development under Alternative E would be similar to Alternative B. Alternative E would not manage mineral exploration and development within a 3 percent disturbance cap.

Locatable Minerals

Locatable mineral management under Alternative E would be the same as under Alternative B, except that additional BMPs and RDFs would not be required on nonhabitat.

Mineral Materials
Alternative E would manage mineral material disposal the same as Alternative B.

Nonenergy Leasable Minerals
Alternative E would manage nonenergy leasables the same as Alternative B.

Fluid Mineral Leasing
Under Alternative E, fluid mineral leasing would be managed the same as under Alternative B.

4.17.9 Alternative F

Impacts from Wild Horse and Burro Management
Management of wild horse and burro under Alternative F would be the same as Alternative B, except that there would be a reduction in wild horse AML of 25 percent for HMAs that contain PHMA and GHMA. This would reduce grazing pressure on the vegetation in these areas, which could locally improve soil health from the impacts described under **Section 4.17.2**.

Impacts from Livestock Grazing and Range Management
Under Alternative F 7,506,632 acres, or 59 percent, of the planning area would be managed as open to livestock grazing; 2,502,210 acres, or 19 percent, of the planning area would be managed as closed to livestock grazing. Alternative F would result in a 4,751,705 acreage reduction, or a 37 percent decrease in lands open to grazing over Alternative A. Of the acres closed to livestock grazing, 1,118,081 acres are located in PHMA and 1,384,129 acres are located in GHMA. Alternative F is the second most restrictive alternative for livestock grazing, removing approximately 56 percent of the area from grazing. This alternative would therefore be the second most protective of soil resources from potential short-term effects on vegetation and long-term effects on biological crusts due to livestock grazing behind Alternative C.

Impacts from Travel Management
Alternative F would manage the same number of acres as open, limited, or closed to cross-country motorized travel as Alternative B thus be equally protective of soil resources and more protective than Alternative A. Additionally, Alternative F would prohibit road construction and upgrades within 4 miles of active leks, and would avoid road construction and upgrades within occupied habitat. This would further limit the potential effects of travel management on soils, as described under **Section 4.17.2**.

Impacts from Lands and Realty Management
Alternative F would have the same potential for impacts on soil resources as Alternative C and would manage the same acreage as ROW exclusion (10,682,124 acres) and ROW avoidance (292,671 acres) areas.

Impacts from Energy and Mineral Development

Management of energy and mineral development under Alternative F would be similar to Alternatives B and E for locatable minerals and similar to Alternatives B and D for salable or disposal mineral materials. In addition, a 3 percent surface disturbance cap would be applied under this alternative, including disturbance from fire. Because fire would be included in the disturbance cap under Alternative F, the 3 percent cap is more likely to be reached sooner, resulting in limitations to additional disturbance, thus it would be more protective of soil resources than Alternatives A or C.

Locatable Minerals

Locatable mineral management under Alternative F would be the same as under Alternative B and E.

Mineral Materials

Alternative F would manage mineral material disposal the same as Alternative B and E

Nonenergy Leasable Minerals

Alternative F would manage nonenergy leasables the same as Alternative B.

Fluid Minerals

Alternative F would manage fluid mineral leasables the same as Alternative C.

4.17.10 Proposed Plan

Impacts from Wild Horse and Burro Management

Management of wild horses and burros under the Proposed Plan would be similar to Alternative B. The Proposed Plan would use HMAPs to incorporate GRSG habitat objectives, and would adjust AMLs through the NEPA process in SFA and PHMA. This would be in cases where wild horses and burros are identified as a significant factor in not meeting land health standards. These additional parameters for HMAs would reduce negative impacts on the rangeland and reduce grazing pressure, which would improve soil conditions and quantity of biological soil crusts.

Impacts from Livestock Grazing and Range Management

The Proposed Plan would be similar to Alternative B. Livestock grazing management would emphasize the SRH parameters. Grazing permits, leases, and AMPs would be adjusted before the start of the next grazing season if the allotment is not meeting SRH. If SRH is being met, then no changes would be made to current management or activity plans. The Proposed Plan would manage 12,232,499 acres as open to livestock grazing, which is approximately 25,838 acres more than Alternative A. Of the acres open to livestock grazing, 4,447,931 (36 percent) are in PHMA and 5,478,656 (44 percent) area in GHMA. The Proposed Plan would manage 279,342 acres as closed to livestock grazing, which is 25,838 more acres than Alternative A. Of the closed acres, 70,469 are

in PHMA and 125,006 are in GHMA. All or portions of key RNAs would be unavailable to grazing, and fences, corrals, and water storage facilities would be considered for removal in closed areas. The potential impacts on soil resources from livestock grazing would be essentially the same under the Proposed Plan as under Alternative A.

Impacts from Travel Management

The Proposed Plan would manage 1,202,682 acres as open to cross-county motorized travel, 367,000 acres as closed to cross-country travel, and 11,043,240 acres as limited to existing routes, which is most similar to Alternative C. Additionally, the Proposed Plan would exclude new road construction and upgrades within 4 miles of active leks, except for public safety, administrative use, and valid existing rights. It would avoid new road construction and upgrades in occupied habitat, which would further limit the potential effects of travel management on soil resources, as described under **Section 4.17.2**. The reduction in lands open to cross-country motorized travel and managed as limited to existing roads and trails would provide greater protection of soil resources from the potential effects of cross-country motorized travel than Alternative A.

Impacts from Lands and Realty Management

The Proposed Plan would manage ROW permitting, with 858,203 acres (6 percent) managed as exclusion areas and 9,914,490 acres (78 percent) as avoidance areas. The Proposed Plan would manage a similar number of acres as ROW avoidance as Alternative A, but it would manage 6,468,805 more acres as avoidance areas. Of the acres managed as ROW exclusion, 265,403 would be in PHMA and 286,733 would be in GHMA. Of the acres managed as ROW avoidance, 4,229,620 would be in PHMA and 5,250,480 would be in GHMA.

The Proposed Plan would be more protective of soil resources than Alternative A due to a near doubling of ROW avoidance areas, but it would be less protective than Alternatives B, C, E, and F due to less acreage of ROW exclusion areas. Additionally, the Proposed Plan would have a 3 percent disturbance cap on human disturbances, which is applicable to ROW authorizations. Once this cap is reached, the Proposed Plan would result in greater protection of soil resources from disturbance associated with ROW authorizations than Alternatives A, C, and E.

Impacts from Energy and Mineral Development

The Proposed Plan would be more protective of soil resources (including biological crusts) from vegetation clearing, soil compaction, and soil excavation than Alternative A due to more restriction on energy and mineral development. (Specific acreage differences under the various mineral resources are detailed below.) The Proposed Plan would manage energy and mineral development with a 3 percent disturbance cap, which would result in more protection for soil resources than Alternatives A, C, and E, once the cap is reached.

Locatable Minerals

The Proposed Plan would manage 1,435,911 acres (10 percent) as withdrawn from locatable mineral entry and would propose an additional 1,835,762 (13 percent) for withdrawal. The remaining 10,876,592 (77 percent) would be managed as open to locatable mineral entry. This is more restrictive than Alternatives A and D, and less than Alternatives B, C, E, and F.

Mineral Materials

The Proposed Plan would manage 7,343,283 acres (52 percent) as closed to mineral material disposal and 6,804,973 acres (48 percent) as open to mineral material disposal. This is a 3,731,537-acre reduction from Alternative A. This would be less restrictive than Alternative C and similar to Alternatives B, D, E, and F.

Nonenergy Leasable Minerals

The Proposed Plan would manage nonenergy leasables the same as Alternative B, E, and F.

Fluid Minerals

Under the Proposed Plan, 1,469,912 acres (10 percent) of the planning area would be managed as open, 4,847,381 acres (34 percent) would be managed with CSU, 4,333,744 acres (31 percent) would be managed with NSO, and 3,497,102 acres (25 percent) would be managed as closed. This is less restrictive than Alternatives B, C, E, and F.

4.18 WATER RESOURCES

4.18.1 Methods and Assumptions

Indicators

Indicators of impacts on water resources are as follows:

- Alter land open or closed to surface disturbing-activities
- Alter the characteristics of water sources that influence GRSG to a point where these resources are not properly functioning or sustainable
- Provide or restore water sources for GRSG
- Alter water resources for reduced mosquito-breeding habitat
- Alter the condition of riparian and wetland vegetation (increase or decrease either extent or species type)

Assumptions

The analysis includes the following assumptions:

- Projects that help restore watersheds, desirable vegetation communities, or wildlife habitats (including surface disturbance associated with these efforts) would benefit water resources over the long term.
- The degree of impact attributed to any one disturbance or series of disturbances would be influenced by several factors. These are proximity to running streams, drainages and groundwater wells, location within the watershed, time and degree of disturbance, reclamation potential of the affected area, vegetation present, precipitation, and mitigating actions applied to the disturbance.
- Surface-disturbing actions related to fluid mineral development would comply with Gold Book surface operating standards (and subsequent updates), and all federal and state water quality standards.
- Fluid mineral operations on existing federal leases, regardless of surface ownership, would be subject to COAs by the BLM Authorized Officer. The BLM can deny surface occupancy on portions of leases with COAs to avoid or minimize resource conflicts if this action does not eliminate reasonable opportunities to develop the lease or does not affect lease rights.

4.18.2 Nature and Type of Effects

Surface water quality is influenced by both natural and human factors. Natural factors include weather-related erosion or soil delivery into waterways as the result of wildfire removal of vegetation. Human related factors that can temporarily affect surface water quality includes additional transport of eroded soils into streams due to improper recreational activities or unmanaged livestock grazing. Water quality can be affected by introduction of waste matter into streams from domestic livestock or congregating horse herds, and soil from low-water crossing points of roads, routes, and ways used by motorized vehicles. Activities that introduce chemicals into the natural environment also have the potential to degrade surface and water quality through chemical leaks, accidents, or broken well casings. All of these activities have appropriate regulation and mitigation measures in place to reduce and, in most cases, eliminate these risks.

Surface-disturbing activities under certain circumstances can also lead to soil compaction, which decreases infiltration rates and elevates the potential for overland flow. Overland flow can increase erosion and sediment delivery potential to area surface water bodies, leading to surface water quality degradation.

Surface-disturbing activities within stream channels, floodplains, and riparian habitats are more likely to alter natural morphologic stability and floodplain function. Morphologic destabilization and loss of floodplain function accelerate stream channel and bank erosion, increase sediment supply, dewater near-stream alluvium, cause the loss of riparian and fish habitat, and deteriorate water quality (Rosgen 1996). Altering or removing riparian habitats can reduce the hydraulic roughness of the bank and increase flow velocities near the bank, which can also lead to accelerated erosion and possibly decrease water quality (National Research Council 2002).

Removing riparian vegetation and the shade it provides contributes to elevated stream temperatures (Rishel et al. 1982; Beschta 1997). Channel widening or lowering overall flow can similarly increase solar loading. The principal source of heat energy delivered to the water column is solar energy striking the stream surface directly (Brown 1969). Exposure to solar radiation can increase stream temperature. The ability of riparian vegetation to shade the stream throughout the day depends on aspect and vegetation height, width, density, and positions relative to the stream, as well as aspect the stream flows (streamside vegetation provides less shade on a north- or south-flowing stream than on an east- or west-flowing stream).

There are natural and human-induced causes of stream degradation due to removal of riparian vegetation and destabilization of streambanks across the planning area. Bank erosion from high water volume and velocity during intense rainstorms can alter the bed and banks. The land uses most commonly associated with stream degradation in the planning area is unmanaged livestock grazing and excessive use by wild horses and burros because it is most prevalent, compared with other disturbance factors. Other land uses associated with degraded streams are road location, construction and use, trails, water withdrawal, mining, reservoir storage and release, altered physical characteristics of the stream, and wetlands alteration.

Management to protect GRSG generally involves reducing or otherwise restricting land uses and activities that disturb the surface. Therefore, the greater the amount of acreage restricted from a land disturbing use, the greater the protection of impacts from surface disturbing activities afforded to water resources.

Lands and realty management decisions effect where ground-disturbing activities can and cannot occur. The use of ROW exclusion and ROW avoidance designations limit the amount of human-made runoff of soils and chemicals into waterways within those areas and are generally considered to be protective of water quality. ROW exclusion and avoidance are also seen as a means to reduce the likelihood of chemical spills onto the ground which may contaminate surface or groundwater. Areas where ROWs are authorized are permitted with conditions of approval (COAs) which assure that the holder of the rights

comply with the Water Quality Act and other federal and state laws, which would protect water resources from degradation.

In areas with NSO stipulations and managed as ROW exclusion, the potential for effects on water quality would be reduced since new ground disturbances would be prohibited. In areas managed as ROW avoidance, water quality would receive some protection since ground disturbance would often be limited. ROW avoidance areas would generally result in lower impacts on water quality, compared with areas not managed as ROW avoidance.

Livestock, wild horses, and burros often use the same riparian and wetland areas for water and shade and may congregate around water developments. This can result in compacted soil, decreased water quality due to fecal coliform introductions, trampled and consumed nearby vegetation, and reduced riparian community conditions and hydrologic functionality.

Unmanaged livestock grazing and wild horse and burro populations above AMLs can lead to loss of vegetation cover, reduced water infiltration rates and nutrient cycling, decreased plant litter and lower water quality, and increased bare ground and soil erosion (Manier et al. 2013). Livestock grazing can be a compatible use in riparian areas when managed in harmony with land management objectives. Regardless of other differences in management objectives, grazing must be compatible with achieving or maintaining PFC to be considered sustainable (USDI 1997).

Land health evaluations, appropriate animal management levels, rangeland monitoring studies, and rangeland health standards are used to assess rangeland condition and help to identify where a change in livestock grazing or wild horse and burro management would be beneficial. Additionally, drought management objectives are also available on top of livestock and wild horse and burro management during drought years to respond to specific environmental needs. These objectives are maintaining the water quality of lower water levels in ponds, lakes, and streams and assessing instream flows for water management and use (State of Oregon EOP 2002).

At the same time, water supply structures throughout the landscape that have been established for the benefit of livestock and wild horses and burros may also provide drinking water sources for GRSG. GRSG will use free water although they do not require it because they obtain their water needs from the food they eat. Information on the extent of habitat influenced by produced water and the net effects on GRSG populations is unknown (USFWS 2010a). Natural water bodies and reservoirs can provide mesic areas for succulent forb and insect production, thereby attracting GRSG hens with broods (Connelly et al. 2004). It is unknown whether wildlife guzzlers built to supply free water in normally arid habitats provide a net benefit to GRSG or if potential benefits are countered by potential negative consequences. These negative consequences may include increased competition from other species that benefit from

guzzlers, such as domestic and wild ungulates, or predators and the associated increase in predation risk (Braun 1998). In addition, new water resources may become additional habitat for mosquitoes carrying West Nile virus (Naugle 2004).

Diverting the water sources has the secondary effect of changing the habitat at the water source before diversion. This could result in the loss of either riparian or wet meadow habitat important to GRSG as sources of forbs or insects. Further study is needed to determine the effects of water management on the sagebrush biome.

Travel across land, especially by motorized or mechanized travel, can result in vegetation loss, loss of biotic crusts, soil compaction, and soil erosion, which may increase soil deposition into waterways. Management approaches that designate travel to specified routes can result in more predictable, localized, and manageable impacts. Selectively locating travel routes away from areas where water resources exist can minimize the extent of these effects.

Recreation on BLM-administered lands may result in temporary and localized increased soil deposition into waterways, and temporary decreases in water quality from recreational uses such as OHV use, camping and river floating. There are a number of activities that have minimal impacts. The effects of recreation on water resources are determined by the proximity of the recreation to waterways, and the severity and intensity of the recreation taking place. Areas with large number of visitors or the use of OHVs have a greater chance of resulting in some of the detrimental effects than lower impact, lower visitor number recreation areas.

Potential impacts from locatable mineral, mineral material disposal, nonenergy leasable, and fluid leasable mineral activity may result from violation of mineral regulations. The violations can include the release of pollutants capable of contaminating surface water or aquifers during groundwater recharge as a result of use, storage, and transportation of hazardous fluids and compounds. Mining activities and developments could alter drainage patterns which would affect stream flow and water supplies, and unintended discharge of mine water could alter water chemistry and impair natural stream morphologic conditions. Effects or impacts from mineral activity is regulated and mitigated through federal and state laws, as well as handbooks, stipulations, and conditions of approval which have effectively reduced the potential of surface or groundwater contamination. However, areas managed as closed to mineral entry would eliminate any potential for impacts on water resources, and therefore be more protective of water resources than areas open to mineral entry.

