BLM

# Oregon Sub-Region Greater Sage-Grouse Draft Resource Management Plan Amendment and Environmental Impact Statement

## Volume II

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# CHAPTER 4
# ENVIRONMENTAL CONSEQUENCES

## 4.1 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 cumulative impacts. The purpose of this chapter 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.

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 in 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.

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

| Resource/Resource Use | Rationale for Not Analyzing Resource or Resource Use in Detail |
|---|---|
| Air Quality and Climate Change | Implementing management for the protection of Greater Sage-Grouse (also referred to as sage-grouse or GRSG) generally involves reducing or otherwise restricting land uses and activities that generate air pollutants and greenhouse gases. Livestock grazing, travel, mineral extraction, wildland fires, and construction activities within ROW grants have all been identified as actions that generate emissions that affect air quality. Protecting areas from these activities for the purpose of protecting GRSG would also protect air quality from an increase in particulates, decreased visibility, and increased deposition and would reduce the amount of emissions generated in the area that contribute to climate change. |
| 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 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

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.

### 4.1.1 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.
- Local climate patterns of historic record and related conditions for plant growth may change, with warmer, drier conditions likely to occur over the life of this plan.
- In the future, tools for predicting climate changes in a management area may improve and changes in climate may affect resources and necessitate changes in how resources are managed. Because of this, the BLM may be required to reevaluate decisions made as part of this planning process and to adjust management accordingly.

- 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., non-habitat inside PPMA or PGMA), 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 Web site 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, conventional leasable minerals, or nonenergy leasable minerals.

### 4.1.2 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.

### 4.1.3 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 GREATER SAGE-GROUSE AND SAGE GROUSE HABITAT

This section discusses impacts on GRSG from proposed management actions within each alternative. Existing conditions concerning GRSG are described in **Section 3.2**.

### 4.2.1 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).

*Greater Sage-Grouse (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 weed invasion. 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 Sage-Grouse 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.

**Table 4-2**
**Acres of Designated Sage-Grouse Habitat Types by Alternative**

| Sage-Grouse Habitat Type | Alt A (No Action) | Alt. B | Alt. C | Alt. D | Alt. E | Alt. F |
|---|---|---|---|---|---|---|
| Preliminary Priority Habitat (PPH) | 4,547,043 | 0 | 0 | 0 | 0 | 0 |
| Preliminary General Habitat (PGH) | 5,662,632 | 0 | 0 | 0 | 0 | 0 |
| Core Areas | 0 | 0 | 0 | 0 | 4,547,043 | 0 |
| Low Density | 0 | 0 | 0 | 0 | 3,923,539 | 0 |
| Preliminary Priority Management Area (PPMA) | 0 | 4,547,043 | 4,547,043 | 4,547,043 | 0 | 4,547,043 |
| Preliminary General Management Area (PGMA) | 0 | 5,662,632 | 5,662,632 | 5,662,632 | 0 | 5,662,632 |

Source: Oregon/Washington BLM 2013

- 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.

- 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, overgrazing, conifer encroachment and treatment, mechanical sagebrush treatment, and fuels reduction projects using the Vegetation Dynamics Development Tool (VDDT).

- Because GRSG are highly sensitive to habitat fragmentation, development, or changes in habitat conditions and require large, intact habitat patches to complete their annual life history, alternatives proposing to protect the most 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 accrue over distance depending on the type of development:

  – Impacts from transmission lines constructed before 2002 are likely fully manifested. 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.

  – 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.

  - 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 could improve habitat in the long term.
  - 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) in instances where increased predation from infrastructure (e.g. power lines, wind turbines, communication towers, agricultural and urban development) is a threat.
  - 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; Taylor et al. 2012).
  - Interstate highways influence GRSG to 4.7 miles (7.5 kilometers) and paved roads and primary and secondary routes at 1.9 miles (3 kilometers) based on indirect effects measured through road density studies (Connelly et al. 2004; Holloran 2005; Lyon 2000)
  - 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)

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

### 4.2.2 Nature and Type of Effects

Factors related to the decline in GRSG distribution and abundance include habitat loss and degradation, disease 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 traffic, 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, and improper grazing by livestock, wild horses, and burros are all associated with loss, fragmentation and degradation of habitat. 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 management zone and population area analysis to highlight the substantial threats to GRSG populations in each region (USFWS 2013a).

***COT Report Threat—Fire***

Wildfires have burned over 800,000 acres of GRSG habitat in the past decade and are one of the largest threats to GRSG habitat in Oregon. As discussed in **Section 3.2**, the 2012 fire season was record-setting; two major fires burned over 500,000 acres in Vale District, and an estimated 225,000 acres in the Burns and Vale Districts. Sagebrush recovers slowly from fire; most species do not resprout but must be replenished by wind-dispersed seed from adjacent unburned stands or seeds in the soil. Depending on the species and the size of a burn, sagebrush can reestablish itself within five years, but a return to a full pre-burn community cover can take 50 to over 100 years (Baker 2011).

While wildfire likely played an important historical role in creating a mosaic of habitat for GRSG, current and historic land-use patterns have restricted the system's ability to support wildfire. In Oregon 19$^{th}$ and early 20$^{th}$ century grazing practices, along with introduction and spread of invasive plant species and the practice of fire suppression in the 20$^{th}$ century, have all contributed to fire suppression and to increasingly destructive wildfires.

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).

*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. This is particularly important in areas where fire frequency has increased as a result of weed invasion, or where landscapes are highly fragmented. Fire also increases opportunities for invasive species, such as

cheatgrass (*Bromus tectorum*), to expand (Balch et al. 2012); fire suppression may limit this expansion. 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 buildup.

Controlled 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. Controlled burning can increase landscape heterogeneity, thereby reducing the risks of severe wildfire in large, homogeneous vegetation communities. Use of prescribed fire should be avoided in areas with less than 12-inch 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 exotic species is significant.

Reseeding with native plants and long-term monitoring to encourage the production of GRSG cover and forage plants would assist vegetation recovery (NTT 2011). While reseeding is not necessary after all controlled burns, it is important to avoid controlled burns in areas prone to invasive plant establishment. Furthermore the COT Report recommends avoiding controlled 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). Invasive plants are thought to alter plant community structure and composition, productivity, nutrient cycling, hydrology and competitively exclude native plants. In particular, invasive plants can reduce and eliminate vegetation that GRSG use for food and cover, resulting in habitat loss and fragmentation, and may also increase the risk of wildfire. An assortment of nonnative annuals and perennials are 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); in addition, GRSG require such habitats as 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 weed species in GRSG habitat would decrease the spread of weeds. Weeds directly compete for resources (water) with native plants and indirectly increase the risk of fire (in the case of cheatgrass and medusahead) impacts on sagebrush. To reduce the likelihood of invasive weed spread and the extent of current infestations, the BLM uses integrated weed management techniques through weed control cooperative range improvement agreements (BLM 1992b). To reduce weed infestations, the BLM implements mechanical, chemical, and manual vegetation treatments and prescribed burning. Implementation of BMPs may also help reduce the likelihood that invasive plants become established in GRSG habitat. These conservation efforts would reduce the impacts of weeds on sagebrush and increase the availability of GRSG habitat.

*Impacts from Wildland Fire Management*

In addition, fuels management actions, as described above, can also reduce weeds 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 limit fuel continuity and loads if applied annually before the grasses have cured (Connelly et al. 2004).

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 juniper (*Juniperus* spp.), while native to Oregon, threaten GRSG because they do not provide suitable habitat and mature trees displace shrubs, grasses, and forbs required for GRSG through competition for resources. Juniper expansion is also associated with increased bare ground and potential for erosion. Also, it offers additional perch sites for raptors; thus, woodland expansion may also represent

expansion of raptor predation threat, which is similar to perches on power lines and other structures (Connelly et al. 2004). GRSG have been found to avoid habitats with increased predator perch sites (Freese 2009).

*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.

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

***COT Report Threat—Grazing and Wild Horse and Burro Management***

*Impacts from Livestock Grazing and Range Management*
Livestock grazing has diffuse effects across the landscape. It 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 (USFWS 2010a). Grazing practices can be used to reduce fuel load (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 cured. Light to moderate grazing does not appear to affect cover of perennial grasses important to nest cover (Strand and Launchbaugh 2013; Reisner et al. 2013). However, Reisner et al. (2013) also found that grazing can reduce density of native perennial bunchgrasses, and thus facilitate cheatgrass invasion.

Grazing at inappropriate intensity, 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)

Low grass height can reduce the suitability of nesting and brood-rearing habitat; grazing reduces the grass height of grazed or trampled plants. It may negatively impact GRSG nesting success (Beck and Mitchell 2000) by removing cover, increasing exposure to predators.