Implementing management for the following resources would have negligible impact or no impact on water resources for all alternatives; therefore, they are not discussed in detail:

- Special status species—GRSG
- Coal
- Recreation management
- Special designations
- Air quality and climate change
- Special status plants

4.18.3 Impacts Common to All Alternatives

Impacts from Vegetation Management

Under all alternatives, habitat restoration would occur. It would be implemented based on environmental variables that indicate areas most likely to succeed in restoration and therefore benefit GRSG. Restoring habitat has a beneficial effect on water quality over the long term. Direct effects of vegetation management are not expected to occur unless the required design features or BMPs fail. Then there may be a temporary decrease in water quality through increased sedimentation into waterways from vegetation clearing or burning. However, vegetation management would be designed and implemented so that sediment delivery into waterways is minimized. Long-term effects of vegetation management would protect water quality by maintaining infiltration rates, thereby reducing runoff and sediment delivery into surface waters by way of stabilizing soils with vegetation.

Vegetation management would also aim to reduce and prevent the spread of invasive plants under all alternatives. Displacement of native plants by invasive plants results in changes in the soil properties such as soil water availability. This change may result in bare ground or the inability to support the ecological site, which may affect water resources by increasing sediment deposition into waterways and decreasing overall water availability.

Impacts from Leasable Minerals Management

While there is potential for development, there have been no wells developed on these leases issued on occupied GRSG habitat in the planning area. Under all alternatives, the potential for development is estimated to be low; therefore, impacts on water resources from development as described in **Section 4.18.2** would be extremely limited. The differences in potential management effects on water resources from leasable minerals management under each alternative are the amount of acreage that would be closed to leasing. The greater the amount of land closed to leasing, the more protective of water resources the alternative is due to eliminating potential for impact.

Impacts from Locatable Minerals Management and Mineral Materials

All locatable minerals and mineral materials have potential to exist within the planning area, but exploration efforts have been minimal and the potential is unknown across all alternatives. The differences in potential management effects on water resources from locatable mineral entry and mineral material disposal

under each alternative are the amount of acreage that would be recommended for withdrawal or closed from mineral entry. The greater the amount of land withdrawn from locatable mineral entry, the more protective of water resources the alternative is due to eliminating potential for impacts as described in **Section 4.18.2**.

Impacts from Nonenergy Leasable Minerals Management

As mineral potential reports are not completed, and there is currently no commercial interest in solid leasables, the potential for nonenergy leasable minerals is unknown. Impacts on water resources are likely to be minimal across all alternatives. The differences in potential management effects on water resources from nonenergy leasable minerals management under each alternative are the amount of acreage that would be closed to leasing. The greater the amount of land closed to leasing, the more protective of water resources the alternative is due to eliminating potential for impacts as described in **Section 4.18.2**.

Impacts from Mineral Split-Estate Management

For the purposes of impacts on water resources, split-estate minerals would be similar to that described above by category of minerals.

Impacts from Wildland Fire Management

Effects of fire on water resources are determined largely by the location for the fire, the severity of the fire, any decisions made relative to any suppression activities, and the immediate post-fire precipitation regime. Highly variable effects of fire on water resources can occur under all alternatives. This results in a wide range of short term decreases in water quality due to increase particulate loads, increased streamflow and average storm flow discharge as a result of lower vegetation density and reduction in litter cover (Forest Service 2005).

4.18.4 Alternative A

Impacts from Wild Horses and Burros

Alternative A would continue to manage HMAs at the current AML and would evaluate AMLs based on existing management. Alternative A would continue to manage water resources and range improvements in the current manner, which would continue to support the current disbursement of wild horses and burros on the landscape.

Impacts from Livestock Grazing and Range Management

Under Alternative A, 12,58,337 acres, or 98 percent of the planning area is open to livestock grazing; 253,504 acres or 2 percent of the planning area is closed to livestock grazing. Of the acres open to livestock grazing 4,470,799 acres (36 percent) are within PPH and 5,511,327 acres (44 percent) are within PGH on BLM-administered lands.

All permits and leases under Alternative A would continue to be required to meet or make progress toward meeting standards defined in the Oregon and Washington Public Land Health Standards (described in **Section 3.8**, Livestock Grazing and Range Management). Grazing permits, including grazing systems, permitted AUMs, and allotment boundaries would be modified as necessary to conform to Standards and Guidelines for Livestock Grazing Management. Changes to rangeland management would be directed first to allotments not meeting land health standards, which may include changes in number of permitted AUMs, or current timing, duration or frequency of permitted used, including temporary closures.

Alternatives A, B, and E have the most acreage that would be managed as open to livestock grazing. This would subject the water resources to the greatest possible short- and long-term impacts from livestock grazing, as outlined in **Section 4.18.2.** Generally the short-term impacts are decreased water quality, due to fecal coliforms, and reduced riparian community conditions, depending on severity of vegetation removal. Longer term impacts include compacted soil, trampled or consumed nearby vegetation that exposes land surfaces to erosion or change vegetation community types, and associated changes to stream hydrologic functionality.

Due to the large planning area, the distribution of any of the impacts, either short term or long term, would be localized to individual grazing allotments or pastures and not entirely over the planning area, as would impacts from compacted areas or changes to streams that alter their hydrologic function. Based on the number of allotments that do not meet standards because of grazing factors (14 percent;), the overall impact would be considered low for any of the stated alternatives.

Impacts from Travel Management

Alternative A would manage 6,811,890 acres (54 percent) of the planning area as open to cross-country motorized travel, 300,328 acres (2 percent) of the planning area as closed to cross-country motorized travel, and 5,325,377 acres (42 percent) as limited to existing roads and trails, with possible additional seasonal or vehicle type restrictions. Alternative A would manage the largest amount of acreage as open to cross-country motorized travel, which subjects the most water body resources to the possible impacts caused by overland travel as outlined in **Section 4.18.2**. Potential effects of travel management on water resources include point source temporary degradation from stream crossings and increased soil deposition into waterways.

Impacts from Lands and Realty Management

Under Alternative A, 857,564 acres (7 percent of the planning area) would continue to be managed as ROW exclusion areas, and 3,445,685 acres (27 percent) would continue to be managed as ROW avoidance areas. Alternative A

would manage 8,314,779 acres (66 percent) of the planning area as open to potential ROW authorizations.

Within exclusion areas, new ROW development would continue to be prohibited. This would prevent surface disturbance from ROW development within these areas. Within avoidance areas, the BLM would require ROW applicants to observe additional conditions, such as location criteria and design requirements. This could discourage new ROW development in these areas. Within areas open to ROW authorization, water resources may be affected by ROW development, including potential for vegetation loss, soil compaction and erosion. However, any effects on water resources from ROW authorizations would be limited to the footprint of the disturbance area within the ROW, and any access roads necessary to get to the ROW development location, which varies with each authorization. The BLM would analyze impacts from individual ROW authorizations upon receipt of applications and as part of subsequent implementation-level environmental analyses.

4.18.5 Alternative B

Impacts from Wild Horse and Burro Management

Alternative B would amend HMAPs to incorporate GRSG habitat objectives and would prioritize the evaluation of all AMLs based on indicators that address the structure, condition, and composition of vegetation and measurements specific to achieving GRSG habitat objectives. GRSG habitat objectives are conservation based, and aimed at improving vegetation composition and riparian areas, which would reduce cases of soil erosion and sediment delivery into streams.

Impacts from Livestock Grazing and Range Management

Under Alternative B, management actions would not result in direct changes to the number of acres open or closed to livestock grazing. GRSG habitat objectives and management considerations would be incorporated into all BLM grazing allotments through AMPs or permit renewals. Land health assessments would be prioritized to permits within PHMA. GRSG habitat objectives are conservation based and are aimed at improving vegetation composition and riparian areas.

Alternative B would provide for range improvements, including new water diversions from springs and seeps, only if the water developments would benefit PHMA and improve GRSG habitat. Improving water sources includes fencing around springs and seeps and moving watering areas away from the streams and springs. This would improve the distribution of livestock and water quality. By locating improvements in upland areas away from riparian areas there is less crushing and removal of vegetation and concentration of livestock, wild horses, and burros. This improves the water quality by reducing sediment and fecal color form inputs and improving riparian areas used by GRSG.

Impacts from Travel Management

Under Alternative B, 4,141,539 acres (33 percent of the BLM-administered surface lands) would be managed as open to unrestricted cross-country motorized travel, 300,328 acres (2 percent) would be managed as closed to cross-country motorized travel, and 7,996,165 acres (63 percent) would be limited to existing roads and trails. This equates to a 21 percent reduction in lands open to cross-country motorized travel, and a 21 percent increase in lands managed as limited to existing roads and trails. Thus Alternative B may reduce the open traveled areas that are more susceptible to degradation and would open more areas that would confine travel to an improved travel way. Therefore, Alternative B would be more protective of water resources from the potential effects of cross-country motorized travel (described in **Section 4.18.2**) than Alternative A.

Impacts from Lands and Realty Management

Alternative B would manage 4,866,030 acres (39 percent of the planning area) as ROW exclusion areas, 6,106,923 acres (48 percent) as ROW avoidance areas, and 1,645,075 acres (13 percent) as open to ROW authorizations. Compared with Alternative A, Alternative B would be more protective of water resources from potential impacts from ROW authorizations due to greater acreage of exclusion areas. Alternative B would increase the acreage managed as ROW exclusion areas by 4,008,466 acres or 32 percent, would increase the acreage managed as ROW avoidance areas by 2,661,238 acres or 21 percent, and would decrease the acreage open to ROW authorizations by 6,669,704 acres, or 53 percent compared with Alternative A. Additionally, Alternative B would implement a 3 percent disturbance cap on all human activity in GRSG habitat, including ROW leasing, which would limit ROW leasing in the open areas within habitat.

ROW avoidance and exclusion designations have more restrictive conditions of use than areas open to ROW authorization which reduces the amount of vegetation clearing, soil compaction, and potential for increased erosion into waterways occurring within a ROW authorization. Regardless of ROW designation, any authorized ROW effects on water resources would be limited to the footprint of the disturbance area within the ROW, and any access roads necessary to get to the ROW development location, which varies with each authorization. The BLM would analyze impacts from individual ROW authorizations upon receipt of applications and as part of subsequent implementation-level environmental analyses.

Alternative B would also remove power lines and would reclaim ROW sites that are no longer in use. This would restore the surrounding habitat and would reduce the compacted surfaces that could be a potential source for soil erosion and runoff into water ways from traffic using these areas.

4.18.6 Alternative C

Impacts from Wild Horse and Burro Management

Alternative C would manage wild horses and burros similarly to Alternative A. However under Alternative C, water developments are proposed for removal, which would modify the distribution of wild horses and burros on the landscape and may result in intensified use of riparian areas year-round. This may result in increased fecal coliforms in the water, trampling and vegetation removal, and soil compaction in these areas, which may contribute to the warming of and sediment delivery to the adjacent stream water.

Impacts from Livestock Grazing and Range Management

Alternative C would close all acres to livestock grazing and would remove all allotments from the planning area. This would include any allotments completely or partially within occupied GRSG habitat. This would eliminate the possibility of the short-term, site-specific impacts from livestock grazing.

Impacts from Travel Management

Under Alternative C, 1,202,694 acres (9 percent of the planning area) would be managed as open to cross-country motorized travel, 300,328 acres (3 percent) would be managed as closed to cross-country motorized travel, and 10,937,171acres (87 percent) would be managed as limited to existing roads and trails.

Alternative C would manage the same amount of acreages as closed to cross-county motorized travel as Alternative A, 5,609,196 fewer acres as open to travel management than Alternative A, and 5,611,794 more acres as limited to existing roads and trails. This equates to a 45 percent reduction in lands open to cross-country motorized travel, and a 45 percent increase in lands managed as limited to existing roads and trails, which would be more protective of water resources from the potential effects of cross-country motorized travel than Alternative A, and a near doubling of the level of protection compared with Alternative B.

Impacts from Lands and Realty Management

Alternative C would manage 10,682,124 acres as ROW exclusion areas (85 percent of the planning area), 292,671 acres (2 percent) as ROW avoidance areas, and 1,643,233 acres (13 percent) as open to ROW authorizations. Compared with the other Alternatives, Alternative C would be more protective of water resources from potential impacts from ROW authorizations due to a greater amount of acreage designated as ROW exclusion areas which is the most restrictive ROW designation.

Alternative C would increase the acreage managed as ROW exclusion areas by 9,824,560 acres (78 percent), but would decrease the acreage managed as ROW avoidance areas by 3,153,014 acres (25 percent), and would decrease the acreage open to ROW authorizations by 6,671,546 acres (52 percent)

compared with Alternative A. ROW avoidance and exclusion designations have more restrictive conditions of use than areas open to ROW authorization which reduces the potential of human-made runoff of soils and chemicals into waterways within those areas. Regardless of ROW designation, any authorized ROW effects on water resources would be limited to the footprint of the disturbance area within the ROW, and any access roads necessary to get to the ROW development location, which varies with each authorization. The BLM would analyze impacts from individual ROW authorizations upon receipt of applications and as part of subsequent implementation-level environmental analyses.

4.18.7 Alternative D

Impacts from Wild Horse and Burro Management

Alternative D would evaluate HMAs in PHMA, based on HAF indicators or with values adjusted for regional conditions. It could modify AMLs based on rangeland health analysis and monitoring data if GRSG habitat objectives were not being met. GRSG habitat objectives are conservation based and are aimed at improving vegetation composition, which would reduce cases of soil erosion and runoff into streams and improve riparian areas.

Impacts from Livestock Grazing and Range Management

Under Alternative D, 12,183,315 acres, or 97 percent, of the planning area would be managed as open to livestock grazing, and 335,588 acres, or 3 percent of the planning area, would be managed as closed to livestock grazing. Of the acres open to livestock grazing, 4,408,539 acres (29 percent) are in PHMA and 5,514,479 acres (44 percent) are in GHMA. Compared with Alternative A, this is a 62,260-acre reduction in acres open to livestock grazing in PHMA and a 3,152-acre reduction in acres open to livestock grazing in GHMA.

Of the 335,588 acres closed to livestock grazing, 269,823 are in PHMA or GHMA, and the remaining acres were either already closed to livestock grazing under existing management or are priority RNAs that would be closed regardless of meeting land health standards.

Alternative D would essentially provide the same level of protection for the water resources from the potential effects of livestock grazing than Alterative A. There is approximately a 1 percent reduction of acres open to livestock grazing in in key RNAs that contain PHMA. Under Alternative D, new and existing range improvements would be authorized to enhance the functionality of seeps and springs for wildlife in PHMA and GHMA. BMPs would be used to manage for mosquito control by reducing their breeding habitat.

Impacts from Travel Management

Alternative D would manage the same number of acres as open, limited, or closed to cross-country motorized travel as Alternative B, and would therefore have similar effects on water resources as Alternative B. However, Alternative

D would provide fewer restrictions on route construction and maintenance, which may lead to more dispersed construction and therefore more dispersed impacts on water resources.

Impacts from Lands and Realty Management

Alternative D would manage 857,564 acres as ROW exclusion areas and 5,964,814 acres as ROW avoidance areas. ROW exclusion areas under Alternative D would be the same as Alternative A, and ROW avoidance areas would increase by 2,519,129 acres. Overall effects of lands and realty management would be very similar to Alternative A as an increase in ROW avoidance areas does not restrict ROW authorizations. Exceptions could be made for some development, so disturbance from ROW development could still affect water resources.

4.18.8 Alternative E

Impacts from Wild Horse and Burro Management

Alternative E would be managed similarly to Alternatives A and C. The HMAs would be managed at a total AML of 1,340-2,655 horses and burros, which is similar to current management. Wild horse roundups would be prioritized in GRSG areas that are over AML, and additional measures may be warranted to conserve GRSG habitat if sagebrush habitat were being impacted in HMAs.

Impacts from Livestock Grazing and Range Management

Alternative E would have the same amount of acreage open and closed to livestock grazing as Alternative A. Alternative E would also manage the same amount of acreage of Core Area habitat as open or closed to livestock grazing as Alternative A. Alternative E would also manage 3,826,015 acres (30 percent) as open to livestock grazing in Low Density habitat, which is a 1,6,85,312 acre reduction in lands open to livestock grazing compared with Alternative A. Alternative A would manage 5,511,327 acres as open to livestock grazing within PGH. Effects of livestock grazing on water resources under Alternative E would be less than those expected under Alternative A, with potential impacts reduced in Low Density habitat due to greater restrictions on livestock grazing.

Alternative E would allow for the relocation of existing or development of new water developments within GRSG habitat. These developments would be constructed or modified to maintain their free-flowing and wet meadow characteristics, which would maintain water quality and riparian area functions.

Impacts from Travel Management

Alternative E would manage 3,913,675 acres (31 percent of the planning area) as open to cross-country motorized travel, 274,965 acres (2 percent) as closed to cross-country motorized travel, and 6,043,851 acres (48 percent) as limited to existing road and trails. This would be a 2,898,215 acre or 23 percent reduction in acres open to cross-country travel, a 25,363 acre or 0.2 reduction in acres closed to cross-county travel, and a 720,344 acre or 6 percent increase in acres

managed as limited to existing roads and trails. Due to the 23 percent reduction in acres open to cross county travel, Alternative E would be more protective of water resources than Alternative A, due to less acreage open and available for soil disturbance and possible stream crossings caused by overland travel. Also, Alternative E would seasonally restrict OHV use to areas greater than 2 miles from leks during the GRSG breeding season (approximately March 1 through July 15), which would reduce the potential for effects on water resources from overland travel during this generally wet season timeframe.

Impacts from Lands and Realty Management

Under Alternative E, 4,866,030 acres (39 percent) would be managed as ROW exclusion and 1,821,721 acres (14 percent) would be managed as ROW avoidance. Of these, 4,547,043 acres of ROW exclusion area would be in core area habitat and 156,523 acres of exclusion area would be in low density habitat. Additionally 1,384,208 of ROW avoidance acres would be in low density habitat.

Alternative E would manage the same number of acres as ROW exclusion as Alternative B, which is more than Alternatives A and D and less that Alternatives C and F. However, Alternative E would manage fewer acres as ROW avoidance than Alternatives A, B, or D.

In conclusion, Alternative E would be less protective of water resources than Alternatives C and F due to their greater acreage of exclusion areas, and it would be less protective than Alternative B due to its equal amount of exclusion areas and higher amounts of avoidance area. While Alternative E would manage fewer acres as ROW avoidance than Alternative A, it would exclude ROW development on more acres, which would be more protective of water resources.

4.18.9 Alternative F

Impacts from Wild Horse and Burro Management

Management of wild horses and burros under Alternative F would be the same as Alternative B, except that there would be a reduction in wild horse AML of 25 percent for HMAs that contain PHMA and GHMA. This would reduce grazing pressure on the vegetation in these areas, which could locally improve water resources from the potential impacts, as described under **Section 4.18.2**.

Impacts from Livestock Grazing and Range Management

Under Alternative F 7,506,632 acres, or 59 percent, of the planning area would be managed as open to livestock grazing; 2,502,210 acres, or 20 percent, of the planning area would be managed as closed to livestock grazing. Alternative F would result in a 4,751,705 acreage reduction, or a 37 percent decrease in lands open to grazing over Alternative A. Alternative F is the second most restrictive alternative for livestock grazing, behind Alternative C, and would therefore be the second most protective of water resources from potential effects of

unmanaged livestock grazing. Unlike Alternative B, Alternative F would not modify existing water developments or develop new water diversion from springs or seeps within GRSG habitat. This would protect water resources from development, which may draw livestock that alter stream channels and cause bank erosion.

Impacts from Travel Management

Alternative F would manage the same number of acres as open, limited, or closed to cross-country motorized travel as Alternative B. Additionally, Alternative F would prohibit new road construction and upgrades within 4 miles of active leks. It would avoid new road construction and upgrades within occupied habitat, which would further limit the potential effects of travel management on water resources, as described under **Section 4.18.2**.

Impacts from Lands and Realty Management

Alternative F would have the same potential for impacts on water resources as Alternative C and would manage the same acreage as ROW exclusion (10,682,124 acres) and ROW avoidance (292,671 acres).

4.18.10 Proposed Plan

Impacts from Wild Horse and Burro Management

Management of wild horses and burros under the Proposed Plan would be most similar to Alternative B through its use of HMAPs to incorporate GRSG habitat objectives. This would improve vegetation composition and riparian areas, which would reduce cases of soil erosion and sediment delivery into streams.

The Proposed Plan would amend HMAPs to incorporate GRSG habitat objectives. It would prioritize the evaluation of all AMLs based on indicators that address the structure, condition, and composition of vegetation and measurements specific to achieving GRSG habitat objectives. AMLs would be adjusted through the NEPA process in SFA and PHMA when wild horses and burros are identified as a significant factor in not meeting land health standards.

Water developments or other rangeland improvements for wild horses and burros would be assessed using the NEPA process for planning and implementation, using criteria identified for domestic livestock. Removing water sources before first replacing them may reduce the distribution of wild horses and burros on the landscape. Dispersing animals across the landscape rather than concentrating them around springs and seeps would improve the water quality coming from those sources.

Impacts from Livestock Grazing and Range Management

The Proposed Plan would be similar to Alternative B. Livestock grazing management would emphasize the SRH parameters. Grazing permits, leases, and AMPs would be adjusted before the start of the next grazing season if the

allotment were not meeting SRH. If SRH were being met, then no changes would be made to current management or activity plans.

The Proposed Plan would manage 12,232,499 acres as open to livestock grazing, which is approximately 25,838 acres fewer than Alternative A. The potential impacts on water resources from livestock grazing would be essentially the same under the Proposed Action as under Alternative B. All or portions of key RNAs would be unavailable to grazing, and fences, corrals, and water storage facilities would be considered for removal. This could concentrate livestock around riparian and wetland areas, which could result in a local decrease in water quality from fecal coliforms, bank vegetation removal, and trampling.

Impacts from Travel Management

The Proposed Action would manage 1,202,682 acres as open to cross-county motorized travel, 367,108 acres as closed to cross-country travel, and 11,043,240 acres as limited to existing routes, which is most similar to Alternative C. Additionally, the Proposed Action would exclude new road construction and upgrades within 4 miles of active leks, except for public safety, administrative use, and valid existing rights. It would avoid new road construction and upgrades within occupied habitat, which would further limit the potential effects of travel management on water resources, as described under **Section 4.18.2**.

Impacts from Lands and Realty Management

The Proposed Action would manage ROW permitting, with 858,203 acres (6 percent) managed as exclusion areas and 9,914,490 acres (78 percent) as avoidance areas. The Proposed Action would manage similar acres as ROW avoidance as Alternative A but would manage 6,468,805 more acres as avoidance areas.

The Proposed Action would be more protective of water resources than Alternative A, due to a near doubling of ROW avoidance areas, but it would be less protective than Alternatives B, C, E, and F due to less acreage of ROW exclusion areas. Additionally, the Proposed Action would have a 3 percent disturbance cap on human disturbances, which is applicable to ROW authorizations. Once this cap is reached, the Proposed Action would result in greater protection of water resources from disturbance associated with ROW authorizations than Alternatives A, C, and E.

4.19 LANDS WITH WILDERNESS CHARACTERISTICS

4.19.1 Methods and Assumptions

Indicators

Indicators of impacts on lands with wilderness characteristics are protection or degradation of the inventoried characteristics to a level at which the value of the

wilderness characteristic would no longer be present within the specific area. The inventoried wilderness characteristics are as follows:

- Size of road acres—Impacts would result from building roads that would reduce the roadless size.
- Naturalness (apparent naturalness, not ecological naturalness)—Impacts would result from developments or vegetation manipulations that make the area appear less natural.
- Opportunities for solitude or primitive recreation—Impacts would result from increases in visitation or loss of recreation opportunities.
- Supplemental values—Impacts would result from any action that degrades the inventoried values.

Assumptions

The analysis includes the following assumptions:

- No available statewide GIS data track whether or not inventoried lands with wilderness characteristics have been assessed in an RMP revision and decisions have been made about whether to protect their wilderness characteristics. As such, all lands with wilderness characteristics are treated as if their wilderness characteristics are not protected, and impacts on them are discussed.
- Management to protect GRSG under Alternatives B through F and the Proposed Plan could provide additional protections of wilderness characteristics and, at a minimum, would provide complementary management.

4.19.2 Nature and Type of Effects

Wilderness characteristics are primarily influenced by actions that impact the undeveloped nature of the area or by activities that increase the sights and sounds of other visitors. These actions and activities could damage the qualities listed in BLM Manual 6310 (naturalness, outstanding opportunities for solitude, and opportunities for primitive and unconfined types of recreation) that make up the criteria for wilderness characteristics (BLM 2012j). Generally, actions that create surface disturbance degrade the naturalness of wilderness characteristics, as well as the setting for experiences of solitude and primitive recreation. In addition, restrictions on dispersed recreation (e.g., prohibiting campfires or permitting camping only in designated sites) diminish the opportunities for unconfined recreation.

Management actions that could impact an area's natural appearance include the following:

- Presence or absence of roads and trails and use of motorized vehicles along those roads and trails
- Fences and other improvements
- The nature and extent of landscape modifications
- Other actions that result in surface-disturbing activities

All of these activities affect the presence of human activity and, therefore, could affect an area's natural appearance. Prohibiting surface-disturbing activities and new developments within lands with wilderness characteristics would protect naturalness.

Two other wilderness characteristics—outstanding opportunities for solitude or primitive and unconfined types of recreation—are related to the human experience in an area. Visitors can have outstanding opportunities for solitude or for primitive, unconfined recreation under the following conditions:

- When the sights, sounds, and evidence of other people are rare or infrequent
- Where visitors can be isolated, alone, or secluded from others
- Where the use of the area is through nonmotorized, nonmechanized means
- Where there are no developed or only minimally developed recreation facilities.

High concentrations of recreation users (large group sizes or frequent group encounters) would decrease outstanding opportunities for solitude. Limiting visitor use to prevent substantial degradation of naturalness and opportunities for solitude would confine recreation to some extent.

Any increase in travel on existing routes could reduce opportunities for solitude by increasing sights and sounds of other people. Any increase in motorized and mechanized access would also reduce opportunities for primitive recreation. The existence of trails open to motorized and mechanized travel could reduce the natural appearance in the vicinity of the trails. Effects would be localized and would not be experienced in the unit as a whole. Prohibiting motorized and mechanized use on lands with wilderness characteristics would enhance those characteristics by restricting activities that could impact natural appearance and opportunities for solitude and primitive and unconfined recreation. Increased motorized and mechanized use of routes by established livestock grazing permittees would impact opportunities for solitude and naturalness of appearance. Creating new routes would impact naturalness and size, if created by mechanical means.

While vegetation treatments are implemented, both naturalness and solitude experienced by recreational users could be impacted in the short term. The presence of treatment crews would decrease the sense of solitude and the presence of machinery and/or tools necessary for treatments would lessen the sense of naturalness. After the treatment is over, solitude would be restored with the departure of treatment crews. Over the long term, naturalness would likely be enhanced by restoring natural vegetation structures and patterns although stumps may remain for many decades where juniper treatments occurred.

Managing for wildland fire could impact wilderness characteristics. In areas where suppression is a priority, vegetation modification could prevent the spread of fires, potentially reducing the natural appearance. Wildfire management and prescribed burns could have short-term impacts on wilderness characteristics by disturbing naturalness and the sense of solitude, but over the long term it could improve ecological function. Constructed fuel breaks would reduce naturalness, whereas designated fuel breaks that use natural features only, such as rimrock and wet areas, would have no effect on naturalness. The degree of reduction in naturalness from constructed fuel breaks would depend on fuel break size and type and the degree to which vegetation is altered so that the fuel break can function.

Allowing any type of energy or mineral development, such as fluid, coal, nonenergy solid, locatable, and salable minerals, as well as renewable energy, would result in surface disturbance that would diminish the area's natural characteristic. Any new roads authorized for access to the development area could eliminate wilderness characteristics of the entire unit. This would be the case if the road were to bisect the unit so that it would no longer be considered a roadless area of adequate size. In addition, allowing developers regular access to the lease area or mine site would reduce opportunities for solitude.

Impacts on wilderness characteristics are possible from changes in livestock grazing and wild horse and burro management, particularly from new developments (e.g., water developments and fences) in lands with wilderness characteristics. This could lessen the natural appearance or could limit unconfined recreation. Existing range improvements used for livestock grazing and wild horses and burro management, such as fences, stock trails, and springs, would not change current wilderness characteristics. Maintaining range improvements could result in short-term impacts on solitude and naturalness. Where PHMA and GHMA were closed to livestock grazing, lands with wilderness characteristics that overlap PHMA and GHMA would experience a reduction of these impacts. Gathering operations to manage wild horse and burro populations would temporarily reduce opportunities for solitude.

ROW exclusion areas provide indirect protection of wilderness characteristics by preserving naturalness and opportunities for solitude and primitive

recreation by prohibiting disturbance from transmission lines, roads, and other utility developments.

Implementing management for the following resources would have negligible impact or no impact on wilderness characteristics for all alternatives; therefore, they are not discussed in detail:

- Special status species—GRSG
- Wildfire management
- Air quality and climate change
- Special status plants

4.19.3 Impacts Common to All Alternatives

Impacts on wilderness characteristics from water developments associated with wild horses and burros would be the same under all alternatives. All of the action alternatives (B through F) and the Proposed Plan would result in greater restrictions on resource uses and surface-disturbing activities than would management under Alternative A. These restrictions could provide incidental protection of wilderness characteristics, and wilderness characteristics in those areas could be maintained. Wilderness characteristics would likely experience either increased protection or no impacts from GRSG management and restrictions. Impacts would vary in degree across alternatives.

4.19.4 Alternative A

Under Alternative A, 192,087 acres of PHMA and GHMA are closed to off-road use. Alternative A would also limit travel to existing routes on 4,405,795 acres of PHMA and GHMA, the fewest of any of the alternatives. Lands with wilderness characteristics that overlap these areas would experience fewer of the incidental protections resulting from prohibiting or restricting motorized and mechanized use and more of the impacts from such use as discussed in *Nature and Type of Effects*.

Under Alternative A, 2,657,254 acres of PPH and PGH are closed to fluid mineral leasing. Closing acres to fluid minerals leasing would protect wilderness characteristics by prohibiting development and infrastructure related to those actions, subject to valid existing rights, as discussed in *Nature and Type of Effects*. Alternative A, along with Alternative D and the Proposed Plan, has the fewest acres closed to oil and gas leasing on BLM-administered lands and consequently would offer less protection of wilderness characteristics than would Alternatives B, C, E, and F.

There would be more acres of PPH and PHMA and PGH and GHMA open to livestock grazing (9,982,126 acres) under Alternatives A and B than under any of the other alternatives. Therefore, lands with wilderness characteristics that overlap livestock grazing open areas would experience fewer of the incidental protections resulting from closing acres to livestock grazing under Alternatives

A and B and more of the impacts from livestock grazing discussed in *Nature and Type of Effects*.

Under Alternative A, there are 2,362,868 acres of HMAs. Similar to livestock grazing, wilderness characteristics that overlap HMAs would experience fewer incidental protections and would result in the types of impacts discussed in *Nature and Type of Effects*.

Additionally, Alternatives A and D would have fewer acres of ROW exclusion areas (545,349 acres) in PPH and PHMA and PGH and GHMA than the other alternatives. Where lands with wilderness characteristics overlap ROW exclusion areas, this would likely result in fewer indirect protections of lands with wilderness characteristics than Alternatives B, C, E, and F. The effects of having more acres open to livestock grazing and fewer ROW exclusion areas are described in **Section 4.19.2**, *Nature and Type of Effects*.

4.19.5 Alternative B

Alternative B would close the same number of acres to off-road use as would Alternative A (192,087 acres), and would limit travel to existing routes on 7,075,386 acres, 2,669,591 acres more than under Alternative A . Lands with wilderness characteristics that overlap these areas would experience more of the incidental protections resulting from prohibiting or restricting motorized and mechanized use and fewer of the impacts from such use as discussed in *Nature and Type of Effects*.

Under Alternative B, 5,911,395 acres of PHMA and GHMA are closed to fluid mineral leasing, 3,254,141 more acres than under Alternative A. Types of effects are discussed in *Nature and Type of Effects*.

The same number of acres would be open to livestock grazing under Alternative B as under Alternative A, so impacts on lands with wilderness characteristics would be the same.

Alternative B would have the same number of acres of HMAs as Alternative A. Impacts from wild horse and burro management under Alternative B would be the same as those described under Alternative A.

More than 8 times more acres of PHMA and GHMA would be ROW exclusion areas under Alternative B (4,547,043 acres) than under Alternative A. Where lands with wilderness characteristics overlap ROW exclusion areas, this would likely result in more indirect protection of lands with wilderness characteristics than under Alternative A, as described in *Nature and Type of Effects*.