Livestock may occasionally trample birds or nests or may disturb and temporarily displace lekking or nesting GRSG during movement or trailing(Coates 2007), may directly compete with GRSG for available resources, and also may indirectly reduce invertebrates that are important for GRSG by reducing herbaceous vegetation,

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 be dependent upon several factors, including, but not limited to: available forage, other water sources, stocking rate, and period/length of use. Furthermore, providing drinking water troughs and stock ponds for livestock can create puddles that serve as breeding grounds for mosquitoes that carry West Nile virus (Walker and Naugle 2011). GRSG may also use free water, although they do not require it because they obtain their water needs from their food. Information on the extent of habitat influenced by produced water and the net effects on GRSG populations is unknown (USFWS 2010a).

The BLM may use a number of mechanisms to reduce impacts from grazing on GRSG, if necessary. At the planning level, the BLM can decide where areas would be open and closed to livestock grazing. Future negative impacts would be eliminated in areas closed to grazing, but some past impacts would likely persist for some time. Closing grazing may result in other harmful impacts, such as fine-fuel buildup and increased fencing.

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 the conditions of the resources. For example, at the implementation level, the BLM can consider changes in grazing practices or systems to ensure allotments meet rangeland health standards, or it 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 within 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 fences) represent potential movement barriers to GRSG, predator perches, and predator travel corridors, making them a potential cause of direct mortality to 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 Burros 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. A horse consumes 20 to 65 percent more forage than a cow of equivalent body mass, due to physiological differences (Connelly et al. 2004). While horse and burro-induced changes can reduce total vegetative cover, lower sagebrush canopy cover, increase fragmentation of shrub canopies, and lower species richness at GRSG sites (Beever and Aldridge 2011). Additionally, because horses can use higher elevations and steeper slopes, horse occupancy reduces the occurrence of ungrazed areas of sagebrush (Connelly et al. 2004). Effects of wild horses on habitats may also be more pronounced during periods of drought or vegetation stress (NTT 2011, p. 18).

Besides the impacts of fencing on GRSG, water must also be available year-round in HMAs and wild horse territories (Wild and Free-Roaming Horses and Burros Act of 1971). This can lead to riparian areas receiving yearlong use by wild horses or riparian areas being modified with additional fencing and troughs in order to accommodate yearlong horse use. The range improvements would result in increased potential perch sites for avian predators and less water naturally available, and could possibly limit flow to riparian habitat.

Indicators of potential impacts on GRSG from livestock and wild horse and burro grazing under the proposed alternatives are disturbance to birds, population loss, acres of sagebrush habitat, understory of sagebrush, habitat degradation, and habitat fragmentation.

***COT Report Threats—Energy Development and Mining***

Energy development and mining are not among the largest threats to GRSG in Oregon. However, 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. 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).

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. 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 2012), the presence of wind turbines negatively impacted GRSG nest and brood survival but did not appear to affect female survival.

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 and nests could be directly affected by trampling or vehicle collision on access 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 (8 pads/2.6 square kilometers, or 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 between pre- and post-mine 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).

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. The species responds negatively to increased human infrastructure in sagebrush habitats, including roads, power lines, and communication towers (Knick and Connelly 2011; Johnson et al. 2011). Although transmission line and power line construction does not generally result in substantial direct habitat loss, it would temporarily disturb individual GRSG and habitat along the ROW.

Following construction, GRSG avoidance of vertical structures, likely due to raptors perching on the structures, may result in habitat exclusion via behavioral response. One study reported that the frequency of raptor/GRSG interactions during the breeding season increased 65 percent; golden eagle interactions alone increased 47 percent in an area where a transmission line had been constructed (Ellis 1984).

In addition, fences are often associated with power lines and communication towers. As discussed above under grazing, fences also pose a hazard to GRSG from collision as well as providing perches for predators and increasing 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 2 kilometers (approximately 1.25 mile) of leks, fence densities exceeding 1 kilometer of fence (0.6 mile) per square km (0.4 square miles), and flat terrain posed greater risk.

GRSG have been observed avoiding brood-rearing habitats within three miles of power lines (LeBeau 2012). 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. 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.

Johnson et al. (2011) found that lek counts increased at greater distance from highways. In the Northern Great Basin, lek counts appeared to increase with distance to roads of any type (Johnson et al. 2011). Literature suggests increased road length, traffic levels, and traffic activity during the early morning within approximately two miles of leks all negatively influence male lek attendance (Holloran 2005; LeBeau 2012; Forman and Alexander 1998 and Lyon and Anderson 2003, cited in Manier et al. 2013).

Closing and reclaiming unused, minimally used, or unnecessary roads in and around GRSG habitat will reduce disturbance there and will increase GRSG habitat when the roads are reclaimed (NTT 2011).

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

Over time, sagebrush habitats have been lost to agriculture and urban development. Habitat loss also decreases the connectivity between seasonal habitats, increasing population isolation and susceptibility to stochastic events, such as disease or drought. 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 human traffic, wildfire, and invasive plant spread. 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.

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

*Impacts from Land Tenure Decisions*

Land tenure adjustments or withdrawals 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*

Special designations (e.g., ACECs, Wilderness, and WSAs) and other conservation may be designated to provide protection from population loss and habitat loss, fragmentation, or disturbance of GRSG and their habitats. Existing ACECs may also protect GRSG though they were not established for this purpose. 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, by protecting from habitat fragmentation, loss and human disturbance.

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.

### 4.2.3 Impacts Common to All Alternatives

*Impacts from Vegetation Management*
Under all alternatives, the BLM would continue to follow Integrated Vegetation Management Handbook (H-1740-2) policies for vegetation management. Application of these policies would control spread of invasive weeds, limit conifer expansion, restore sagebrush, and other activities which improve vegetation management in sagebrush habitat.

*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.

There are no other impacts common to all alternatives.

### 4.2.4 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. As a result, there is general direction to preserve and improve vegetation communities; however, discrete human disturbances, such as road construction and mineral and ROW development, would continue, which could result in impacts on GRSG as described in Nature and Type of Effects.

***COT Report Threat—Fire***

*Impacts from Wildland Fire and Fuels Management*
Under existing management, prescribed burning may be used in support of resource management objectives, such as restoring grassland or shrubland, reducing conifer encroachment, and increasing age-class variety. The intention of prescribed burning is to improve wildlife habitat and vegetation production. Sagebrush treatments are designed to maintain sagebrush within the canopy at 15 to 50 percent and to increase succulent forbs in order to improve forage for GRSG and increase population stability.

Older LUPs are often less specific but are generally consistent in allowing use of fire to meet land management objectives, including enhancement or maintenance of healthy sagebrush ecosystems, though they often lack clear descriptions of desired conditions to guide use of fire. The guidance in newer plans is generally more specific with regard to desired conditions.

Under Alternative A, chemical weed treatments may also be applied following prescribed burns to limit the expansion of weeds or invasive species in the burned area. Rest periods following wildfire or controlled burn are determined on a site-specific basis. Intensive wildfire suppression would be applied to high-value areas, such as sagebrush, fire-sensitive woody riparian areas, and commercial forests.

Continuation of this management approach would protect sagebrush acreage, but could also contribute to fuels buildup, which directly threatens sagebrush ecosystems.

***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. Noxious weed control would be the responsibility of the affected permittee or lessee under existing weed control cooperative range improvement agreements. Permittees and lessees would submit records and maps of treatment areas to the BLM annually. Current management programs designed to reduce weeds also benefit GRSG habitat.

Vegetation dynamics development tool (VDDT) modeling was completed to describe vegetative changes across all the alternatives for the short term (10 years) and the long term (50 years). **Table 4-3**, Projected Percentage of Sage-Grouse Habitat in Preferred Condition in the Oregon Sub-region After 10 Years, and **Table 4-4**, Projected Percentage of Sage-Grouse Habitat in Preferred Condition in the Oregon Sub-region After 50 Years, display these comparisons. No alternative approaches or reaches goal of 70 percent of the area with sagebrush cover of 10 to 30 percent after 10 years or after 50 years at a 1-percent treatment rate. In the absence of any treatment, habitat trend is downward for all populations, largely due to expansion of annual grass at approximately 0.1 percent per year.

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).

According to the VDDT model, for Alternative A, habitat trends are negative through year 50 for subpopulations 902 and 903, but up slightly by year 10 and generally stable through year 50 for subpopulations 904 and 906. For population P04, habitat trends are upward through year 50. Overall, habitat trend is slightly upward through year 10 and then declines back to current levels by year 50. None of the populations would reach the target of 70 percent cover of sagebrush in 10 or 50 years.

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

| Name of Population | Analysis Area[1] | Total Acres[2] | Current Habitat[3] (% of Area) | Alt. A | Alt. B | Alt. C | Alt. D | Alt. E | Alt. 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% with predominantly native species understory without juniper

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

| Name of Population | Analysis Area[1] | Total Acres[2] | Current Habitat[3] (% of Area) | Alt. A | Alt. B | Alt. C | Alt. D | Alt. E | Alt. 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% with predominantly native species understory without juniper

### *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 retention of pre-settlement trees and stands 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.