4.19.6 Alternative C

Alternative C would limit travel to existing routes on 10,017,585 acres of PHMA and GHMA, more than double the number of acres under Alternative A and more than all of the other alternatives except the Proposed Plan. Lands

with wilderness characteristics that overlap these areas would experience more of the incidental protections resulting from prohibiting or restricting motorized and mechanized use and fewer of the impacts from such use as discussed in *Nature and Type of Effects*.

Under Alternative C, 9,751,575 acres of PHMA and GHMA would be closed to fluid mineral leasing, almost four times more acres than Alternative A. Types of effects are discussed in *Nature and Type of Effects*.

Under Alternative C, no areas would be open to livestock grazing. This would result in the most indirect protection of lands with wilderness characteristics of all the other alternatives because lands with wilderness characteristics would not be subject to the types of impacts from livestock grazing that could reduce naturalness. The effects of closing acres to livestock grazing on lands with wilderness characteristics are described in *Nature and Type of Effects*.

Alternative C would have the same number of acres of HMAs as Alternative A. Impacts from wild horse and burro management under Alternative C would be the same as those described under Alternative A.

The same amount of PHMA would be ROW exclusion areas under Alternative C as under Alternative B. In addition, 5,669,422 acres of GHMA would be ROW exclusion areas. Management under Alternative C would have greatest potential to maintain wilderness characteristics on lands with wilderness characteristics. Allowable uses such as livestock grazing and ROWs for corridors and towers would be prohibited in PHMA and GHMA. ROW activities and associated development can reduce the size of lands with wilderness characteristics and can impair the apparent naturalness of the area and the feeling of solitude, as described in **Section 4.19.2**, *Nature and Type of Effects*. Precluding these types of activities would help protect wilderness characteristics. In addition, all PHMA would be designated as a new ACEC, which would likely provide incidental protection of the 697,893 acres of PHMA within lands with wilderness characteristics.

4.19.7 Alternative D

The number of PHMA and GHMA acres closed to off-road use (i.e., limited to existing routes) would be the same as under Alternative B; impacts would be the same as Alternative B.

The number of PHMA and GHMA acres closed to fluid mineral leasing would be the same as under Alternative A, as would the impacts. Along with the Proposed Plan, this would be the fewest number of acres closed to fluid mineral leasing of all action alternatives and would result in the fewest incidental protections of wilderness characteristics.

There would be 9,923,018 acres of PHMA and GHMA open to livestock grazing under Alternative D, 59,108 fewer acres than would be open under Alternative

A. There would be 69,978 more acres of PHMA and 29,943more acres of GHMA closed to livestock grazing under Alternative D than under Alternative A, resulting in more indirect protection of wilderness characteristics on these closed lands under Alternative D than under Alternative A. The effects of closing acres to livestock grazing on lands with wilderness characteristics are described in *Nature and Type of Effects*.

Alternative D would have the same number of acres of HMAs as Alternative A. Impacts from wild horse and burro management under Alternative D would be the same as those under Alternative A.

Alternative D has the same number of ROW exclusion areas (545,349 acres) in PHMA and GHMA as Alternative A. Alternative D also would manage 5,961,914 acres as ROW avoidance, 2,953,743 acres more than under Alternative A. Consequently, there would be more protection of wilderness characteristics under Alternative D than under Alternative A.

Juniper treatments under Alternatives D and E could temporarily impact wilderness characteristics; however, this could enhance wilderness characteristics in the long term, as discussed in *Nature and Type of Effects*.

4.19.8 Alternative E

Alternative E would close to off-road use and limit travel to existing routes the fewest acres of Core Habitat (PHMA in the other action alternatives) and Low Density and Currently Occupied Habitat (GHMA in the other action alternatives) of any of the actions alternatives. Lands with wilderness characteristics that overlap these areas would experience the fewest incidental protections resulting from prohibiting or restricting motorized and mechanized use and the most impacts from such use as discussed in *Nature and Type of Effects*.

Under Alternative E, 5,601,984 acres of Core Habitat and Low Density and Currently Occupied Habitat would be closed to fluid mineral leasing, 2,944,730 more acres than under Alternative A. Types of effects are discussed in *Nature and Type of Effects*.

There would be the same number of acres of Core Habitat (PPH under Alternative A)and 1,685,312 fewer acres of Low Density and Currently Occupied Habitat (PGH under Alternative A) open to livestock grazing under Alternative E as under Alternative A. There would be the same number of acres of Core Habitat and 44,126fewer acres of Low Density and Currently Occupied Habitat closed to livestock grazing under Alternative E than under Alternative A. This is the smallest number of acres closed to livestock grazing of all the alternatives and would result in fewer incidental protections from grazing of lands with wilderness characteristics.

Alternative E would have 454,297 fewer acres of low density and currently occupied habitat (GHMA under the other action alternatives) in HMAs than under Alternative A. This could result in fewer impacts on wilderness characteristics from the presence of wild horses and burros, such as those described in *Nature and Type of Effects*.

The same amount of Core Habitat (PHMA under Alternative B) would be ROW exclusion areas under Alternative E as under Alternative B. In addition, 156,523 acres of Low Density and Currently Occupied Habitat (GHMA under Alternative B) would be ROW exclusion areas. Impacts on wilderness characteristics would be similar to those described under Alternative B.

Additionally, juniper treatments under this alternative could temporarily impact lands with wilderness characteristics, as described under Alternative D.

4.19.9 Alternative F

The number of PHMA and GHMA acres closed to off-road use would be the same as under Alternative A, and impacts would be the same as Alternative A. The number of PHMA and GHMA acres limited to existing routes would be the same as under Alternative B. The impacts would be the same as under Alternative B, except that under Alternative F, seasonal buffers would apply. This would increase the possibility of incidental protections of wilderness characteristics that overlap these buffers.

The number of PHMA and GHMA acres closed to fluid mineral leasing would be the same as under Alternative C, and impacts would be the same as Alternative C.

There would be 1,118,081 acres of PHMA (24 times more acres of PHMA than would be under Alternative A) and 1,384,129 acres of GHMA (over 10 times more acres than under Alternative A) closed to livestock grazing under Alternative FA. This is the second-largest number of acres closed to livestock grazing of all the action alternatives and would result in more incidental protections from grazing of lands with wilderness characteristics than all the other alternatives except Alternative C because wilderness characteristics would not be subject to the types of impacts from livestock grazing that reduce naturalness. The effects of closing acres to livestock grazing on lands with wilderness characteristics are described in **Section 4.19.2**, *Nature and Type of Effects*.

Alternative F would have the same number of acres of HMAs as Alternative A. Impacts from wild horse and burro management under Alternative F would be the same as those under Alternative A.

The same number of acres of PHMA and GHMA would be ROW exclusion areas under Alternative F as under Alternative C, so impacts on wilderness characteristics would be the same.

Under Alternative F, 17 new ACECs would be designated to conserve GRSG and other sagebrush-dependent species. The new ACECs would encompass 1,241,571 additional acres of GHMA and 2,560,384 additional acres of PHMA as compared with Alternative A. The protections and restrictions on uses within these new ACECs could provide indirect protections of wilderness characteristics where they overlap with the new ACECs, and wilderness characteristics in those areas could be maintained.

4.19.10 Proposed Plan

Under the Proposed Plan, off-road use would remain prohibited on 227,657 acres of PHMA and GHMA. This could result in more incidental protections from the types of travel impacts described in *Nature and Type of Effects*. Travel would also be limited to existing roads and trails on 9,987,722 acres of PHMA and GHMA, 5,581,927 acres more than under Alternative A.

Almost the same number of acres of PHMA and GHMA would be closed to fluid mineral leasing under the Proposed Plan as under Alternative A, which would result in similar impacts. Under the Proposed Plan, 9,956,587 acres of PHMA and GHMA would be open to livestock grazing, 25,539 acres fewer than under Alternative A. This could result in slightly more protection of wilderness characteristics under the Proposed Plan. Under the Proposed Plan, 12,435,558 more acres would be managed as ROW avoidance and 558,923 more acres would be managed as ROW exclusion than under Alternative A. This would result in more incidental protection of wilderness characteristics than under Alternative A.

4.20 Social and Economic Impacts (Including Environmental Justice)

This section discusses social and economic impacts from proposed GRSG management actions related to other resources and resource uses. Existing social and economic conditions are described in **Section 3.21**, Social and Economic Conditions (Including Environmental Justice). This section also addresses environmental justice impacts and the differences between alternatives for the social and economic impacts identified.

This section is organized slightly differently than the sections for other resource areas. Rather than grouping the analysis of impacts by alternative, the analysis of economic impacts is grouped by affected resource followed by an overall discussion of social impacts. This grouping assists with the reader's understanding of the analytical approach and assumptions used to analyze economic and social impacts associated with each resource use and facilitates interpretation of results. Impacts are grouped by alternative in the **Summary of Economic Impacts** and **Summary of Social Impacts** and in **Table 4-52 Environmental Justice Impacts.**

4.20.1 Methods and Assumptions

Indicators

Conservation measures related to GRSG habitat could have impacts on resource uses on BLM-administered lands. Impacts on social and economic conditions could result from these changes in resource uses. Many of the indicators used to characterize social and economic conditions are quantitative, including population, demographics (e.g., age and gender breakouts), local industry (e.g., recreation and mineral development), employment, personal income, and presence of minority and low-income populations. Other indicators, especially for social conditions, are qualitative.

Assumptions

For the analysis of economic impacts, quantitative estimates are provided where sufficient data or estimates are available on the potential changes in authorized uses of Federal lands under each alternative. When quantitative estimates of economic impacts were not possible, a qualitative discussion of the potential economic impacts of management actions associated with specific authorized uses is presented. Therefore, the overall economic impacts are a combination of quantitative estimates and qualitative discussion.

To the extent that there is a degree of uncertainty regarding the changes in authorized uses of Federal lands under each management alternative, this uncertainty is carried forward to the socioeconomic impacts of management alternatives.

When sufficient information was available to quantify the potential economic impact of alternatives, the IMPLAN model, which captures the indirect and induced economic effects of management alternatives in the Socioeconomic Study Area, was used to estimate impacts on outcomes, employment, and earnings in the study area. This was the case of the analysis of impacts through livestock grazing, wind energy development, and geothermal development. The analysis using IMPLAN includes those impacts derived from the multiplier effect, which captures the impact of several rounds of expenditures that follow an initial direct expenditure in the Study Area. These additional expenditures are due to income received by suppliers and employees directly benefiting from the initial expenditure, and who go on to spend a share of their income locally. This allows for a more complete picture of the economic impacts of the management alternatives in the planning area. However, the IMPLAN model is a static model, and it does not capture changes in the industrial composition of a region over time, nor does it capture dynamic effects that may be associated with processes of growth or decline, such as changes in technology or labor productivity or the feasibility of economic operations that require scale. There is, therefore, a degree of uncertainty in the estimates of impacts obtained through the IMPLAN model.

In the analysis of economic impacts of management alternatives on grazing, billed AUMs were used as a baseline, estimated as a 12-year average share of active AUMs. Active AUMs are the amount of forage from land the BLM has determined are available for livestock grazing; billed AUMs are the amount of forage that the BLM bills for annually. The analysis uses these two scenarios to describe a range of potential economic impacts of management alternatives on economic activity related to livestock grazing.

Alternatives B, D, F and the Proposed Plan include a 3 percent disturbance cap on PHMA, independent of surface ownership. If this disturbance cap is reached, economic activity on BLM lands could be curtailed further than what is described in this section for these management alternatives. All management alternatives, except for Alternatives A and E, would include an adaptive management plan where additional measures could be taken to protect GRSG habitat based on triggers linked to indicators monitored by BLM. If triggered, these additional measures could also impose additional restrictions on economic activity on BLM lands.

As a landscape level planning effort, none of the alternatives prescribe project-level or site-specific activities on BLM or Forest Service managed lands. Furthermore, the agencies' selection of an alternative does not authorize funding to any specific project or activity nor does it directly tie into the agencies' budgets as appropriated annually through the Federal budget process. As a consequence, agencies' costs and differences in program costs across alternatives have not been quantified. Information has been presented in several resource impact sections on the types of costs that might be associated with various GRSG conservation measures.

4.20.2 Nature and Type of Effects

The main economic impacts derived from changes in resource management are reflected in changes in local employment and earnings, costs incurred by the private sector, fiscal revenues, and regional growth prospects.

For the analysis of social impacts, two types of impacts capture the main social effects that can be expected from changes in resource management. The first are derived from migration induced by management actions. These impacts are induced by economic opportunities that drive population into or out of specific areas; they affect population growth as well as the demand for housing and public services. The second group of impacts describes those impacts associated with specific interest groups, community livelihoods, or minority and low-income populations (environmental justice).

Implementing management for the following resources would have negligible or no impact on socioeconomics and environmental justice across alternatives; therefore, they are not discussed in detail:

- Vegetation
- Wild horses and burros management
- Wildland fire management
- Special designations
- Air quality and climate change
- Special status plants

4.20.3 Economic Impacts

Impacts Common to All Alternatives

As described in **Chapter 3**, there have been some claims for the exploration of biomass as a renewable energy source; however, with the possible exception of the Prineville District, the suggestions have not been consistent and the management alternatives would have no impact on existing or developable project areas. There are no existing, proposed, or foreseeable solar energy zones in the primary study area (BLM 2013a).

Impacts from Management Actions Affecting Grazing Allotments

Overall Employment, Earnings, and Output per Job Impacted by Management Alternatives

As discussed in **Section 3.21**, agriculture is an important economic activity in the study area. In 2010, agriculture provided employment for nearly 11 percent of the labor force in the primary Socioeconomic Study Area. This takes into account proprietors and employees, but does not include unpaid or paid-in-kind family labor, which is typically not accounted for in labor force statistics. **Table 3-66** shows the relative share of crops and livestock and demonstrates that in Lake, Malheur, and Harney Counties, livestock grazing provides an important share of all earnings.

The potential impacts of management alternatives affecting grazing on output and employment were estimated quantitatively using the IMPLAN economic model. BLM obtained estimates of employment and output relative to Alternative A by multiplying the estimated reduction in the number of AUMs under each alternative, relative to Alternative A, by the estimated output and employment per AUM (shown in **Table R-4** and **Table R-5** of **Appendix R**, Economic Impact Analysis Methodology). Data from 2011 were used for active AUMs and an average of 2000 to 2011 data for billed AUMs because billed AUMs fluctuate from year to year. The analysis calculated a range of economic impacts. The low impact scenario represents the case where ranchers use as many of the active AUMs in GRSG habitat as possible, using active AUMs that are not currently billed as a buffer to absorb reductions in AUMs imposed by management alternatives.[5] The high impact scenario represents the case where ranchers maintain a constant billed to active AUM ratio and where they reduce

[5] The low impact scenario does not allow for reallocation of livestock to AUMs outside of GRSG habitat.

billed AUMs in proportion to the reduction in active AUMs. In addition, the high impact scenario considered the possibility that the loss of AUMs on public lands could lead to the loss of additional AUMs due to seasonal limitations of grazing areas. This would be the case if livestock operations have no reasonable alternative to seasonal grazing on public lands closed to grazing under a specific alternative. BLM estimated the additional loss of AUMs due to seasonal limitations on livestock grazing based on Torell et al. (2014). Further details are provided in **Appendix R**, Economic Impact Analysis Methodology.

Table 4-45, Annual Impact of Management Actions Affecting Livestock AUMs on Output, Employment, and Earnings, Compared with Alternative A, presents this range of estimates. Note that the employment estimates do not include unpaid or paid-in-kind family labor; if such labor were included, then labor use differences among alternatives would be larger.

Beyond economic impacts linked to closing federal lands to livestock grazing under Alternatives B, C, D, F, and the Proposed Plan, management alternatives could impose other costs on livestock operators as follows:

- Closure of federal lands to grazing could mean additional costs to livestock operators with construction of new water infrastructure on private lands or other infrastructure, if previously used infrastructure is no longer accessible.
- Various measures could affect the efficiency of livestock operations such as restrictions on vegetation treatments, restrictions on structural improvements, or restrictions on supplemental winter feeding.
- To the extent determined necessary in land health assessments, some allotments may be required to change livestock rotation or season of grazing, which could also affect the efficiency of farm operations.
- For Alternatives B, D, F, and for the Proposed Plan, in areas where disturbance caps are exceeded, there is potential for restrictions on new disturbance (e.g., roads) that could increase operation costs for livestock operators.

Details about impacts under each alternative are provided below.