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 controlled burns. These approaches would continue, subject to budget limitations, to have success in reducing juniper extent and cover.

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

*Impacts from Range Management*

As shown in **Table 4-5**, Greater Sage-Grouse Habitat Open and Closed to Livestock Grazing by Alternative, currently, 12,126,923 acres in the planning area are open for livestock grazing and 345,848 acres are closed to livestock grazing. Within PPH, 4,492,467 acres are open to grazing, while 36,244 acres are closed. Within PGH, 5,501,821 acres are open to grazing, with 142,522 acres closed.

**Table 4-5**
**Greater Sage-Grouse Habitat Open and Closed to Livestock Grazing by Alternative**

| | Alternative A | Alternative B | Alternative C | Alternative D | Alternative E | Alternative F |
|---|---|---|---|---|---|---|
| **AUMs Available** | 924,617 | 924,617 | 0 | 915,624 | 924,617 | 350,208 |
| **Acres Open** | 12,126,923 | 12,126,923 | 0 | 11,982,637 | 12,121,617 | 7,495,716 |
| Priority/Core | 4,492,467 | 4,492,467 | 0 | 4,492,467 | 4,492,467 | 3,369,350 |
| General/Low Density | 5,501,821 | 5,501,821 | 0 | 5,438,898 | 3,824,263 | 4,126,365 |
| **Acres Closed** | 345,848 | 345,848 | 11,686,805 | 484,025 | 345,888 | 2,498,572 |
| Priority/Core | 36,244 | 36,244 | 4,528,711 | 101,652 | 36,244 | 1,123,116 |
| General/Low Density | 142,522 | 142,522 | 5,644,343 | 205,447 | 88,203 | 1,375,455 |

Source: Oregon/Washington BLM 2013

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 maintain the effectiveness of grazing management practices and integrated ranch planning used to plan allotments as single units.

For both livestock grazing allotments and wild horse and burro management, 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 specifically address GRSG habitat needs.

Grazing management guidelines are less specific in older land management plans; however, Standards for Rangeland Health and Guidelines for Grazing Management will apply. Allowable grazing utilization levels can be adjusted during permit renewals and in annual operating plans to account for the current conditions. 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. Application of permit modifications to limit vegetation loss would reduce the loss of sagebrush understory.

Range improvements under Alternative A would be designed to meet both wildlife and range objectives for livestock or wild horses and burros. 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, 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 or wild horse and burro use 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 livestock or wild horse and burro grazing.

#### *COT Report Threat—Energy Development and Mining*

*Impacts from Leasable Minerals Management*

Energy development and mineral exploration and extraction directly disturb GRSG and their habitat, as described under **Section 4.2.2**, 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 4-6**, Greater Sage-Grouse Habitat Open and Closed to Fluid Mineral Leasing, shows GRSG habitat open

**Table 4-6**
**Greater Sage-Grouse Habitat Open and Closed to Fluid Mineral Leasing**

| | Alternative A | Alternative B | Alternative C | Alternative D | Alternative E | Alternative F |
|---|---|---|---|---|---|---|
| **Acres Open** | 9,483,868 | 6,087,084 | 2,002,435 | 9,483,868 | 6,087,084 | 2,002,435 |
| Priority/Core | 3,396,784 | 0 | 0 | 3,396,784 | 0 | 0 |
| General/Low Density | 4,084,649 | 4,084,649 | 0 | 4,084,649 | 2,665,747 | 0 |
| **Acres Closed** | 3,134,159 | 6,530,944 | 10,615,593 | 3,134,159 | 6,530,944 | 10,615,593 |
| Priority/Core | 1,150,259 | 4,547,043 | 4,547,043 | 1,150,259 | 4,547,043 | 4,547,043 |
| General/Low Density | 1,577,983 | 1,577,983 | 5,662,632 | 1,577,983 | 1,263,044 | 5,662,632 |

Source: Oregon/Washington BLM GIS 2013.

and closed to fluid mineral leasing. **Table 4-7**, Percent of Populations Affected by Closure to Fluid Mineral Leasing – Alternative A, 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 PPMA and less than 1 percent of each population within PGMA 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 PPMA. Development in PPH and PGH would continue to cause impacts on GRSG as described under **Section 4.2.2**.

**Table 4-7**
**Percent of Populations Affected by Closure to Fluid Mineral Leasing – Alternative A**

| Population | Percent of Population Affected (based on acres of habitat affected) | |
|---|---|---|
| | PPMA | PGMA |
| Baker | 0.4% | 0.02% |
| Northern Great Basin | 1.5% | 0.7% |
| Western Great Basin | 9% | 0.8% |
| Central Oregon | 8% | 0.4% |
| Total by PPMA and PGMA | *19%* | *2%* |
| Total | *21%* | |

Note to all population tables: .Sage-Grouse Core Areas (PPMA) protect 90 percent of the sage-grouse population, representing over 550 lek sites in the Oregon sub-region across all land ownerships (ODFW 2012b; p. 84, Table 21). Approximately 67 percent of PPMA and 68 percent of Low Density habitat occur on BLM-administered lands (see Chapter 3, Table 3-1). Thus, the BLM extrapolates that 74 percent of the population (67% of 90%) would be affected by RMP allocations covering all of PPMA, and approximately 7 percent of the population (68% of 10%) would be affected by RMP allocations covering PGMA. Management applying to both PPMA and PGMA would affect approximately 81% 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 4-8**, Greater Sage-Grouse Habitat Open and Closed to Nonenergy Leasable Mineral Leasing, shows acreage currently open and closed to nonenergy leasable mineral leasing; **Table 4-9**, Greater Sage-Grouse Habitat Open and Closed to Salable Minerals, shows acreage currently open and closed to salable mineral development. **Tables 4-10**, Percent of Populations Affected By Closure to Fluid Mineral Leasing – Alternative A, and **4-11**, 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 each population within PPMA and less than one percent of each population within PGMA would be affected by closure to salable mineral development under Alternative A. The greatest protections would occur in the Northern Great Basin and Western Great Basin populations in PPMA. Less than 1 percent of all populations would be affected by withdrawal from locatable mineral entry.

**Table 4-8**
**Greater Sage-Grouse Habitat Open and Closed to Nonenergy Leasable Mineral Leasing**

| | Alternative A | Alternative B | Alternative C | Alternative D | Alternative E | Alternative F |
|---|---|---|---|---|---|---|
| Acres Closed (Priority/ Core and General/Low Density) | 3,134,159 | 6,530,944 | 10,615,593 | 3,134,159 | 6,530,944 | 6,530,944 |
| Acres Open Priority/ Core and General/ Low Density) | 9,483,868 | 6,087,084 | 2,002,435 | 9,483,868 | 6,087,084 | 6,087,084 |

Source: Oregon/Washington BLM GIS 2013.

**Table 4-9**
**Greater Sage-Grouse Habitat Open and Closed to Salable Minerals**

| | Alternative A | Alternative B | Alternative C | Alternative D | Alternative E | Alternative F |
|---|---|---|---|---|---|---|
| Acres Closed (Priority/ Core and General/ Low Density) | 2,752,534 | 6,373,471 | 10,726,185 | 6,373,471 | 6,373,471 | 6,373,471 |
| Acres Open Priority/ Core and General/ Low Density) | 9,026,017 | 6,244,557 | 1,891,843 | 6,244,557 | 6,244,557 | 6,244,557 |

Source: Oregon/Washington BLM GIS 2013.

**Table 4-10**
**Percent of Populations Affected By Closure to Fluid Mineral Leasing – Alternative A**

| Population | 14.6% | Percent of Population Affected (based on acres of habitat affected) | |
|---|---|---|---|
| | | PPMA | PGMA |
| Baker | | 0.4% | 0.02% |
| Northern Great Basin | | 1.5% | 0.7% |
| Western Great Basin | | 9% | 0.8% |
| Central Oregon | | 8% | 0.4% |
| Total by PPMA and PGMA | | *19%* | *2%* |
| Total | | *21%* | |

Note to all population tables: .Sage-Grouse Core Areas (PPMA) protect 90 percent of the sage-grouse population, representing over 550 lek sites in the Oregon sub-region across all land ownerships (ODFW 2012b, p. 84, Table 21). Approximately 67 percent of PPMA and 68 percent of Low Density habitat occur on BLM-administered lands (Chapter 3, Table 3-1). Thus, BLM extrapolates that 74 percent of the population (67% of 90%) would be affected by RMP allocations covering all of PPMA, and approximately 7 percent of the population (68% of 10%) would be affected by RMP allocations covering PGMA. Management applying to both PPMA and PGMA would affect approximately 81% 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.

**Table 4-11**
**Percent of Populations Affected By Closure to Salable Minerals – Alternative A**

| Population | Percent of Population Affected (based on acres of habitat affected) | |
|---|---|---|
| | PPMA | PGMA |
| Baker | <1% | <1 % |
| Northern Great Basin | 7 % | <1 % |
| Western Great Basin | 6 % | <1 % |
| Central Oregon | 1 % | <1% |
| Total by PPMA and PGMA | 15% | 2% |
| Total | 17% | |

For locatable minerals, mitigation measures would continue to apply to the proposed plans of operation, as the law allows. Approximately 919,300 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. **Table 4-12**, Greater Sage-Grouse Habitat Recommended for Withdrawal from Locatable Mineral Entry, 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 4-13**, 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 4-12**
**Greater Sage-Grouse Habitat Recommended for Withdrawal from Locatable Mineral Entry**

| | Alternative A | Alternative B | Alternative C | Alternative D | Alternative E | Alternative F |
|---|---|---|---|---|---|---|
| Acres Withdrawn | 996,760 | 996,760 | 996,760 | 996,760 | 996,760 | 996,760 |
| Acres Recommended for Withdrawal | 20,453 | 4,292,266 | 9,392,412 | 20,453 | 4,292,266 | 4,292,266 |
| Acres Open | 11,600,814 | 7,321,383 | 2,228,856 | 11,600,814 | 11,600,814 | 7,321,383 |

Source: Oregon/Washington BLM GIS 2013.

**Table 4-13**
**Percent of Populations Currently Affected By Withdrawal from Locatable Mineral Entry – Alternative A**

| Population | Percent of Population Affected (based on acres of habitat affected) |
|---|---|
| Baker | <1% |
| Northern Great Basin | <1% |
| Western Great Basin | <1% |
| Central Oregon | <1% |
| Total | <1% |

***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 4-14**, Greater Sage-Grouse within ROW Avoidance or Exclusion Areas, below shows ROW avoidance and exclusion areas under each alternative, and **Table 4-15**, Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas-Alternative A, shows the percent of each population impacted. The Northern Great Basin and Western Great Basin populations have the greatest proportion 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 4-14**
**Greater Sage-Grouse Within ROW Avoidance or Exclusion Areas**

| | Alternative A | Alternative B | Alternative C | Alternative D | Alternative E | Alternative F |
|---|---|---|---|---|---|---|
| **Exclusion** | 857,564 | 4,547,043 | 10,682,124 | 857,564 | 857,564 | 10,682,124 |
| Priority/Core | 257,154 | 4,547,043 | 4,547,043 | 257,154 | 4,547,043 | 4,547,043 |
| General/Low Density | 288,195 | 0 | 5,669,422 | 288,195 | 156,523 | 5,669,422 |
| **Avoidance** | 3,445,685 | 6,106,923 | 292,671 | 5,964,814 | 3,445,685 | 292,671 |
| Priority/Core | 1,336,146 | 0 | 0 | 4,289,889 | 1,336,146 | 0 |
| General/Low Density | 1,672,025 | 5,662,632 | 0 | 1,672,025 | 1,384,208 | 0 |

Source: Oregon/Washington BLM GIS 2013.

**Table 4-15**
**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% |
| *Total* | *28%* | *27%* |

***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, 5,123,070 acres are open to off-road motorized travel, 2,246,535 acres in PPH and 1,894,043 in PGH. Recreational use of wildlife habitat, especially OHV use, disturbs GRSG, potentially resulting in nest abandonment, and contributing to fragmentation of habitat. **Table 4-16**, Percent of the GRSG Affected by Travel Management Designation 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 4-16**
**BLM-Administered Acres of PPMA and PGMA and Percent of GRSG Affected by Travel Management Designations under Alternative A**

| Allocation | PPMAs (acres) | PGMAs (acres) | % 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.

### 4.2.5 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. PPMA and PGMA 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 PPMA, including a maximum three percent disturbance cap to human activities, not including fire, in PPMA.

The National Technical Team (2011) recommended managing priority GRSG habitats such that discrete anthropogenic disturbances cover less than three percent of the total GRSG habitat, regardless of ownership. 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 species 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.

The proposed actions under Alternative B would likely reduce the disturbance to GRSG, habitat loss and degradation impacts described in Section 4.2.2, and would increase the protection of sagebrush within PPMA and PGMA compared with Alternative A.

***COT Report Threat—Invasive Plant Species***

*Impacts from Vegetation Management*

Current management programs (Alternative A) are already designed to reduce weeds, which benefits GRSG habitat. Noxious weed 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 weed 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 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, 904 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.

#### *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. 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 species.

#### *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 (**Table 4-5**). Impacts on GRSG habitat from grazing, as described under **Section 4.2.1**, would continue under Alternative B. However, AMPs, integrated ranch planning, and land health assessments in PPMA 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 during permit renewals and in annual operating plans to account for the current conditions. 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 PPMA 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 Horses and Burros Management*

Incorporating GRSG habitat objectives and focusing land health assessments within HMAs would increase the potential that habitat issues are discovered and addressed sooner. The habitat assessments would incorporate recommendations from the HAF. 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 PPMA to unleased fluid minerals, nonenergy leasable minerals, and salable minerals. For locatable minerals, the BLM would recommend withdrawal of all PPMA from mineral entry. RDFs would avoid or minimize impacts in PPMA, to the extent the law allows.

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

*Impacts from Leasable Minerals Management*

Geophysical exploration would be allowed within PPMA but only for obtaining information on fluid mineral resources, including geothermal, in adjacent areas outside of PPMA. 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 4.2.1. **Table 4-17**, Percent of GRSG Populations Affected by Closures to Fluid Minerals - Alternative B, shows the percentage of each population impacted by closure to fluid mineral leasing under Alternative B. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be

**Table 4-17**
**Percent of GRSG Populations Affected by Closures to Fluid Minerals - Alternative B**

| Population | Percent of Population Affected (based on acres of habitat affected) | |
|---|---|---|
| | PPMA | PGMA |
| Baker | >2% | 0.02% |
| Northern Great Basin | 35% | 0.7% |
| Western Great Basin | 31% | 0.8% |
| Central Oregon | 6% | 0.4% |
| Total by PPMA and PGMA | 74% | 2% |
| Total | 76% | |

protected by closure to fluid mineral leasing, while less than 10 percent of the Baker and Central Oregon populations would be affected.

*Impacts from Mineral Materials (Salables) and Nonenergy Leasable Minerals Management*

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 PPMA or would be collocated in existing disturbed areas to the extent possible. In PGMA, surface disturbances would be minimized during activity level planning.

**Table 4-18**, Percent of the Populations Affected by Closures to Salable Minerals - Alternative B, shows the percentage of each population impacted 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 affected.

**Table 4-18**
**Percent of the Populations Affected by Closures to Salable Minerals - Alternative B**

| Population | 14.6% | Percent of Population Affected (based on acres of habitat affected) | |
|---|---|---|---|
| | | PPMA | PGMA |
| Baker | | >2% | <1 % |
| Northern Great Basin | | 35% | <1 % |
| Western Great Basin | | 31% | <1 % |
| Central Oregon | | 6% | <1% |
| Total by PPMA and PGMA | | 74% | 2% |
| Total | | 76% | |

In areas that cannot be completely closed to leasable mineral development or withdrawn from locatable mineral entry, the BLM could impose a NSO buffer

around leks and/or a 3 percent surface disturbance threshold in PPMA to the extent allowed by law. Once the 3 percent disturbance cap is met, no new surface disturbance would be allowed in PPMA until restoration has occurred.

For locatable minerals, areas in PPMA 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 would require a mineral appraisal, another resource-intensive task.

**Table 4-19**, 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 Northern Great Basin and Western Great Basin populations would be protected by recommended withdrawal of locatable mineral entry, while less than ten percent of the Baker and Central Oregon populations would be affected.

**Table 4-19**
**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) |
|---|---|
| Baker | >2% |
| Northern Great Basin | 35% |
| Western Great Basin | 31% |
| Central Oregon | 6% |
| Total | 74% |

***COT Report Threat—Infrastructure***

*Impacts from Lands and Realty Management*
As shown in **Table 4-10**, PPMA would be managed as ROW exclusion areas (4,547,043 acres); PGMA 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 4.2.1**. 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 4-20**, Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas – Alternative B.

**Table 4-20**
**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% |
| *Total* | *74%* | *7%* |

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 PPMA, 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 PPMA 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 PPMA.

*Impacts from Travel Management*
The BLM would limit motorized vehicles to existing roads and trails until travel management planning evaluates roads for permanent or seasonal closure. Route construction in PPMA would be limited to realignments or built to minimum standards necessary, and redundant roads would be rehabilitated. **Table 4-21**, BLM-Administered Acres of PPMA and PGMA and Percent of Oregon Populations within Travel Management Designations under Alternative B, shows

**Table 4-21**
**BLM-Administered Acres of PPMA and PGMA and Percent of Oregon Populations within Travel Management Designations under Alternative B**

| Allocation | PPMAs (acres) | PGMAs (acres) | % 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% |

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 PPMA as limited to OHV use would protect over 75 percent of GRSG within the decision area. Less than five percent of GRSG would occur in closed or open areas.