Alternatives A, B, and E

The estimated economic effects are similar under these alternatives because the expected level of AUMs would be the same. However, under Alternatives B and E, increased restrictions would limit the livestock operators' ability to improve infrastructure or treat vegetation. These restrictions could increase livestock operators' costs

Table 4-45
Annual Impact of Management Actions Affecting Livestock AUMs on Output, Employment, and Earnings, Compared with Alternative A

	Alternatives B and E[1]		Alternative C		Alternative D		Alternative F		Proposed Plan	
	Low	High	Low	High	Low	High	Low	High	Low	High
Primary Study Area										
Output	See notes	See notes	-$56.3	-$136.8	$0.0	-$0.6	-$17.6	-$50.9	$0.0	-$0.2
Employment	See notes	See notes	-621	-1,503	$0.0	-6	-194	-560	0	-2
Earnings	See notes	See notes	-$19.6	-$47.7	$0.0	-$0.2	-$6.1	-$17.7	$0.0	-$0.1
Primary and Secondary Study Area										
Output	See notes	See notes	-$57.3	-$139.1	$0.0	-$0.6	-$17.9	-$51.8	$0.0	-$0.2
Employment	See notes	See notes	-633	-1,532	0	-6	-197	-571	0	-2
Earnings	See notes	See notes	-$20.0	-$48.6	$0.0	-$0.2	-$6.2	-$18.1	$0.0	-$0.1

Source: Calculated using the IMPLAN model, applied to active AUMs for each alternative (BLM 2015d), as explained in the text and in **Appendix R**, Economic Impact Analysis Methodology.

Note: Output and earnings are in millions of 2010 dollars.

Note: The low impact scenario does not allow for reallocation of livestock to AUMs outside of GRSG habitat.

[1]Based on available AUMs, there would be no change in economic activity from grazing under Alternatives B and E. However, as described in the text, management actions under Alternatives B and E would restrict vegetation treatments and range improvements, which may increase ranch operators' costs or lead to other adverse economic impacts. Restrictions on travel and realty management would limit other uses, potentially benefitting grazing from reduced disturbance.

or farm efficiency. In addition, under Alternative B, there would be a disturbance cap that would limit new range improvements and other development in areas where the cap is reached.

Alternative C

There would be a reduction in the economic impact of grazing due to the closure of all allotments in PHMA and GHMA. The BLM estimates this loss of AUMs to correspond to between $56 million and $137 million annually in output, between $19 million and $48 million annually in labor earnings, and between 621 and 1,503 annual jobs in the primary Socioeconomic Study Area. The relatively broad range of impacts is due in part to the fact that these estimates incorporate the possibility that some livestock operations may actually go out of business due to closure of livestock grazing on federal lands. Additional costs associated with closure of federal lands to grazing include potential construction of new infrastructure that may no longer be accessible.

Alternative D

Under Alternative D, key RNAs with at least 20 percent PHMA or 50 percent GHMA would be closed to grazing and would be unavailable for the life of the plan. This would result in a loss of AUMs to the extent that livestock operators are unable to reallocate livestock to allotments in GRSG habitat previously not used and still open for grazing. This reduction would occur largely in Malheur, Lake, and Harney Counties. The loss would correspond up to an estimated $0.6 million annually in output, $0.2 million annually in labor earnings, and 6 annual jobs in the primary Socioeconomic Study Area. In addition, under Alternative D livestock operators could face costs associated with construction of new water developments, changes in livestock rotation or season of grazing and restrictions to supplemental winter feeding. In areas where disturbance caps are exceeded there is the potential for restrictions on new disturbance.

Alternative F

Under Alternative F, at least 25 percent of the area for livestock grazing in GRSG habitat would be rested every year and no longer available for grazing. The BLM estimates this loss of AUMs to correspond to between $17 million and $51 million annually in output, between $6 million and $18 million annually in labor earnings, and between 194 and 560 in annual jobs in the primary Socioeconomic Study Area. In addition, under Alternatives F increased restrictions would limit the livestock operators' ability to improve infrastructure or treat vegetation. These restrictions could increase livestock operators' costs or reduce farm efficiency. In addition, under Alternative F, there would be a disturbance cap that would limit new range improvements and other development in areas where the cap is reached. Unlike Alternatives B and D, under Alternative F fire disturbance is included under the 3 percent disturbance cap.

Proposed Plan

Under the Proposed Plan there would be a reduction of 2,388 AUMs relative to Alternative A. This reduction would occur in nine RNAs in Malheur County (1,550 AUMs), three RNAs in Lake County (791 AUMs), and one RNA in Harney County (47 AUMs). This reduction would affect 13 grazing allotments and represents approximately 0.3 percent of the active AUMs in the planning area. The BLM estimates this loss of AUMs to correspond to up to $0.2 million annually in output, up to $0.1 million in labor earnings, and up to 2 annual jobs in the primary Socioeconomic Study Area. To the extent that the livestock operators compensate for the loss of grazing areas on BLM lands by acquiring forage from private lands, this forage would have a higher cost. In addition, under the Proposed Plan livestock operators could face costs or loss of farm efficiency associated with construction of new water developments, changes in livestock rotation or season of grazing, and restrictions to supplemental winter feeding. In areas where disturbance caps are exceeded there is the potential for restrictions on new disturbance. Under the Proposed Plan, permit renewals would be prioritized in Sagebrush Focal Areas (SFA), and in PHMA outside of the SFA. If the standards for rangeland health are not met the season of use may be adjusted, and livestock numbers and AUMs may be reduced.

In summary, economic impacts from closures to livestock grazing in PHMA and GHMA and potential increases in costs to operators are greatest under Alternative C, followed by Alternative F. Some reductions in AUMs in RNAs would occur under Alternative D and under the Proposed Plan. Although no reductions in AUMs would be expected under Alternatives B and E, restrictions on vegetation treatment and structural improvements would have increased costs to operators. Under Alternatives B, D, E, F and the Proposed Plan livestock operators would face a potential increase in management costs with the greatest costs expected under Alternatives B and F and the least costs under Alternatives D and E and the Proposed Plan. Actual cost impacts are not possible to quantify.

As previously noted, **Table 3-66** shows that, although livestock grazing has some economic importance to all counties in the study area it constitutes a larger share of earnings in Lake, Malheur, and Harney Counties. **Figure 2-1**, Greater Sage-Grouse Habitat in the Planning Area, shows that these three counties are also where the most PHMA and GHMA are located. This suggests economic impacts of management alternatives on livestock grazing may be of particular importance to these three counties. Within these counties, communities may be impacted differently, depending on their own dependency on livestock grazing where it overlaps with GRSG habitat.

Output, employment, and earnings losses reported above, although stemming from direct impacts on livestock grazing, would not all occur in the livestock ranching industry, but also in industries that provide inputs and services to these activities and in industries where labor earnings in livestock ranching are spent.

Industries where these impacts would occur include support activities for agriculture and forestry, grain farming, all other crop farming, animal production, veterinary services, retail stores, food services and drinking places, and real estate, among others.

Additional discussion of the potential impacts on communities is included in **Section 4.20.4**, Social Impacts.

Other Values Associated with Livestock Grazing

As described in **Chapter 3**, BLM-administered land managed for livestock grazing provides both market values and nonmarket values. Nonmarket values include open space and western ranch scenery. These provide value to some residents and outside visitors, and ranches may also provide some public value, such as the cultural icon of the American cowboy. Some residents and visitors also perceive nonmarket opportunity costs associated with livestock grazing; in addition, some of the lifestyle value of ranching is likely to be captured in markets, such as property values of ranches adjacent to BLM-administered lands.

The "Other Values" discussion in **Section 3.21** provides additional discussion of these values. Overall, when analyzing net public benefits, the process is uncertain for incorporating potential nonmarket values from managing public land for livestock grazing. The scientific and economic literature on the topic does not provide adequate data or a consensus theoretical framework from which to analyze these values further. Because of this, the BLM did not attempt to quantify these values for this study.

Livestock grazing is one tool that has proved effective in controlling post-fire spread of invasive annual grasses. The spread of invasive annual grasses can lead to a variety of adverse impacts on the human environment including, for example, increased risk for subsequent fires that could threaten forage and structures on public and private lands, reduced hunting opportunities resulting from habitat quality impacts, and potential air quality impacts from dust storms. The closure of large areas to livestock grazing under Alternative C could increase the likelihood of adverse post-fire outcomes when compared with Alternative A. The likelihood of post-fire outcomes to be affected by reductions in permitted AUMs in Alternative F (compared with Alternative A) is uncertain. No noticeable effect of reductions in permitted AUMs on the likelihood of post-fire outcomes would be expected under the remaining alternatives or the Proposed Plan.

To the degree that there are net benefits of nonmarket values attached to livestock grazing and ranching, these would be greatest under Alternatives A and E. This is because both alternatives are likely to result in similar levels of livestock grazing operations in the Study Area. If the net nonmarket value of livestock grazing and ranching is positive, then that value would be greatest under Alternative A; it would be slightly lower under Alternatives B and E,

lower under Alternative D, lower still under Alternative F, and lowest under Alternative C. This is in line with the expected impacts on market values discussed above.

Impacts from Management Actions Affecting Recreation

Direct Economic Activity Dependent on BLM-Administered Land and Resource Management

As discussed in **Chapter 3**, recreation is a consistent contributor to the economy of the various counties in the Study Area. Management activities included in the proposed alternatives could affect recreation by, for example, restricting motorized travel. However, in general, restrictions imposed by management alternatives are expected to have little perceptible impact on recreation. For example, seasonal restrictions would often not coincide with recreation seasons, such as that for hunting. BLM recreation specialists predict the alternatives would not result in measurable impacts on recreation visitor days, although some types of recreation may be affected, particularly motorized travel.

Under some alternatives, restrictions or modifications would be placed on SRPs during certain times of the year or in certain locations when and where they may be detrimental to GRSG habitat. The BLM does not expect these restrictions to limit recreation use of BLM-administered lands, but rather to relocate use to areas or periods where no conflict with GRSG habitat would exist.

The Proposed Plan would not allow new recreational facilities in PHMA. In the past decade, BLM has not typically built recreational facilities in Eastern Oregon, and the extent to which this would alter recreation trends in the Study Area is not clear. Forms of recreation that favor an undeveloped setting could benefit while activities that make use of recreational facilities would be hampered or steered towards other areas.

Changes in travel management could also affect recreation and resulting economic activity, with restrictions on motorized travel under certain alternatives, during certain times of the year. Because opportunities for recreation in a more natural or primitive setting could increase, the net economic effect on recreation is not possible to quantify.

Alternative A

Existing recreation opportunities in the Study Area would be maintained. Alternative A would not result in impacts on revenue of commercial recreation service providers or managing agencies attributable to SRPs. This is because it would result in no changes to current management.

Alternatives B, D, E, and F

Overall visitation levels and the corresponding economic impact of recreation expenditures in the Study Area would not be substantially different from Alternatives A and C. However, limitations on SRPs and motorized travel restrictions could lead to some added costs to recreational users of BLM-administered lands. This could result from having to circumvent closed areas or adopting less preferred options in certain activities. These include hunting, where ATV use is prevalent for retrieving game, or other activities that make use of motorized travel. Beneficial impacts could arise from enhanced opportunities for recreation, such as backcountry camping or low-density hiking, as well as opportunities for such activities as hiking, horseback riding, and hunting in a more primitive setting. The net economic effect on recreation is not possible to quantify, and the net direction (positive or negative economic effect) is uncertain.

Alternative C

Economic impacts of Alternative C are the same as those of Alternative A. The limitations on SRPs and motorized travel restrictions of Alternatives B, D, E and F would not be implemented in Alternative C and Alternative C would result in no substantial changes to current management that could affect recreation.

Proposed Plan

Under the Proposed Plan, overall visitation levels and the corresponding economic impact of recreation expenditures in the Study Area would not be substantially different from Alternatives A, B, C, D, E and F. The Proposed Plan would not allow new recreational facilities in PHMA and this could potentially hamper future growth of some forms of recreation in those areas. Because there has not been a clear trend of building new recreational facilities on BLM lands in Eastern Oregon, the extent to which the Proposed Plan would limit growth of recreational activities is unclear.

Other Values Associated with Recreation

As described in **Chapter 3**, only a portion of the value of recreation on public lands is captured in the marketplace. Here, the concept of consumer surplus is used to measure the nonmarket portion of recreation value. As noted in **Section 3.21**, these nonmarket values are not directly comparable to output, earnings, or jobs associated with various resource uses on BLM-administered lands, which are described elsewhere in this section.

As discussed above, BLM recreation specialists determined none of the alternatives would result in measurable impacts on recreation visitor days. Therefore, there would be no discernible change in nonmarket recreation values.

Impacts from Management Actions Affecting Mining

Direct Economic Activity Dependent on BLM-Administered Land and Resource Management

As described in **Chapter 3**, mining is a relatively minor contributor to the economy of the Study Area, with approximately 0.9 percent of total private employment, slightly higher the national average of 0.6 percent. There is no coal production in the Study Area, and there is no oil and gas production from federal mineral estate. As described in **Section 3.21**, the average annual wage per job in the mining sector is comparable to the general average for the primary Study Area, although higher than that of sectors such as grazing or recreation. Reasonably Foreseeable Development Scenarios (RFDs) and Mineral Potential Reports (MPRs) were not completed for this exercise. Therefore, the below assessment of impacts is based on BLM review of current conditions and broad trends.

Any future production of oil and gas in the Study Area would have the greatest impacts under Alternatives C and F, under which all GRSG habitat would be closed for exploration. Alternatives B and E would impose fewer closures than Alternatives C and F (all PHMA in the case of Alternative B, Core Area habitat in the case of Alternative E). The Proposed Plan would impose a No Surface Occupancy (NSO) restriction with no Waivers, Exceptions, and Modifications (WEMs) in SFA and with few WEMs in PHMA outside SFA. In practice, oil and gas development in PHMA under the Proposed Plan is unlikely because of the pioneer nature of oil and gas in the area, with little exploration and lack of infrastructure, making the added costs of directional drilling prohibitive to oil and gas development. The effect would be similar to that of Alternatives B and E. Alternative D would impose the fewest restrictions on future oil and gas development, after Alternative A, with buffer areas around leks and constraints on surface occupancy. NSO constraints under Alternative D include a greater number of WEMs and are not expected to be as restrictive as those under the Proposed Plan. However, because no development of oil and gas are projected for the Study Area, no impacts of alternatives on output, employment, and earnings are expected under any of the Alternatives.

The main locatable mineral produced in the Study Area is gold in Baker County. According to 2012 County Business Patterns data from the US Census Bureau, employment in gold in Baker County was less than 20 employees (US Census Bureau 2014). The Celatom Mining Complex in Malheur and Harney Counties mines Diatomaceous Earth (BLM Undated). There has also been some interest in uranium.

Under Alternatives A, 10 percent of the federal mineral estate decision area would remain withdrawn from development of locatable minerals, with an additional 0.1 percent recommended for withdrawal. Petitions for withdrawal require that validity exams be conducted on existing mining claims when a

Notice or Plan of Operation is proposed and on notices or Plans of Operation for material changes in existing operations. This delays the start or expansion of mining operations and increases costs.

Alternatives B, E, and F would increase the federal mineral estate recommended for withdrawal by approximately 22 percent of the federal mineral estate for locatables, in addition to the currently withdrawn 10 percent. The Proposed Plan, would increase the federal mineral estate recommended for withdrawal by a almost 3 percent of the federal mineral estate, in addition to the currently withdrawn 10 percent. Alternative C would increase the federal mineral estate recommended for withdrawal by 60 percent of the federal mineral estate, in addition to the currently withdrawn 10 percent. Alternative D is similar to Alternative A, but it would recommend limits on surface disturbance and mitigation of impacts on GRSG habitat.

No Reasonably Foreseeable Development scenario for locatable minerals was developed for this landscape level planning amendment that forecasts production of locatable minerals on Federal lands in the Study Area. In the absence of this information, it is not possible to quantify potential economic impacts across alternatives over the planning horizon. Nor is it possible to assess the extent to which development of locatable minerals on split-estate lands would be affected. However, as discussed above, under Alternatives C, E, F, and the Proposed Plan, costs could arise for validity exams for claims or operations looking to expand in areas that are withdrawn. Validity exams cost in the range of $150,000 to $200,000, excluding contest costs, and are born by the claimants who initiate the action. In the case of Alternative B, validity exams are recommended for every existing claim. As this is an action initiated by the government, the cost is born by the government. In addition to the costs of validity exams, no new claims could be made to explore or mine locatable minerals in withdrawn areas which could possibly impact economic activity under Alternatives B, C, E, F, and the Proposed Plan when compared with Alternatives A and D.