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 PPMA 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 4-22**, 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 4-22**
**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% |
| Total | 74% |

***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 PPMA and PGMA in habitat areas and by restricting development of ROWs, use of OHVs, and mineral leasing in PPMA. 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 PPMA. 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.

### 4.2.6 Alternative C

Under Alternative C, the BLM would manage lands to conserve, enhance, and restore GRSG habitat. Management actions would be applied to all occupied GRSG habitats, both PPMA and PGMA (**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 fuelbreaks 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 4.2.1** 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*

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 (PPMA and PGMA), thus providing restoration and habitat enhancement for GRSG in a larger area over the long term. However, removal of livestock grazing on BLM-administered land would eliminate weed control cooperative range improvement agreements with BLM permittees and lessees. Noxious weed control thus would be by BLM personnel, which could lead to reduced noxious weed control and increased weed patch size and distribution compared to the other alternatives, and which would maintain the permittee/lessee cooperative weed control agreements.

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. 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.

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.

Overall, Alternative C is likely to 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 (PPMA and PGMA).

Alternative C relies on passive management to limit juniper encroachment, which is less effective than active management using herbicide, mechanical means, or fire. Under Alternative C, juniper encroachment would be expected to continue at observed rates, reducing GRSG habitat quality and quantity over time, especially in the Cool-Moist Sagebrush Group, which is the most widely used habitat type for late brood-rearing. As discussed above, the approach under Alternative C could be ineffective and contribute to habitat loss, degradation, and fragmentation.

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

*Impacts from Range Management*

Under Alternative C, 10,177,786 acres would be closed to livestock grazing within PPMA and PGMA (**Table 4-5**). Removal of permitted grazing uses in habitat areas would improve GRSG habitat by reducing impacts such as loss of herbaceous nesting cover, described under **Section 4.2.1**. 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).

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/lessee weed 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 converted to agricultural use, resulting in a loss of GRSG habitat on adjacent private lands. Lands retained in BLM management would not be converted for agriculture. In addition, no-grazing areas on BLM-administered land could require additional miles of fencing to separate these areas from adjacent grazing lands. Additional fencing would increase the adverse effects of fencing on GRSG, such as raptor predation, potential collision, and habitat fragmentation discussed in **Section 4.2.1**.

*Impacts from Wild Horses and Burros Management*

Impacts from wild horses and burro management are same as those described for Alternative A. 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 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 PPMA would avoid or minimize impacts to the extent allowable by law. Alternative C would avoid leasing in occupied habitat (PPMA and PGMA) 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 4.2.1**, to the extent the law allows. **Table 4-23**, 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 one-third of the Northern Great Basin and Western Great Basin populations would be within areas closed to fluid mineral leasing, with over 10 percent of the Central Oregon population and 1 percent of the Baker population protected by these measures.

**Table 4-23**
**Percent of GRSG Populations Affected by Closures to Fluid Minerals - Alternative C**

| Population | Percent of Population Affected (based on acres of habitat affected) | |
|---|---|---|
| | PPMA | PGMA |
| Baker | >2% | >1% |
| Northern Great Basin | 35% | 2% |
| Western Great Basin | 31% | 3% |
| Central Oregon | 6% | 2% |
| Total by PPMA and PGMA | *74%* | *7%* |
| Total | *81%* | |

*Impacts from Mineral Materials (Salables) and Nonenergy Leasable Minerals Management*

Impacts are as described under Alternative B. **Table 4-24**, 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 one-third of the Northern Great Basin and Western Great Basin populations would be within areas closed to salable mineral development, with over 10 percent of the Central Oregon population and 1 percent of the Baker population protected by these measures.

**Table 4-24**
**Percent of the Populations Affected by Closures to Salable Minerals - Alternative C**

| Population | Percent of Population Affected (based on acres of habitat affected) | |
|---|---|---|
| | PPMA | PGMA |
| Baker | >2% | >1% |
| Northern Great Basin | 35% | 2% |
| Western Great Basin | 31% | 3% |
| Central Oregon | 6% | 2% |
| Total by PPMA and PGMA | 74% | 7% |
| Total | 81% | |

**Table 4-25**, 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 Northern Great Basin and Western Great Basin populations would be within areas recommended for withdrawal from locatable mineral entry, with over 10 percent of the Central Oregon population and 1 percent of the Baker population protected by these measures.

**Table 4-25**
**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) |
|---|---|
| Baker | 1% |
| Northern Great Basin | 33% |
| Western Great Basin | 34% |
| Central Oregon | 13% |
| Total | 81% |

Under Alternative C, mineral development impacts would be avoided over largest amount of habitat by closing PPMA and PGMA 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 4.2.1**), 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 PPMA and PGMA would be managed as ROW exclusion areas (10,682,124 acres), (**Table 4-14**) Establishing ROW exclusion areas would reduce fragmentation on BLM-administered land and would protect GRSG habitat, as described under **Section 4.2.1**. 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, potentially over a larger area. Given the absence of land use controls and management, this alternative could increase GRSG habitat fragmentation overall. **Table 4-26**, 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 4-26**
**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 |
| Total | 81% | 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 4-27**, BLM-Administered Acres of PPMA and PGMA 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 4-27**
**BLM-Administered Acres of PPMA and PGMA and Percent of Oregon Populations within Travel Management Designations under Alternative C**

| Allocation | PPMAs (acres) | PGMAs (acres) | % Population Affected |
|---|---|---|---|
| Closed (existing) | 48,450 | 143,637 | 1.7% |
| Limited | 4,498,593 | *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 PPMA or PGMA 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 to 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 4-28**, 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 4-28**
**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% |
| Total | 81% |

*Impacts from ACECs*

ACECs to protect GRSG would be designated as sagebrush reserves in PPMA, consisting of blocks of BLM-administered land that exceed 4,000 acres, covering a total of 4,547,043 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 PPMA. 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 weed control efforts, leading to fine-fuel buildup that may contribute to more damaging wildfires. These impacts may damage habitat more than moderate grazing in accordance with Range Health Standards. In addition, Alternative C relies on passive restoration for weed 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.

### 4.2.7 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 and adaptive management applied to resource uses to account for sub-regional conditions. PPMA and PGMA would be designated (**Table 4-2**). The BLM would require a cap of 3 percent disturbance in PPMA, from human disturbances not including fire, and would implement numerous conservation measures to reduce impacts

from human activities in PPMA. 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 and would do the most to reduce the threats of habitat loss, degradation and fragmentation from fire. 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 as well as 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. Post-burn restoration programs would help regrowth in measurable ways compared to 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 weed treatments and measures to incorporate weed 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.

Overall 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 to current management or the other action alternatives.

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

*Impacts from Range Management*

Under Alternative D, as shown in **Table 4-5**, there would be a small decrease in the available AUMs and acreage open for livestock grazing (67,349 fewer acres in PPMA and 67,173 acres in PGMA), compared with Alternatives A and B. 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 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 Horses and Burros Management*

Alternative D impacts from wild horses 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 Minerals Management*

Under Alternative D, acres closed to fluid mineral leasing in PPMA and PGMA would be similar to Alternative A (see **Table 4-4**). 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 PPMA to the extent the law allows. A 3 percent disturbance cap would apply in PPMA. **Table 4-29**, 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 Northern Great Basin and Western Great Basin populations would be within areas closed to fluid mineral leasing, 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 Closures to Fluid Minerals - Alternative D**

| Population | Percent of Population Affected (based on acres of habitat affected) | |
|---|---|---|
| | PPMA | PGMA |
| Baker | >2% | 0.02% |
| Northern Great Basin | 35% | 0.7% |
| Western Great Basin | 31% | 0.8% |
| Central Oregon | 6% | 0.4% |
| Total by PPMA and PGMA | 74% | 2% |
| Total | 76% | |

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) Management and Nonenergy Leasable Minerals Management*

Under Alternative D, lands would be available to nonenergy leasable minerals subject to NSO stipulation. BMPs and restoration would be required on existing leases. PPMA 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 4-30**, 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 one-third of 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 4-30**
**Percent of the Populations Affected by Closures to Salable Minerals - Alternative D**

| Population | Percent of Population Affected (based on acres of habitat affected) | |
|---|---|---|
| | PPMA | PGMA |
| Baker | >2% | <1 % |
| Northern Great Basin | 35% | <1 % |
| Western Great Basin | 31% | <1 % |
| Central Oregon | 6% | <1% |
| Total by PPMA and PGMA | 74% | 2% |
| Total | 76% | |

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 PPMA by limiting surface disturbance to 3 percent.

### *COT Report Threat—Infrastructure*

*Impacts from Lands and Realty Management*

PPMA would be managed as ROW avoidance areas (4,289,889 acres); no ROW exclusion areas would be established for utilities, including wind power (**Table 4-9**). Exclusion areas already in place would remain in effect in PPMA, but all other areas in PPMA would be designated as avoidance areas (see **Table 4-14**). ROWs would be allowed in avoidance areas if the disturbance would be either under the three percent disturbance cap. In PGMA, 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 PPMA 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 PPMA. **Table 4-31**, 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.

**Table 4-31**
**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% |
| Total | 0 | 74% |

### *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.

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

*Impacts from Land Tenure Decisions*

No lands in PPMA would be available for disposal under Alternative D. Impacts from land tenure decisions are the same as Alternative B. **Table 4-32**, 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 4-32**
**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% |
| Total | 74% |

*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 three percent maximum anthropogenic 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. 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 the highest level of protection for GRSG habitat of the action alternatives.

### 4.2.8 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**). In these habitat areas, the BLM would incorporate

management flexibility to permit high value infrastructure with appropriate mitigation and best management practices tailored for the sub-region. A zero percent limit to human disturbance would apply in Core Area habitat. They will 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 PPMA or PGMA; Low Density habitat covers fewer acres than PGMA, 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 controlled burns 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, avoiding conversion of sagebrush for livestock forage, and using the habitat monitoring techniques in the ODFW plan. Invasive plant species will be managed through the following:

- Systematic detection surveys
- Priorities for weed control
- Establishing weed 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 weed 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 limited 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.

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*

Alternative E is similar to Alternatives B and D, emphasizing use of habitat monitoring techniques to avoid habitat degradation, avoiding conversion of sagebrush for livestock forage, and controlling invasive plants. 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. Limiting broadcast burning of stands to 160 acres can also be challenging logistically, such that some sites that would otherwise be treated might not be. Overall, Alternative E would have approximately the same GRSG habitat improvements as Alternatives B, D, and F, all of which would improve GRSG protection compared to 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 (see **Table 4-5**), using the terminology of Core and Low Density habitat rather than PPMA or PGMA. 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 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 0.6 mile 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 Burros Management*
Impacts from wild horse and burro management are same as under Alternative A.

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 Minerals Management*
Alternative E recommends no development in Core Areas if there is GRSG habitat and with evidence of occupancy, but does not close areas to leasing or apply stipulations. Alternative E also recommends avoidance of mineral development in Low Density/PGMA areas. **Table 4-33**, 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, with less than 10 percent of the Central Oregon and Baker populations protected by these measures.

**Table 4-33**
**Percent of GRSG Populations Affected by Closures to Fluid Minerals - Alternative E**

| **Population** | **14.6%** | **Percent of Population Affected (based on acres of habitat affected)** | |
|---|---|---|---|
| | | **PPMA** | **PGMA** |
| Baker | | >2% | < 1% |
| Northern Great Basin | | 35% | < 1% |
| Western Great Basin | | 31% | < 1% |
| Central Oregon | | 6% | < 1% |
| Total by PPMA and PGMA | | 74% | 2% |
| Total | | 76% | |

*Impacts from Mineral Materials (Salables) and Nonenergy Leasable Minerals Management*

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 recommendation to withdraw GRSG habitat from locatable mineral entry beyond existing withdrawals and recommendations. 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 4-34**, 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 4-34**
**Percent of the Populations Affected by Closures to Salable Minerals - Alternative E**

| Population | Percent of Population Affected (based on acres of habitat affected) | |
|---|---|---|
| | PPMA | PGMA |
| Baker | >2% | <1 % |
| Northern Great Basin | 35% | <1 % |
| Western Great Basin | 31% | <1 % |
| Central Oregon | 6% | <1% |
| Total by PPMA and PGMA | 74% | 2% |
| Total | 76% | |

**Table 4-35**, 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 4-35**
**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) |
|---|---|
| Baker | >2% |
| Northern Great Basin | 35% |
| Western Great Basin | 31% |
| Central Oregon | 6% |
| Total | 74% |

***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 4-36**, 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 4-36**
**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 |
| Total | 74% | 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 4-37**, BLM-Administered Acres of PPMA and PGMA and Percent of Oregon Populations within Travel Management Designations under Alternative E, shows the percentage of GRSG

**Table 4-37**
**BLM-Administered Acres of PPMA and PGMA and Percent of Oregon Populations within Travel Management Designations under Alternative E**

| Allocation | Core Habitat | Low Density | % 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

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.

***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 4-38**, 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 4-38**
**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% |
| Total | 74% |

*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 PGMA, and Core Area rather than PPMA. Management of Core Area habitat would be similar to PPMA; Low Density would cover fewer acres than PGMA and thus would provide less protection than Alternative B. Alternative E includes a zero percent maximum surface disturbance limit for anthropogenic 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.

### 4.2.9 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. PPMA and PGMA would be designated (**Table 4-2**). A maximum 3 percent disturbance cap would be applied to human disturbances in PPMA, 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*

Impacts on GRSG habitat from vegetation management for invasive plants under Alternative F are the same as under Alternative B. Targets for restoration of crested wheatgrass seedings, increasing sagebrush heterogeneity, and livestock utilization levels are not specified, increasing uncertainty of achieving desired outcomes. Overall, the guidance regarding weed 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 overgrazing 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.

The risk of habitat loss and degradation from invasive plant species spread in GRSG habitat under Alternative F would be similar to under Alternatives A, B, D, or E.

#### *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 B.

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

*Impacts from Range Management*
Under Alternative F, livestock grazing acreage in PPMA and PGMA would be reduced to 75 percent of current levels (**Table 4-5**), reducing available AUMs by approximately 60 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 4.2.1**. 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 causal 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 Horses and Burros Management*
Impacts on GRSG habitat from wild horses and burro management under Alternative F are the same as under Alternative B.

#### *COT Report Threat—Energy Development and Mining*

*Impacts from Leasable 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 PPMA 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 PPMA to the extent the law allows.

*Impacts from Mineral Materials (Salables) and Nonenergy Leasable Minerals Management*

Impacts on GRSG from salable and locatable minerals management under Alternative F would be 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.

Under Alternative F, as under Alternative C, energy development and mining impacts would be avoided over the largest amount of BLM-administered habitat by recommending withdrawing all occupied habitat proposed from mineral entry and closing to salable minerals materials. However, these restrictions could have the effect of pushing energy development impacts onto adjacent private lands lacking BLM land use controls, potentially decreasing available habitat for GRSG overall.

### *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 PPMA 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, 1,241,600 acres of PGMA and 2,560,400 acres of PGMA 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 PPMA from all anthropogenic 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 need for additional fencing that would be required under Alternative C, and may lead to improved sagebrush habitat quality or understory vegetation. Alternative F's approach of reducing 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,

### 4.2.10 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. Several COT recommendations are contradictory; for example, the recommendation to restore characteristic fire regimes, but subsequent recommendations greatly limiting use of fire as a management tool. 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 the homogeneous burn patterns and result in invasive plant issues considered adverse for sage-grouse habitat quality and quantity. Post-fire seeding success rates are generally very low in the less than 12-inch precipitation zone.

Alternative D is most likely to reduce fire risks since the widest range of techniques allowed and the use of unplanned fire to meet habitat objectives is explicitly permitted. However, Alternative D still carries 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.

Alternative A is similar to Alternative D in probable outcomes but the lack of clear desired conditions under A allows for a wider range of interpretations 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 weeds. 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), and Surface Management Handbook H-3809-1 (locatable minerals).

Most COT Report recommendations for invasive species 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. Overall, there is little evidence available that collective actions will have significant effect on invasive plant species spread rates. 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 area with sagebrush cover would differ by alternative between zero to 7 percent over a 50 year timeframe at a 1-percent treatment rate (**Tables 4-3** and **4-4**). Alternative C may actually be counterproductive, increasing the

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

***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 are very similar with respect to conifer encroachment, with the clearest treatment priorities under Alternative D by identifying Restoration Opportunity Areas as key location for restoration projects and providing 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 is less specific 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, although they do not specifically address GRSG habitat needs. Allowable utilization can be adjusted during permit renewals and in annual operating plans 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, B, and F have lowest probability of adjusting grazing management to meet sage-grouse habitat needs due to the lack of direction in the older plans under Alternative A, and the unclear management direction in Alternatives B and F. Grazing restrictions under Alternative C could be counterproductive and decrease GRSG habitat quality and quantity over time. Alternative E is less likely

to adjust grazing management to meet sage-grouse habitat needs, largely because assessments are not prioritized. Alternative D provides the clearest direction with highest likelihood of adjusting grazing management to meet GRSG habitat needs.

***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 PPMA 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 also would not avoid leasing in GRSG habitat, new leases would be subject to NSO or CSU stipulations and a total surface disturbance cap of three percent 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, and F, 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 PPMA, 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, so new mining activities would be avoided in occupied habitat. However, a three percent surface disturbance threshold in Alternative D could preclude levels of development reported to cause range abandonment (Knick et al. 2013). Further impact avoidance may occur if the operator agrees to implement BMPs (Appendix D).