Salable minerals in the study area are sand, gravel, limestone, dimension stone, and other crushed and broken stone. Main areas of production are found in Baker, Crook, Lake, and Union Counties. According to 2012 County Business Patterns data from the US Census Bureau, approximate levels of employment in the salable minerals industry ranged from none in Grant County to a high of between 100 and 249 people in Baker County; for the seven counties, the total is between 128 and 313 (US Census Bureau 2014)[6]. The salable minerals sector is by far the main source of overall mining employment in the Study Area.

[6] This range is consistent with the estimates shown in Section 3.21. *Social and Economic Conditions (Including Environmental Justice)* for overall employment in the mining sector. The estimates shown Section 3.21 use other US Census Bureau data to fill in nondisclosure gaps to provide an estimate for the data presented here as a range.

Under Alternative A,, approximately 26 percent of the federal mineral estate would be closed to salable minerals development. This percentage would increase to approximately 52 percent under Alternatives B, D, E, F and the Proposed Plan, and to 83 percent under Alternative C. If employment were to fall proportionally to closures of federal mineral estate, the impact on salable minerals-related employment in the Study Area would be a loss of between 45 and 163 jobs under Alternatives B, D, E, F and the Proposed Plan and between 99 and 241 jobs under Alternative C. The impacts of Alternative B, C, D, E, F, and the Proposed Plan could be larger due to ROW avoidance and exclusion increases in several of these alternatives relative to Alternative A. These avoidance and exclusion increases potentially affect salable minerals through increased costs of minerals development and decreased construction and derived demand for mineral materials. ROW exclusion and avoidance areas would be the greatest under Alternative C and the least under Alternatives A and E.

The closure of federal mineral lands to salable mineral development could also impact the cost of public projects in the Study Area. Salable minerals from BLM-administered lands are typically available to local governments free of charge. Closures of federal lands to salable mineral development could force local governments to obtain mineral materials from more expensive sources. The largest cost in obtaining mineral materials is often transportation of these mineral materials. Having to access more distant sources could increase the cost of construction and maintenance projects for local government (e.g., road maintenance). The Proposed Plan allows restricted exceptions to free use permits, potentially lessening the impact on local governments, when compared with Alternatives, B, C, D, E, and F.

Appendix A, Chapter 2 Alternatives Figures, shows salable minerals areas and constraints under the various management alternatives. Relative to Alternative A, closures or restrictions to salable mineral development under Alternatives B, D, E, F, and the Proposed Plan would affect locations throughout the Study Area, with large extensions in Lake, Harney and Malheur Counties. Alternative C would add closures to various locations that otherwise would remain open to salable mineral development, particularly in central and northern portions of Lake and Harney Counties.

Impacts from Management Actions Affecting Geothermal Exploration and Development

Direct Economic Activity Dependent on BLM-Administered Land and Resource Management

As described in the 2008 Geothermal Programmatic EIS (BLM and Forest Service 2008), the entire Study Area for this EIS has potential for geothermal development. During the Programmatic EIS process, the BLM also developed a reasonably foreseeable development scenario over 20 years for the

development of federal geothermal resources, based on a review of government and industry reports. **Table 4-46**, Reasonable Foreseeable Development Scenario for Geothermal Energy on BLM-Administered Lands, shows the projects identified in the reasonably foreseeable development scenario that are in the Socioeconomic Study Area for this EIS, along with potential electricity generation for 2025.

Construction and operation expenditures associated with geothermal electricity exploration and development include those for drilling wells, constructing power plants, and operating facilities. The geothermal reasonably foreseeable development scenario provides only information on electricity generation capacity; it does not provide additional details that would be necessary to develop a detailed economic impact estimate, such as resource temperature and depth. These data were also not readily available from other sources.

Table 4-46
Reasonable Foreseeable Development Scenario for Geothermal Energy on BLM-Administered Lands

Area	Projected MW at 2025	BLM Field Office
Neal Hot Springs	50	Vale
Lakeview—Hot Lake Area	20	Lakeview
Summer Lake	50	Lakeview
Other Potential Locations	50	Includes Burns and Vale
Total	170	

Source: BLM and Forest Service 2008
MW megawatts

Nonetheless, to provide an estimate of economic impact that would be associated with the development of the above projects, the BLM made reasonable assumptions based on available information[7]. The geothermal reasonably foreseeable development scenario does not provide detailed location information, and at this time the BLM is uncertain how the potential projects shown would be affected by the management alternatives. In order to provide a quantitative estimate of how economic impacts might differ by alternative, the BLM assumed impacts would occur in proportion to the acres open to geothermal leasing under each alternative. However, depending on specific locations and project parameters, the impact of management alternatives may

[7] The BLM assumed the capacity estimates from the October 2008 Geothermal Programmatic EIS, which are consistent with estimates from the Geothermal Task Force Report of the Western Governors' Association (WGA 2006), represent nameplate capacity (including parasitic losses). The BLM assumed the geothermal plants would be developed using conventional hydrothermal, binary cycle technology, with an average resource temperature of 300 degrees at a depth of 3,000 feet, which is roughly consistent with the currently operating commercial energy plant at Neal Hot Springs (Clutter 2010; ODEQ 2010b). Construction was assumed to be distributed over a 10 year period.

not be proportional to the acres open for geothermal leasing and the estimates below may overestimate or underestimate the impacts.

Table 4-47 shows the estimated impacts by alternative, using default parameters from the National Renewable Energy Laboratory's Jobs and Economic Development Impact model (NREL 2012).

Table 4-47
Economic Impact of Management Actions Affecting Geothermal Exploration and Development Compared with Alternative A

	Alternative B, E—Alternative A	Alternative C, F—Alternative A	Alternative D—Alternative A	Proposed Plan—Alternative A
Construction (representative for one year)				
Output	-$5,450,444	-$11,994,622	$0	-$5,630,937
Employment (jobs)	-64	-140	0	-66
Earnings	-$2,223,289	-$4,892,724	$0	-$2,296,914
Operations (for year 5 of planning period)				
Output	-$1,984,767	-$4,367,815	$0	-$2,050,493
Employment (jobs)	-16	-36	0	-17
Earnings	-$1,489,104	-$3,277,025	$0	-$1,538,416

Source: Calculated using the IMPLAN model as explained in the text and in **Appendix R**, Economic Impact Analysis Methodology.

Notes: Output and earnings are in millions of year 2010 dollars. The economic impact for operations in year 5 of the planning period represents the point at which half of the expected geothermal power plants have been developed and are operating.

Alternative A

Under Alternative A, the BLM projects the 170 megawatts of geothermal energy shown in **Table 4-46** to be in place by 2025. This development would be estimated to support an average of 187 annual jobs during the construction period and 48 annual jobs during operations (not shown in Table 4-52).

Alternatives B and E

Access to geothermal potential could be limited. Acres open to leasing would be reduced by over one-third, compared with Alternative A, which could reduce access to geothermal potential. If these closures were to include the areas identified in the geothermal reasonably foreseeable development scenario, the development of geothermal energy could also be reduced, compared with

Alternative A. If the reduction is proportional to the reduction in acres open to leasing, Alternatives B and E would imply a loss of an estimated 64 annual jobs during construction and about 16 annual jobs during operations, compared with Alternative A.

Alternatives C and F

Acres open to leasing would be reduced by approximately 75 percent. Alternatives C and F would be the most likely to constrain development of geothermal energy resources. If closures were to include the areas identified in the geothermal reasonably foreseeable development scenario, the development of geothermal energy would be reduced, relative to Alternative A. If the reduction were proportional to the reduction in acres open to leasing, Alternatives C and F would imply a loss of an estimated 140 annual jobs during construction and about 36 jobs during operations,, compared with Alternative A.

Alternative D

Based on acres open to leasing, projected employment under Alternative D would be the same as under Alternative A. However, some decrease relative to Alternative A could occur due to NSO stipulations in buffer areas around leks.

Proposed Plan

The Proposed Plan would establish a NSO with WEM in PHMA outside SFA and a NSO without WEM in SFA. Because the potential for geothermal development using horizontal drilling is limited due to thermal gradient drops in transport, these NSOs would make geothermal development in SFA and in PHMA outside SFA unlikely. Acres open to leasing without NSOs would be reduced by over one-third, compared with Alternative A. Assuming the development of geothermal energy would be reduced in proportion to the acres with geothermal potential not closed or under NSOs, the socioeconomic impact would be similar to that of Alternative B. Compared with Alternative A, the Proposed Plan would imply a loss of an estimated 66 annual jobs during construction and about 17 annual jobs during operations.

Impacts from Management Actions Affecting Wind Energy Development

Overall Employment, Earnings, and Output per Job Impacted by Management Alternatives

The socioeconomic impact of management alternatives on wind energy development depends on trends in wind energy development and the extent to which proposed sites overlap with GRSG habitat. For the purposes of the socioeconomic impact analysis, the BLM used a scenario based on the existing applications at the time of this EIS. Under this scenario the BLM projects that 182 megawatts of wind energy installed capacity expected to occur under Alternatives A, D, and E would no longer occur under Alternatives B, C, F, and the Proposed Plan. This installed capacity corresponds to two existing

applications in Harney County that overlap GRSG habitat. Additional wind energy development could also be affected by the choice of management alternatives as described further below. **Tables 4-48**, Average Annual Impact on Wind Energy Development on Output, Employment, and Earnings by Alternative Compared with Alternative A, Construction1,3, and **4-49**, Average Annual Impact on Wind Energy Development on Output, Employment, and Earnings by Alternative Compared with Alternative A, Operations, Operations, show the estimated impacts of the choice of management alternative on output, employment, and earnings generated by these two projects in Harney County.

Alternative A

Under Alternative A, the BLM projects the 182 megawatts of installed capacity planned for Harney County would be in place by 2025. BLM estimates this would support an average of 60 annual jobs to Study Area over a 10-year period. In addition, exclusion and avoidance areas would not impede additional wind energy investments in most of the planning area.

Table 4-48
Average Annual Impact on Wind Energy Development on Output, Employment, and Earnings by Alternative Compared with Alternative A, Construction[1,3]

	Alternatives B, C, F, and the Proposed Plan[2]	Alternatives D and E[2]
Primary Study Area		
Output	-$6.9	See notes
Employment (jobs)	-43	See notes
Earnings	-$1.9	See notes
Primary and Secondary Study Area		
Output	-$7.1	See notes
Employment (jobs)	-44	See notes
Earnings	-$2.0	See notes
Harney County		
Output	-$5.9	See notes
Employment (jobs)	-23	See notes
Earnings	-$0.9	See notes

Source: Calculated using the IMPLAN model as explained in the text and in **Appendix R**, Economic Impact Analysis Methodology.

[1]Average annual impacts of construction calculated distributing impacts over a 10 year period.

[2]Based on installed megawatts, there would be no change in economic activity from wind energy under Alternatives D and E, relative to Alternative A. However, as described in the text, management actions under Alternatives D and E could increase costs and discourage additional wind energy investments.

[3]Output and Earnings are in millions of 2010 dollars

Table 4-49
Average Annual Impact on Wind Energy Development on Output, Employment, and Earnings by Alternative Compared with Alternative A, Operations[1,3]

	Alternatives B, C, F, and Proposed Plan[2]	Alternatives D and E[2]
Primary Study Area		
Output	-$1.4	See notes
Employment (jobs)	-17	See notes
Earnings	-$0.8	See notes
Primary and Secondary Study Area		
Output	-$1.4	See notes
Employment (jobs)	-17	See notes
Earnings	-$0.8	See notes
Harney County		
Output	-$1.3	See notes
Employment (jobs)	-16	See notes
Earnings	-$0.7	See notes

Source: Calculated using the IMPLAN model as explained in the text and in **Appendix R**, Economic Impact Analysis Methodology.

[1]Average annual impacts of operations calculated assuming capacity installed over a 10 year period. Impacts would be representative of year 5.

[2]Based on installed megawatts, there would be no change in economic activity from wind energy under Alternatives D and E, relative to Alternative A. However, as described in the text, management actions under Alternatives D and E could increase costs and discourage additional wind energy investments.

[3]Output and earnings are in millions of 2010 dollars.

Alternative B

Under Alternative B, the BLM projects the 182 megawatts of installed capacity planned for Harney County would no longer occur. This corresponds to an estimated average reduction of 60 annual jobs when compared with Alternative A over a 10 year period (between construction and operations). Additional investments in wind energy could also be affected due to PHMA exclusion and GHMA avoidance, with the potential of increased costs in routing of transmission lines and access roads and potential mitigation costs.

Alternative C

Under Alternative C, the BLM projects the 182 megawatts of installed capacity planned for Harney County would no longer occur with the estimated average reduction of 60 annual jobs when compared with Alternative A over a 10 year period (between construction and operations). Additional investments in wind energy could also be affected due to the closure of all GRSG to new ROW authorizations.

Alternative D

Under Alternative D, the BLM projects the 182 megawatts of installed capacity planned for Harney County would be in place by 2025. Restrictions to

additional wind energy development would be greater than under Alternative A, because wind energy would be avoided in PHMA. Increased costs to investors could occur due to impacts of PHMA avoidance on transmission lines and access roads and due to potential mitigation measures required by BLM.

Alternative E

Under Alternative E, the BLM projects the 182 megawatts of installed capacity planned for Harney County would be in place by 2025. Restrictions to additional wind energy development would be greater than under Alternative A, because wind energy would not be allowed to develop in PHMA where there is evidence of GRSG.

Alternative F

Under Alternative F, the BLM projects the economic impacts from wind energy development to be the same as under Alternative C.

Proposed Plan

Under the Proposed Plan, wind energy development would be avoided in GHMA. In PHMA, wind energy development would be avoided outside SFA in Harney, Lake, and Malheur Counties and excluded in other PHMA. Avoidance of ROW authorizations in PHMA and of major ROW authorizations in GHMA could further impact wind energy development. Under the Proposed Plan, the 182 megawatts of installed capacity planned for Harney County may no longer occur due to the increased costs to investors in either relocating development or meeting mitigation requirements for development in avoidance areas. For the purposes of the socioeconomic analysis, the BLM considered that these 182 megawatts of wind energy installed capacity would no longer occur under the Proposed Plan.

Output, employment, and earnings reported above include direct, indirect, and induced impacts compared with Alternative A. Thus, the estimated economic activity reflects not only the wind energy industry, but also industries that provide inputs and services to this activity and industries where associated labor earnings are spent. The main industries where these impacts would occur include mining and quarrying, retail stores, concrete manufacturing, food services wholesale trade, transport by truck, and hotels, mainly during the construction period.

Impacts from Management Actions Affecting Lands and Realty and Travel Management

Direct Economic Activity Dependent on BLM-Administered Land and Resource Management

Management actions that affect development of infrastructure could have effects on the growth of economic activity in the Socioeconomic Study Area. Limiting new ROWs for power lines, pipelines, and access routes or restrictions to route construction and to travel on existing roads could increase the cost of

new economic investments. It could even make them no longer economically viable.

Alternative A

Alternative A would place the fewest restrictions on ROW development and route construction and would maintain the largest area open to travel, among the alternatives; therefore, having the least impacts of the alternatives.

Alternative B

Management actions under Alternative B to protect GRSG habitat would impact lands and realty through the closure of PHMA to new ROW authorizations. Burial of power lines could be required when technically and financially feasible. All cross-country motorized travel would also be prohibited except for designated routes; that is, motorized travel would be limited to existing routes. Alternative B would impose added costs to future economic investments in the Study Area, when compared with Alternative A.

Alternative C

All GRSG habitat, PHMA, and GHMA would be closed to new ROW authorizations. This alternative would impose the greatest restrictions on new infrastructure development. Potential new investments in power lines, pipelines, roads and renewable energy projects requiring new ROW authorizations in GRSG habitat would not occur, potentially reducing the generation of associated employment and earnings opportunities. To the extent that new projects are modified to move forward off Grater Sage-Grouse habitat, economic activity generated by the construction and operation of a modified project would support regional economic activity. However, modification to projects would typically have a cost. To the extent possible, utilities would be expected to pass these costs to consumers. Restrictions on travel management would be the same as those under Alternative A.

Alternative D

ROW development under Alternative D would also face restrictions, but these would be more limited than under Alternatives B and C. Exclusion areas in GRSG habitat would be the same as under Alternative A, but PHMA would be managed as avoidance. Burial of power lines could be required when technically and financially feasible. Restrictions to travel would be the same as those under Alternative B. Restriction and costs to infrastructure development under Alternative D would be greater than under Alternative A but less than under Alternatives B or C.

Alternative E

Management under Alternative E would have impacts similar to Alternative B for land use authorizations and travel management.

Alternative F

Impacts from Alternative F are the same as or similar to those under Alternative B, except there would be greater restrictions under Alternative F for wind energy, as previously described. New road construction or upgrades would not be allowed in GRSG habitat, resulting in future potential limitations to economic activity in the area.