All of the action alternatives, except Alternative E, have the same RDFs (Appendix C) and BMPs (Appendix D). 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 PPMA and PGMA in the RDFs apply to Alternatives B, C, D, and F. 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, Alternative D (as well as Alternatives B and F) would adhere to a three 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 PPMA and avoidance areas in PGMA. Alternative D would avoid ROWs in PPMA, and on a case-by-case basis in PGMA, 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 merely push ROW development onto adjacent private land with fewer land use restrictions. Thus, Alternative D's flexible approach 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 and F, but dispersed recreational activity does not require a permit and would not be impacted.

For road closures, Alternatives A, B, D and F 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 also limit OHVs to existing routes in PPMA. 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 and F would avoid disposal of PGMA/Core Area habitat lands, but Alternative C would also retain PGMA, 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.

## 4.3 VEGETATION

### 4.3.1 Methods and Assumptions

***Indicators***

Indicators of impacts on vegetation are as follows:

*Upland Vegetation*

- Acres and condition of native vegetation communities
- Change in the trend or trajectory of conifer encroachment

*Noxious Weeds and Invasive Species*

- Change in the likelihood for noxious weed or invasive plant species introduction or spread
- Change in the amount or density of noxious weed or invasive plant species

*Riparian and Wetland*

- Amount and condition of riparian and wetland vegetation

*Special Status Plants, Including Federally Listed Plants*

Potential impacts on special status plants could occur if anticipated future actions were to change and of the following:

- Number of special status plant populations
- Size of special status plant populations
- Habitat quality and distribution
- Extent or number of invasive plant species in occupied or potential habitat
- Fire frequency and intensity

***Assumptions***

The analysis includes the following assumptions:

- The degree of impact attributed to any one disturbance or series of disturbances would be influenced by several factors, including location in the watershed; the type, time, and degree of disturbance; existing vegetation; precipitation; and mitigating actions applied to the disturbance.

- New invasions of noxious and invasive weeds 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.
- Because the effects of climate change are complex and not yet well known or understood, the analysis was conducted assuming continuation of the current climate regime.
- Ecological health and ecosystem functioning depend on a number of factors, including vegetative cover, species diversity, nutrient cycling and availability, water infiltration and availability, percent cover of weeds, and climatic fluctuation.
- Short-term effects on upland vegetation would occur over a time frame of 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 a time frame of two years or less, and long-term effects would occur over longer than two years.

### 4.3.2 Nature and Type of Effects

GRSG rely on sagebrush ecosystems for all aspects of their life cycle. Typically, a range of sagebrush community composition within the landscape (including variations in subspecies composition, co-dominant vegetation, shrub cover, herbaceous cover, and stand age) are needed to meet seasonal and interseasonal requirements for food, cover, nesting, and wintering habitats. The landscape required for GRSG may be up to 40 square miles. Thus, conserving and managing GRSG is as much about the ecology, management, and conservation of large, intact sagebrush ecosystems as it is about the dynamics and behaviors of the populations themselves (Manier et al. 2013).

Historically, sagebrush-dominated vegetation was one of the most widespread habitats in the country, but its expanse has been fragmented, lost, or altered by invasive plants and human disturbance (NTT 2011). Protection of GRSG habitat would involve restrictions and limitations on activities that contribute to the spread of invasive species, fire, and other surface disturbance and management of vegetation to promote healthy sagebrush and understory vegetation to support GRSG.

Implementing management for non-motorized recreation and coal resources would have negligible or no impact on vegetation for all alternatives; therefore, they are not discussed in detail.

***Vegetation Management and Habitat Protection***

In addition to landscapes with large, intact patches of sagebrush, GRSG require high-quality habitat conditions. This includes a diversity of herbaceous species, vegetative and reproductive health of native grasses, and an abundance of

sagebrush. This requires management for high-quality condition in seasonally important habitats (Manier et al. 2013). The distribution of suitable sagebrush habitats is limited and the cost of habitat restoration is high. Given this, management plans that protect intact sagebrush and restore impacted areas to enhance existing habitats (for example, connectivity of intact sagebrush) have the best chance of increasing the amount and quality of sagebrush cover (Manier et al. 2013). Over the long term, sagebrush-promoting vegetation treatments will enhance native vegetation and overall ecosystem productivity, while reducing the distribution of invasive species and some woody species.

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 plants 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 are currently invading sagebrush ecosystems.

Expansion of conifer woodlands, especially western juniper (*Juniperus occidentalis* var. *occidentalis*), presents a threat to GRSG because they do not provide suitable habitat, and mature trees displace shrubs, grasses, and forbs through direct competition for resources. Juniper expansion is also associated with increased bare ground and increased potential for erosion. Mature trees can offer perch sites for raptors, so woodland expansion would also represent expansion of predation threat, similar to perches on power lines and other structures (Manier et al. 2013).

Current treatments and active vegetation management typically focus on the following:

- Vegetation composition and structure for fuels management
- Habitat management
- Productivity manipulation for improving the habitat and forage conditions for ungulates and other grazers, using surface soil stabilization to increase productivity or removing invasive plants.

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 on vegetation from vegetation removal and disturbance, but they would result in long-term improvements.

Management of vegetation resources to protect GRSG would alter vegetative communities by promoting increases in sagebrush height and herbaceous cover and vegetation productivity. Treatments designed to prevent encroachment of shrubs, nonnative species, or woody vegetation would alter the condition of

native vegetation communities by changing the density, composition, and frequency of species within plant communities. The intent of these management programs is to improve rangeland condition and to enhance sagebrush ecosystems over the long term.

Vegetation manipulations in the riparian zone, such as weed treatments, native plantings, and erosion control in the channel, would improve the condition of the riparian vegetation community, individual riparian species, and hydrologic functionality to attain proper functioning condition. Habitat connectivity for GRSG could be increased through vegetation manipulation designed to restore vegetation, particularly sagebrush overstory cover.

Direct protection of sagebrush habitat to support GRSG would limit or modify uses in this habitat type. Such use restrictions would reduce damage to native vegetation communities and individual native plant species in areas that are important for regional vegetation diversity and quality. Likewise, use restrictions would minimize loss of connectivity and would be more likely to retain existing age class distribution within these specific areas. Use restrictions could also minimize the spread of invasive species by limiting human activities that cause soil disturbance or seed introductions.

***Wildland Fire***

While wildfires likely played an important role historically in creating a mosaic of herbaceous dominated areas (recently disturbed) and mature sagebrush (less-frequently disturbed), current land-use patterns have restricted the system's ability to support natural wildfire regimes. Slow rates of regrowth and recovery of vegetation after disturbances (driven by low water availability and other constraints) are coupled with high rates of disturbance and conversion to introduced plant cover. These conditions are largely responsible for the accumulating displacement and degradation of the sagebrush ecosystem (Manier et al. 2013). Thus, preservation of sagebrush against wildfire and limiting use of prescribed burning is important to preserving GRSG habitat over both the short and long terms.

Sagebrush ecosystems are adapted to a historic fire regime and fire return intervals. Big sagebrush 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 within five years; however, a return to a full pre-burn community cover can take 15 to 100 years (Manier et al. 2013; Evers 2013). Fire suppression can be used to maintain habitat for GRSG (NTT 2011). When management reduces wildland fire frequency by controlling natural ignitions, the indirect impact is that vegetation ages across the landscape, and early successional vegetation communities are diminished. In addition, woody plant density increases, leading to a reduction in the herbaceous understory, and the fuelbed structure homogenizes, promoting the development of larger fires with homogenized fire

effects. Fire suppression can preserve the condition of some vegetation communities, as well as habitat connectivity. This is particularly important in areas where fire frequency has increased as a result of weed invasion, or where landscapes are highly fragmented. Fire suppression can also lead to increased fuel loads, which can lead to more damaging or larger-scale fires in the long term. Fire also increases opportunities for invasive species, such as cheatgrass, to expand (Brooks et al. 2004); fire suppression can limit the dominance of some invasive species.

Controlled burning can be used to 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).

***Lands and Realty***

Permitted activities, such as construction of utility ROWs, involve short-term and sometimes long-term vegetation removal. This reduces the condition of native vegetation communities and individual native plant species, alters age class distribution, reduces connectivity, and encourages the spread of invasive species. Construction activities could compact soils. This would inhibit natural revegetation in areas without active reclamation efforts. It also would reduce plant vigor, which would make plants more susceptible to disease, drought, or insect attack. In most cases soils in reclaimed areas would be ripped and seeded during interim or final reclamation (NTT 2011).

Different types of ROWs would impact vegetation in different ways. Above ground 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 would be permanently removed for construction of surface linear ROWs, such as roads. Furthermore, since above ground and surface linear ROWs can extend for many miles, vegetation communities could be fragmented and the potential for weeds to be introduced or spread would increase. Above-ground site-type ROWs and wind energy projects would remove vegetation during project construction; however, areas would be restored after the ROW is installed.