Proposed Plan

Under the Proposed Plan, impacts would be similar to those under Alternative D. Increased avoidance in PHMA, compared with Alternative A, means project proponents would typically need to alter preferred locations or alignments or accept mitigation measures imposed for development in avoidance areas, which would have a cost to project proponents. As under Alternatives B and D, motorized travel would be limited to existing routes.

Restrictions to ROW development under Alternatives B, C, D, E, F, and the Proposed Plan could require investors to relocate or reroute infrastructure investments. When feasible, such modifications would have a cost that would typically be passed on to consumers. A 2012 WECC study, for example, provides information on transmission line costs per mile, ranging from $927 thousand to $2,967 thousand depending on voltage and whether lines are single or double circuit lines. The same study provides cost multipliers for difficult terrains, reaching up to 2.25 in the case of forested lands (WECC 2012). Because utility providers allocate costs on to their rate base, per-customer rate impacts would be greater where the ratepayer base is smaller, all else being equal (i.e., given an identical fixed cost associated with burial of transmission lines). Areas with smaller and local utility providers with fewer ratepayers would be required to absorb a greater proportion of the costs of relocation or rerouting compared with areas serviced by larger, multi-state providers. Alternatives B, D, and the Proposed Plan could require burial of transmission lines when technically and financially feasible. New construction costs of underground transmission lines can be between 4 and 14 times higher (PSC 2011), depending on terrain, although burial of existing lines would be a fraction of the cost of new lines. Burial of distribution lines would be considerably less, averaging under $500 per mile in rural areas (EIA 2012).

ROW restrictions in PHMA or GHMA could also impact private landowners' costs for and ability to obtain new ROW authorizations for accessing private property through BLM managed land. Landowners pay a fee for processing an application for a ROW authorization—the fee is a schedule that depicts the number of Federal staff hours needed to process the application. In cases where ROW restrictions in GRSG habitat require an alternative route to be identified or other mitigation to be performed, landowner costs could be expected to be higher for Alternatives B, C, D, E, F and the Proposed Plan when compared with Alternative *A*.

Impacts from Management Actions Affecting Special Status Species

Other Values Associated with Populations of GRSG

As described in **Section 3.21**, economists and policy makers have long recognized that rare, threatened, and endangered species have economic values beyond those associated with active use through viewing or hunting. **Section 3.21** documents current methods to estimate these non-use values, including a description of the literature review that the BLM conducted to determine if there were existing non-use value studies for GRSG. There are no studies on valuation specific to the GRSG, but there are several studies published in peer-reviewed scientific journals for bird species with similar characteristics. These studies find the average stated willingness-to-pay at between $15 and $58 per household per year in order to restore a self-sustaining population or to prevent regional extinction of the species (see **Section 3.21** for non-market valuation methods details). These values represent a mix of use and non-use values; the non-use components of value are likely to be the majority share since the studies primarily address species that are not hunted.

GRSG protection is a public good available to all households throughout the intermountain west. If similar per-household values apply and if even a small portion of the per-household value represents a non-use value, then the aggregate regional non-use value could be substantial. However, the BLM did not quantify the aggregate value because of several factors, including uncertainty over the comparability of the existing studies to the GRSG context and the documented difference between stated and actual willingness-to-pay.

From a qualitative perspective, however, the non-use values associated with populations of GRSG would correspond to the degree of habitat protection associated with each alternative. Current management, Alternative A, provides the least protection for GRSG in the planning area, so it could result in the most impacts on GRSG. As a result, to the degree that there are non-use values associated with populations of GRSG, management under Alternative A would have the greatest adverse impacts on those values.

As discussed in **Section 4.3**, most of the management actions under the alternatives would be beneficial for the GRSG. It is therefore estimated that, in comparison to Alternative A, each alternative would have a positive impact on non-use values associated with populations of GRSG. However, so many factors impact the protectiveness of each alternative, such as vegetation and soils management, livestock grazing management, fire and fuels management, and recreation management. Because of this, it is difficult to anticipate the comparative protection and therefore non-use values provided by Alternatives B through F and the Proposed Plan.

Impacts on Tax Revenues and Payments to States and Counties

Reductions in economic activity can reduce tax revenues for local, state, and federal governments. At the state level, these could take the form of reductions in personal and corporate income taxes. At the local level, revenues could be reduced if property taxes decrease. A portion of leases and royalties from activities on BLM lands (e.g., geothermal development) is also shared with counties.

The alternatives are unlikely to have a significant impact on state tax revenues, given the small share of the Study Area on total state fiscal revenues. However, local government tax revenues could be considerably affected in specific areas that would experience reductions in economic activity, particularly under Alternatives C and F. Based on the anticipated reductions in economic activity, the local communities that may be most affected by reductions in local tax revenues under these alternatives would be communities where grazing forms a major basis for the local economy in Malheur, Harney, and Lake Counties.

In FY 2013-14, farm and forest land assessed value for property taxation was, in 2010 dollars, approximately $89.0 million in Harney County (25 percent of total property taxes in Harney County), $117.8 million in Lake County (17.2 percent of property taxes in Lake County), and $277.8 million in Malheur County (22.5 percent of total property taxes in Malheur County) (Oregon Department of Revenue 2014). To obtain a very rough approximation of the potential impact of Alternative C on property tax collections through impacts on livestock grazing, BLM used the estimated change in employment derived from impacts on livestock grazing as a proxy for the percent change in farm property assessed values. BLM assumed that all jobs impacted by reductions in livestock grazing would be farm related jobs and that all impacts would occur in Malheur, Harney, and Lake Counties. These assumptions overestimate the impacts. The estimated reduction in annual jobs from the impacts of Alternative C on livestock grazing is between 743 and 1,797 jobs (**Table 4-50**). If divided by the total share of farm jobs in Malheur, Harney, and Lake Counties, the reduction in jobs would correspond to between 21.3 percent and 51.6 percent of the total. If farm property assessed values were similarly impacted, the effect on total property tax assessments in Malheur, Lake, and Harney Counties would be between 4.5 percent and 11.0 percent (because farm property assessments are approximately 21.3 percent of total property assessments in the three counties). As previously noted, this likely overestimates the impacts and should be interpreted as reference for the potential magnitude of impacts. On the other hand, property taxes under Alternative C would also be affected by losses in renewable energy investments, particularly in Harney County, where expected wind energy projects would no longer occur. Utilities were responsible for 12.8 percent of total property assessed value in Harney County in FY 2013-14, 21.5 percent in Lake County, and 27.3 percent in Malheur County. (Oregon Department of Revenue 2014).

In addition, impacts on individual communities within these and other counties could be considerably greater than impacts on counties, depending on their dependency on livestock grazing, Also, reductions in assessed property values impact not only county property tax collections but also schools districts, fire departments, libraries, and other special districts.

Impacts on local tax collection would be expected to be substantially lower under Alternative F and lower still under the remaining Alternatives and the Proposed Plan, relative to Alternative A.

4.20.4 Social Impacts

Impacts from Management Actions Affecting Migration

Population

The decrease in employment opportunities in the Study Area under Alternative C from the adverse impacts on farming corresponds to approximately 2 percent of the current employment in the Study Area. Compared with the employment in Harney, Lake, and Malheur Counties, where the impact is more likely to be felt, the adverse impact corresponds to almost 5 percent of the current employment. As shown in **Chapter 3**, of these three counties, Malheur experienced the most population growth from 1990 to 2010 (20 percent) and Harney the least (5 percent). This decrease in employment opportunities could impact the capacity of parts of the Study Area to attract and retain its labor force, with possible consequences for population growth. The impact may be larger in individual communities within those counties. Impacts may also be felt under Alternative F, although to a lesser degree.

Housing and Public Services

Although reductions in employment opportunities could affect population, under no alternatives would population be increased. This means that the alternatives would not affect housing demand in a way that could be adverse for most populations in the area. Demand for public services also would not increase, for the same reason. Under Alternatives C and F, the abilities of counties to supply public services could be reduced in accordance with potential reductions in local tax revenues.

Impacts from Management Actions Affecting Specific Groups and Communities

Consistency with County Land Use Plans

The decision under consideration may result in amended BLM management and LUPs throughout Study Area. The BLM management and LUPs must be consistent with state and local LUPs to the extent possible, and any amendments would aim to maintain this consistency. This would be the case under all alternatives. In public comments to the Draft LUPA/EIS, some counties

were of the opinion that restrictions to uses of public lands could conflict with goals of local LUPs.

Interest Groups and Communities of Place

As described in **Chapter 3**, there is a range of interest groups in the Study Area with overlapping and divergent interests. Groups centered on grazing, land development, infrastructure development, wind and geothermal energy development, conservation of natural resources, and business development generally would be impacted differently by the management alternatives. Also, as described in Chapter 3, groups of interests are defined not just by the economic activity associated with use of BLM lands, but also by the value attributed to BLM lands, often nonmarket values[8]. Within these interest groups, there are more specific ones that could be particularly affected. Among the interest groups most likely to be affected by the choice of alternative are those associated with livestock grazing, wind and geothermal resource exploration and development, infrastructure development, mining, wildlife conservation, recreationists who desire unobstructed cross-country travel in motorized vehicles (not limited to existing routes), and recreationists who could benefit from additional protections to GRSG habitat, such as low-density backcountry camping, or could be harmed by restrictions on Grater Sage-Grouse habitat, such as rockhounding groups.

Among alternatives, Alternative C would generate the greatest impacts. Conservation interests would be expected to benefit most from Alternative C. However, use of BLM-administered lands for income generation and in support of traditional livelihoods would be adversely affected. Grazing interests and communities associated with grazing in Lake, Malheur, and Harney Counties would be expected to be particularly affected. As previously noted, some of these communities could face increased difficulties in attracting and retaining their labor force. As noted in **Section 4.20.5**, Environmental Justice Impacts, these impacts would be expected to disproportionately affect low-income populations. The extent to which these impacts on the livelihoods of low-income populations would have effects on the social fabric of communities in these three counties (e.g., through increased social conflict or decreased social cohesion of individual communities) is not possible to determine based on the information available at this time.

Specific communities would not be impacted in the same way by the management alternatives. Communities with more diversified economies, particularly those less dependent on livestock grazing, would likely be less impacted than those that depend heavily on grazing. For instance, communities where the economy is based on tourism, agricultural crops (but not livestock),

[8] Wulfhorst et al (2006) describe how different groups associate with public lands in neighboring Owyhee County (Idaho) in different ways and compete with each other to define the value of public lands in Owyhee County based on their own sense of place.

or activities unrelated to natural resources or public lands would be relatively unaffected by any of the management alternatives.

The BLM reviewed the scoping report to identify any comments related to specific communities that may be particularly affected by various management alternatives (BLM and Forest Service 2012). Several comments highlighted concern with impacts on livestock grazing in Harney and Malheur Counties. Some commenters raised the possibility of adverse impacts on wind energy development. Public comments to the Draft LUPA/EIS expressed more generally that the analysis done in the Draft LUPA/EIS was "piecemeal" and did not allow for a comprehensive understanding of the potential impacts of management alternatives on individual communities. Some comments from county representatives, for example, noted that impacts on one family can sometimes affect entire rural communities, through closure of local facilities such as schools, which serve as gathering places for rural communities. A similar concern was expressed by business associations who referred to Oregon's experience in the 1990s, when steps were taken to protect the habitat of the Northern Spotted Owl. After the threatened listing of the spotted owl, the availability of federal timber would have been reduced and communities would have suffered with loss of jobs and increase in harmful social conditions such as alcoholism and abuse, affecting the dignity and respect of communities and families.

As previously noted, the BLM recognizes that impacts on individual communities may differ considerably, particularly under Alternative C, and to a lesser extent under Alternative F, because these are the two alternatives under which socioeconomic impacts would most likely be felt. Because the main source of socioeconomic impacts under these two alternatives would be restrictions to the use of BLM managed lands for livestock grazing, the communities mostly likely impacted would be communities dependent on these activities and where BLM managed lands have considerable overlap with GRSG habitat. As previously noted, the counties where these impacts are expected to be the greatest are Lake, Harney, and Malheur.

BLM analyzed data from the U.S. Census Bureau 2007-2011 5-year American Community Survey on employment by broad industrial sectors available at the zip code geographic level (U.S. Census Bureau. 2011). Several communities in Lake, Harney, and Malheur Counties depend on natural resources (agriculture, forestry, fishing, hunting and mining) for over 50 percent of total employment. Comparing the location of these communities with that of GRSG habitat, BLM noted that several of these communities are next to considerable public land with GRSG habitat. These include communities such as Adel, Plush, Silver Lake, and Christmas Valley in Lake County; Frenchglen and Drewsey in Harney County; and Westall in Malheur County. Under Alternative C, and to a lesser extent under Alternative F, communities such as these, highly dependent on livestock operations using federal lands with GRSG habitat for grazing, could

experience broad adverse socioeconomic impacts derived from the reduction in traditional sources of income.

Summary of Social and Economic Impacts

Alternative actions evaluated in this EIS consist of different packages of conservation measures that include land use restrictions, management practices or design features, habitat priorities or desired conditions, and monitoring protocols. These conservation measures, in aggregate, are intended to address threats to, and provide protection for GRSG (see Chapter 2 of this FEIS). This section has evaluated the social and economic impacts resulting from conservation measures that address threats associated with specific land and resource uses (e.g., grazing, minerals) which are linked to social and economic conditions (e.g., employment). There are other conservation measures included in the alternatives (to varying degrees) that address other threats such as fire, invasive plants, and vegetation (e.g., pinyon-juniper) encroachment on GRSG habitat that would have direct impacts on local economies of communities. However, the extent of these impacts is not known at this planning stage and due to uncertainty (e.g., occurrence of fire). Therefore, while the regional economic impact of these conservation measures were not evaluated in this section, they would not only play a critical and complementary role in helping meet the goal of effectively protecting GRSG from a full spectrum of threats, but also support local economic activity.

The discussion and tables below summarize the range of potential social and economic impacts that may occur as a result of the subset of conservation measures that affect land or resource uses linked to readily identifiable social or economic conditions.

Table 4-50, Average Annual Impact on Employment and Earnings by Alternative, Compared with Alternative A, provides a summary of potential effects of management alternatives on employment, earnings, and employment in the Study Area. Alternative A represents impacts associated with current management. The differences shown in the table are derived from summing the estimated reductions for each alternative related to livestock grazing (using the midpoint of the low and high scenarios), and related to geothermal and wind energy development (using both construction and operations impacts in year 5). Although the quantitative analysis includes only earnings and employment affected by management impacts on grazing, geothermal exploration and development, and wind energy development, these activities capture the majority of the economic impact of the alternatives.

Table 4-50
Average Annual Impact on Employment and Earnings by Alternative, Compared with Alternative A

		Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Employment relative to Alternative A (jobs)	Grazing	0	-1,062	-3	0	-375	-1
	Geothermal	-80	-176	0	-80	-176	-83
	Wind	-60	-60	0	0	-60	-60
	Total	**-140**	**-1,298**	**-3**	**-80**	**-613**	**-144**
Earnings relative to Alternative A (2010$ millions)	Grazing	$0	-$34	-$0.09	$0	-$12	-$0.03
	Geothermal	-$4	-$8	$0	-$4	-$8	-$4
	Wind	-$3	-$3	$0	$0	-$3	-$3
	Total	**-$6**	**-$44**	**$0**	**-$4**	**-$23**	**-$7**
Average Earnings Per Job Lost (2010$)	Grazing	N/A	$31,679	$32,324	N/A	$31,634	$30,946
	Geothermal	$46,405	$46,419	N/A	$47,942	$46,419	$46,209
	Wind	$44,690	$44,690	N/A	N/A	$44,690	$44,690
	Total	**$45,670**	**$34,279**	**$32,324**	**$47,942**	**$37,157**	**$45,470**

Source: Impacts calculated using the IMPLAN model as explained in the text and **Appendix R**.

Notes: For grazing impacts, the mid-point between the low impact and high impact scenarios is shown; for geothermal and wind energy, impacts for year 5 are shown and sum the estimated impacts of construction and operations activities in that year.

The analysis shows that reductions in economic employment and earnings would be greatest under Alternative C and F, and there would also be reductions under Alternatives B, D, E and the Proposed Plan. The reductions in Alternative C would correspond to approximately 2.1 percent of total 2010 employment in the Study Area (1,298 out of 62,234 jobs, per **Table 3-57**). Reductions in Alternative F would correspond to approximately 1.0 percent of 2010 employment in the Study Area.

In Alternative B, the reductions are due to reductions in wind energy development and geothermal development. Harney County could be particularly affected because it is a potential location for both wind energy and geothermal development.

In Alternative C, over 80 percent of the reductions would be due to reductions in livestock grazing; these impacts would be expected to be felt to a considerable extent in Lake, Harney and Malheur Counties.

In Alternative D, the magnitude of the impacts would be the least, after Alternative A and attributed to reductions in livestock grazing.

The reductions in Alternative E would be attributed to reductions in geothermal development and could presumably occur throughout the Study Area.

Alternative F would have the second largest reductions in employment and earnings relative to Alternative A. Impacts would be distributed among grazing, geothermal development and wind energy development, but over 60 percent of impacts would be due to grazing.

Under the Proposed Plan, the reductions are mostly due to reductions in wind energy development and geothermal development, with some impact from grazing. As in Alternative B, Harney County could be particularly affected because it is a potential location for both wind energy and geothermal development.

Some differences among the alternatives cannot be quantified. Among these are impacts on locatable and salable minerals, land authorizations such as power lines, and state and local tax revenues. Because tax revenues are largely tied to economic output and earnings, the relative magnitude of impacts on local and state governments across alternatives, and geographic areas, would be consistent with the impacts on employment and earnings presented above. In this respect the comparisons of expected impacts on current conditions are probably most useful for understanding the impacts on tax revenues in the context of other (unaffected) existing and anticipated future revenues.

Management under Alternatives B, C, D, E, F, and the Proposed Plan—and especially Alternatives C and F—could have the effect of limiting the attraction and retention of population in the Study Area. These impacts would not be homogeneous throughout the Study Area, but would be concentrated in specific communities where GRSG habitat intersects with resources important to employment opportunities.

Communities with strong interest groups focused on livestock grazing or geothermal and wind energy development would likely experience adverse impacts from Alternatives B, C, D, E, F, and the Proposed Plan, but especially from Alternatives C and F. Impacts on grazing and geothermal development are likely to be of importance to most counties in the Study Area.

Table 4-51, Social Impacts Relative to Alternative A, summarizes the social impacts of the management alternatives.

Table 4-51
Social Impacts Relative to Alternative A

	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Population growth; demand for housing and public services	Between A and the Proposed Plan	Potential impacts on specific communities	Between A and E	Between A and B	Between A and C	Impacts slightly greater than B
Consistency with county LUPs	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Impacts on interest groups and communities of place	Between A and the Proposed Plan	Most benefits to conservation groups; adverse impacts on grazing interests	Most benefits to energy interests	Between A and B	Between A and C; adverse impacts on grazing interests	Slightly greater than B

Non-market benefits from the management alternatives would be derived from the ability of the full spectrum of conservation measures to conserve, enhance, and/or restore GRSG habitat by reducing, eliminating, or minimizing threats to GRSG habitat. The magnitude of benefits associated with stabilizing or improving GRSG populations or habitat has not been monetized or quantified due to the absence of specific data on the values of non-market benefits of GRSG and uncertainty about quantifying projected responses of GRSG habitat and populations to conservation measures.

A qualitative evaluation of the benefits from potential changes in GRSG populations and habitat resulting from the subset of conservation measures addressing land and resource uses and extraction, as evaluated in this section, indicates the alternatives have the following capability to protect or improve benefits from GRSG:

- Alternative A has the lowest capability.
- Alternative B has greater capability than A, but lower capability than the Proposed Plan.
- Alternative C has the greatest capability.
- Alternative D has the second lowest capability after Alternative A.
- Alternative E has greater capability than Alternative A or D but less than B, C, F or the Proposed Plan.
- Alternative F has second greatest capability after Alternative C.
- The Proposed Plan has greater capability than A, B, D or E, but less than C or F.

In addition to the conservation measures directly associated with social or economic impacts considered in this section, there are other conservation measures that address other threats (e.g., fire, nonnative plants, encroachment) that contribute to GRSG and GRSG habitat protection and corresponding benefits that are not addressed here. As a consequence, for a complete description of potential improvements in GRSG habitat protection resulting from the full spectrum of conservation measures under each alternative, the reader is referred to the effects summary tables provided in Chapter 2. Social and economic impacts cannot be considered in isolation or exclusive of other impact indicators discussed in this EIS.

4.20.5 Environmental Justice Impacts

The BLM considered information on the presence of minority and low-income populations (from **Chapter 3**), along with additional information described in this section, to assess the potential for the alternatives to have disproportionately high and adverse impacts on minority or low-income populations. Although conservation measures would be implemented consistently across all identified habitat, with no discrimination over particular populations, environmental justice guidance requires agencies to consider also whether their actions could unintentionally result in disproportionately high and adverse effects.

To help guide the analysis of potential environmental justice impacts, the BLM considered the information gathered in the Economic Strategies Workshop that was conducted in June 2012. That workshop was convened to identify public concerns related to potential social, economic, and environmental justice impacts that could result from the management alternatives. None of the public comments received during that workshop called out a specific concern related to minority populations.

The BLM also reviewed the scoping report to identify any comments related to environmental justice issues received in the scoping phase. One commenter identified the need to examine exploitation of poor workers, including workers on foreign visas, for work on sheep ranching and other cattle ranching on BLM-administered lands. (This comment was not specific for Oregon but for all sub-regions considering GRSG habitat conservation measures.) No other comments during the scoping period were identified raising concerns regarding potential impacts on minority and low-income populations.

Potential Impacts on Minority Populations

As discussed in **Chapter 3**, CEQ guidance identifies a community or a specific population group as a minority population when either minority populations in the affected area exceed 50 percent of the total population or if the percentage of minorities in the affected area is meaningfully greater than the percentage in the general population or appropriate unit of geographical analysis. Based on the description of minority presence in the primary study area in **Chapter 3**, and

based on definitions in relevant guidance, the BLM considers Malheur County to have a concentration of a minority population. In Malheur County, Hispanics are represented in almost three times the proportion of Oregon as a whole, roughly 20 percentage points more than in the state. Hispanics represent almost a third of the total population of Malheur County. Total minority presence in that county is also over 50 percent higher than in the state. Given its large geographic coverage, the primary Study Area may contain smaller communities, where minority presence is meaningfully greater than in the state as a whole. This is not identified in **Chapter 3**. In addition, the two tribes present in the Socioeconomic Study Area (Burns Paiute in Harney County and Fort McDermitt Paiute and Shoshone in Malheur County) and the two tribes with traditional interests in the Socioeconomic Study Area (Confederate Tribes of the Warm Springs Reservation and Klamath Tribes) were also considered.

The extent to which existing minority populations are disproportionately impacted by high and adverse human health or environmental effects depends on two factors: the existence of high and adverse human health or environmental effects from management alternatives on any of the resources analyzed, and whether minority populations are particularly vulnerable to these impacts or more likely to be exposed to such impacts.

Adverse impacts of alternatives were identified under the various resources analyzed and are described in their respective sections of **Chapter 4**.

- Adverse impacts under any of the alternatives would not be restricted to one community or small communities but would be spread out in a broad region.
- No minority group is identified with the specific collection of activities that could be impacted by GRSG management (e.g., grazing).
- No pathways were identified through which minority populations would be particularly vulnerable to the adverse impacts identified in Chapter 4.

The BLM concluded that there would be no disproportionately high and adverse impacts on minority populations under the management alternatives considered.

Potential Impacts on Low-Income Populations

The presence or absence of low-income populations in the primary Study Area is discussed in **Chapter 3**. Of the seven counties in the Socioeconomic Study Area, all but one have a greater percentage of residents below the poverty level than the state's 14.0 percent. Crook County (14.0 percent) has the same percentage of residents below the poverty level as Oregon as a whole. Grant County has almost the same, at 14.4 percent. Malheur County (22.7 percent) has the highest percentage of residents below the poverty level. The percentage of Baker County (19.9 percent), Harney County (18.5 percent), Lake County

(17.5 percent), and Union County (16.1 percent) residents below the poverty level are also higher than Oregon as a whole. For the purposes of this EIS, the BLM considers Malheur, Baker, Harney, Lake, and Union Counties to be low-income communities.

The BLM reviewed the impacts of alternatives described in the respective sections of **Chapter 4**. It identified impacts on grazing in Malheur, Lake, and Harney Counties under Alternatives C and F to be high and adverse and to disproportionately impact low-income populations. This conclusion was based on the share of farm employment in those counties that could be affected by Alternatives C and F, and the fact that the three counties where impacts would most likely be concentrated were all low-income populations. Adverse impacts from management alternatives through mining, geothermal development, wind energy development, or ROW restrictions could occur but would not be considered to be high and adverse, based on review of the various resource impact sections.

Table 4-52
Environmental Justice Impacts

	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Disproportionately high and adverse impacts on minority populations	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Disproportionately high and adverse impacts on low-income populations	No Impact	No Impact	Disproportionately high and adverse impact related to employment and earnings from ranching and grazing (Lake, Harney, and Malheur)	No Impact	No Impact	Disproportionately high and adverse impact related to employment and earnings from ranching and grazing (Lake, Harney, and Malheur)	No Impact

4.21 UNAVOIDABLE ADVERSE IMPACTS

Section 102(c) of NEPA requires disclosure of any adverse environmental impacts that could not be avoided should the RMPA be implemented. Unavoidable adverse impacts are those that remain following the implementation of mitigation measures or impacts for which there are no mitigation measures. Some unavoidable adverse impacts occur as a result of implementing the RMPA. Others are a result of public use of BLM-administered lands within the planning area. This section summarizes major unavoidable impacts discussions of the impacts of each management action (in the discussion

of alternatives) and provides greater information on specific unavoidable impacts.

Permanent conversion of areas to other uses, such as transportation and mineral and energy development or OHV use, would be unlikely under all of the action alternatives, however, the scope, scale, and location allowed varies by alternative. These would most likely increase erosion and decrease the relative abundance of species within plant communities, the relative distribution of plant communities, and the relative occurrence of seral stages of those communities. These activities would also intrude on the visual landscape. This type of development is most likely to occur under Alternative A. The other action alternatives place many restrictions on many types of development, which would most likely result in fewer visual intrusions and fewer instances of unavoidable wildlife habitat loss.

Unavoidable damage to cultural resources from permitted activities could occur if resources undetected during surveys were identified during surface-disturbing activities. In these instances, further activity would cease on discovery of a cultural resource, and mitigation measures would be implemented to minimize damage or loss. This scenario is most likely to occur under Alternative A because it would place the fewest restrictions on surface-disturbing activities. Unavoidable loss of cultural resources would also occur, due to them not being recognized, lack of information and documentation, erosion, casual collection, and inadvertent destruction or use. Broad-scale sampling and classification of areas with a high likelihood of containing cultural and resources would be expected to greatly reduce the probability of unavoidable adverse impacts on the resource.

Wildlife, livestock, and wild horses as well as other herbivores consume vegetation and impact soils through hoof action and possible compaction. When these impacts are kept at appropriate levels, natural processes such as plant growth and recovery and microbial activity in the soil surface result in recovery from these impacts and maintain site stability and health. Vegetative treatments promoting recovery of GRSG would result in the destruction of the target species, be it invasive plants, encroachment of juniper, or changes in the structural classes of a sagebrush stand. Some level of competition for forage between these species, although mitigated to the extent possible, would be unavoidable. Instances of displacement, harassment, and injury could also occur. These types of scenarios are most likely to occur under Alternative A. The action alternatives would place restrictions on many development and surface-disturbing activities, which would make the likelihood that displacement, harassment, and injury would occur to be much lower than Alternative A.

Recreation, development of mineral resources, and general use of the decision area would introduce additional ignition sources into the planning area, which would increase the probability of wildfire and the need for its suppression.

These activities, combined with continued fire suppression, would also affect the overall composition and structure of vegetation communities; this could increase the potential for high-severity wildfires. Restrictions on development under all of the action alternatives would be expected to decrease the potential for ignitions in the decision area.

As recreation demand increases, recreation use would disperse, creating unavoidable conflicts between recreation users, such as those seeking more primitive types of recreation, and motorized users sharing recreation areas. In areas where development would be greater, the potential for displaced users would increase. Under all of the action alternatives, restrictions on development would be expected to reduce the potential for displaced recreational users.

Numerous land use restrictions imposed throughout the decision area to protect GRSG habitat and other important values affect the ability of operators, individuals, and groups who use the BLM-administered lands to do so without limitations. Although attempts would be made to minimize these impacts, unavoidable adverse impacts in the number and miles of roads or trails available for recreational use could occur under all of the action alternatives. Minimization would include limiting restrictions to the level of protection necessary to accomplish management objectives and providing alternative use areas for affected activities.

4.22 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Section 102(2)(c) of NEPA requires a discussion of any irreversible or irretrievable commitments of resources that would be involved in the RMPA should it be implemented. An irretrievable commitment of a resource is one in which the resource or its use is lost for a period of time (e.g., extraction of any locatable mineral ore or oil and gas). An irreversible commitment of a resource is one that cannot be reversed (e.g., the extinction of a species or loss of a cultural resource site without proper documentation).

Implementation of the RMPA management actions for all alternatives, except Alternative A, would result in fewer surface-disturbing activities, including mineral, energy, and ROW development, that result in loss of irreversible or irretrievable resources.

Although new soil can develop, it is a slow process. Soil erosion or the loss of productivity and soil structure might be considered irreversible commitment to resources. Surface-disturbing activities, therefore, would remove vegetation and accelerate erosion, which would contribute to irreversible soil loss. However, many of the management actions in the RMPA are intended to reduce the magnitude of these impacts and to restore some of the soil and vegetation lost. Such disturbances would occur to the greatest degree under Alternative A, which would allow many more surface-disturbing activities, compared with the action alternatives.

Development of mineral resources (e.g., oil, gas, sand, and gravel) is irreversible. If these nonrenewable resources were extracted for consumption or use, they would be irreversibly removed. BLM Handbook H-1624-1, Planning for Fluid Minerals, acknowledges leasing of oil and gas resources as an irreversible commitment. As noted above, this would be most likely under Alternative A.

4.23 Relationship Between Local Short-term Uses and Long-term Productivity

Section 102(c) of NEPA requires discussion of the relationship between local, short-term uses of the human environment and the maintenance and enhancement of long-term productivity of resources. As described in the introduction to this chapter, short term is defined as anticipated to occur within the first 5 years of implementation of the activity; long term is defined as following the first 5 years of implementation but within the life of the RMPA.

Management actions would result in various short-term impacts, such as increased localized soil erosion, fugitive dust emission, and vegetation loss or damage, and decreased visual resource quality. These impacts would be expected primarily under Alternative A, which would allow the most surface-disturbing activities.

Other surface-disturbing activities, including transportation and utility corridor construction and mineral resource development would result in the greatest potential for impacts on long-term productivity. Management prescriptions and reasonably foreseeable development scenarios are intended to minimize the effect of short-term commitments and to reverse changes over the long term. These prescriptions and the associated reduction of impacts would be greatest under Alternative C, with Alternative F close behind for such resources as vegetation and wildlife habitat. However, some impacts on long-term productivity might occur, despite the prescriptions intended to reduce impacts on GRSG habitat.

ROW authorizations and short-term use of an area to foster energy and minerals would result in long-term loss of soil productivity and vegetation diversity. Impacts would persist as long as surface disturbance and vegetation loss continue. In general, the loss of soil productivity would be directly at the point of disturbance; even so, long-term vegetation diversity and habitat value could be reduced due to fragmentation and the increased potential for invasive plants to spread from the developments or disturbances. Alternative A would have the greatest potential for short-term loss of productivity and diversity due to the high level of potential development and the lack of stringent mitigation and reclamation standards contained in Alternatives B, C, D, E, and F and the Proposed Plan. Alternative C would provide the greatest long-term productivity by excluding development in many areas through closures or application of severe restrictions on development.

ROWs and the short-term use of GRSG habitat for energy and minerals could impair the long-term productivity of GRSG populations. This would happen by displacing animals from primary habitats and removing components of these habitats that might not be restored for more than 20 years. These short-term uses could also affect the long-term sustainability of some special status species. The potential for these impacts would vary by alternative because long-term deterioration of GRSG habitat as a result of mineral activity would be more evident under Alternative A. The short-term resource uses associated with travel, transportation, and mineral development (e.g., individual short OHV trips, oil and gas seismic exploration, natural gas test well drilling, and the noise associated with these activities) would have adverse impacts on the long-term productivity of GRSG populations. This would be the case if these resource uses were to infringe on GRSG winter habitat, breeding and brood-rearing habitat, and summer habitat. These activities, though short-term individually, could have collective long-term impacts on GRSG productivity and health if they were to increase in the long term.

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