ROW exclusion areas would prohibit all development of ROWs in areas where they are designated, which would directly protect vegetation from disturbance and removal. In ROW avoidance areas, the BLM would consider on a case-by-case basis whether a ROW should be allowed. This flexibility may be advantageous where federal and private landownership areas are mixed, and exclusion areas could result in more widespread development on private lands.

Land tenure adjustments can be made to reduce the fragmentation of GRSG habitat, which would improve the BLM's ability to implement management actions. These would result in increased vegetation diversity, ecological health, and attainment of land health standards. In addition, retention of federal lands

would prevent sagebrush removal associated with land conversion to agricultural or urban uses.

***Mineral Resources***

Energy development requires construction of roads, well pads, wells and other infrastructure, and associated noise, traffic, and lights. These conditions alter, degrade, or entirely displace native ecosystems in the short and long terms (Manier et al. 2013). Surface disturbance associated with mineral development often removes vegetation, reduces the condition of native vegetation communities and the connectivity of habitat, and encourages the spread of invasive species (NTT 2011). Since most mines or claims in Oregon are relatively small, the surface impacts are also generally small. Vegetation removal would convert areas to an earlier seral stage, which could change vegetation community succession and reduce desired plant communities. The remaining vegetation could have reduced vigor or productivity due to mechanical damage, soil compaction, and dust. Impacts would not occur in areas closed to mineral leasing or development.

Impacts are reduced through the implementation of required reclamation and approved reclamation plans that are created, approved, and implemented prior to any surface disturbance and address vegetation, invasive weeds, and other important resource values, such as special status plants.

There are no anticipated effects on vegetation from coal development or management. This is because this resource is not expected to be developed over the course of the plan.

***Recreation***

Recreation in GRSG habitat can be benign, but casual use, such as camping, bicycling, and off-road vehicle use, can degrade sagebrush vegetation in the short and long terms. Potential impacts from casual recreation use include trampling, soil compaction, erosion, spread of invasive plants, and generation of fugitive dust (Knick et al. 2011). Recreation can also increase the potential for wildfire caused by invasive plant spread or humans (Knick et al. 2011). Most impacts occur in easily accessible areas and in areas open to cross-country travel, particularly motorized use. Restrictions on recreation in GRSG habitat would limit damage to the vegetation communities that comprise this habitat. This would be accomplished by directly reducing disturbance to vegetation from trampling, motorized vehicles, dust, and spread of invasive species. Such restrictions could involve seasonal area closures or limitations on the number of users or types of uses permitted, particularly off-road vehicle use (NTT 2011).

***Travel and Transportation***

Road construction can divide and fragment vegetation over the long term, depending on the location of the road. The use of roads creates soil compaction and allows the spread of human disturbance, including wildfire and invasive plant species (USFWS 2010a; Manier et al. 2013). Invasive species 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).

The more areas that restrict motorized vehicle use, the less likelihood there would be for impacts on vegetation from surface disturbance, such as reduced acreage and condition of vegetation, increased likelihood for weed invasion, and reduction in the number and size of special status plant populations and habitat quality and distribution.

***Livestock Grazing***

Livestock grazing is the most widespread land use across the sagebrush habitat (Connelly et al. 2004). Livestock grazing affects soils, vegetation health, species composition, water, and nutrient availability over the short and long terms 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, 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, which reduces riparian community conditions and hydrologic functionality at certain levels. Properly managed grazing could help restore functioning condition of riparian areas, and could also reduce litter and fine fuel loading, helping to reduce fire size and severity.

Water developments, roads, and structural range improvements associated with livestock grazing throughout the planning area would remove vegetation over the long term and could be a source of weed introduction 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 and thereby potentially improve rangeland health.

At certain levels, grazing leads to loss of vegetative cover, reduced water infiltration rates and nutrient cycling, decreased plant litter and water quality, and increased bare ground and soil erosion (Manier et al. 2013). 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.

Management of grazing systems that aims to protect sagebrush and riparian ecosystems would enhance vegetation by allowing more plant growth and reducing trampling and introduction of exotic species. Conversely, concentration of livestock grazing in certain areas would increase surface-disturbing impacts in those areas.

***Wild Horses and Burros***

Unlike cattle and other ungulates, horses can crop vegetation close to the ground, potentially limiting or delaying recovery of plants (Menard et al. 2002, p. 127). In addition, horses seasonally move to higher elevations, spend less time at water, and range farther from water resources than cattle (Beever and Aldridge, in press, p. 21). Given these differences, along with the confounding factor of past range use, it is difficult to assess the overall magnitude of the impact of horses on the landscape in general, or on GRSG habitat in particular.

Similar to domestic livestock grazing, wild horses and burros have the potential to negatively affect GRSG habitats over the short and long terms in in areas where they occur by decreasing grass cover, fragmenting shrub canopies, altering soil characteristics, decreasing plant diversity, and increasing the abundance of invasive species.

Water developments, roads, and structural range improvements associated with wild horse and burro grazing would remove vegetation over the long term and could be a source of weed introduction to rangelands. Wild horse and burros congregate around water developments, compacting soil and trampling nearby vegetation, including shoreline and riparian areas. This would make reestablishment of native vegetation difficult in the area surrounding water developments.

Management of wild horse and burros populations within the Appropriate Management Level (AML) range and emphasis on meeting rangeland health standards would enhance the suitability of habitat for GRSG, reduce trampling and introduction of exotic species. Land health evaluations are used to assess rangeland condition and help to identify where a change in AML would be beneficial. Conversely, concentration of wild horse and burros would increase surface disturbing impacts on those areas.

***Special Designations***

Special designations (e.g., ACECs, Wilderness, and WSAs) and other conservation measures may be established to protect vegetation in GRSG habitat as a relevant or important value. While existing ACECs, Wilderness, WSAs, and other special designations do not have GRSG habitat as a relevant or important value, some incidental protection may be conferred to vegetation in existing ACECs by restricting resource uses intended to protect other values.

### 4.3.3 Impacts Common to All Alternatives

***Impacts from Special Status Species—Greater Sage-Grouse Management***
There are no impacts on vegetation common to all alternatives from GRSG management.

***Impacts from Vegetation Management***
Under all alternatives, Integrated Vegetation Management Handbook policies would be followed and would provide guidance on which treatments and chemicals could be used. Application of these policies would improve vegetation management in sagebrush habitat over the short and long terms, thereby likely improving the condition of native vegetation in these areas. In addition, riparian and wetland areas would be managed to achieve or trend towards achieving proper functioning condition under all alternatives.

***Impacts from Wild Horse and Burro Management***
There are no impacts on vegetation common to all alternatives from wild horse and burro management.

***Impacts from Wildland Fire Management***
Post-wildland fire management would be common to all alternatives, with implementation of emergency stabilization and rehabilitation. This would help to reduce the effects of fire and maintain the extent of vegetation over the long term.

***Impacts from Livestock Grazing/Range Management***
There are no impacts on vegetation common to all alternatives from livestock grazing/range management.

***Impacts from Travel Management***
There are no impacts on vegetation common to all alternatives from travel management.

***Impacts from Lands and Realty Management***
There are no impacts on vegetation common to all alternatives from lands and realty management.

***Impacts from Leasable Minerals Management***
There are no impacts on vegetation common to all alternatives from leasable minerals management.

***Impacts from Locatable Minerals Management***
There are no impacts on vegetation common to all alternatives from locatable minerals management.

***Impacts from Mineral Materials (Salables) Management***

There are no impacts on vegetation common to all alternatives from mineral materials management.

***Impacts from Nonenergy Leasable Minerals Management***

There are no impacts on vegetation common to all alternatives from nonenergy leasable minerals management.

***Impacts from Mineral Split-Estate Management***

There are no impacts on vegetation common to all alternatives from mineral split-estate management.

***Impacts from Special Designations Management***

There are no impacts on vegetation common to all alternatives from special designations management.

***Impacts from Air Quality and Climate Change Management***

There are no impacts on vegetation common to all alternatives from air quality and climate change management.

***Impacts from Special Status Plants Management***

Under all alternatives, the BLM would follow management policy for federally listed and BLM-sensitive species provided in BLM Manual 6840. Under all alternatives, the BLM would protect and manage habitat for the enhancement and protection of the species' future existence. This would help to retain the number and size of special status plant populations over the long term.

### 4.3.4 Alternative A

In general, Alternative A would rely on management guidance that would not reflect the most up-to-date science regarding GRSG. Older land use plans would be implemented that often would lack a landscape-level approach to land use planning; however, many incorporate objectives for maintaining, improving, or restoring vegetation communities, particularly sagebrush and riparian and wetland habitats. As a result, there is general direction to preserve and improve vegetation communities. Nevertheless, discrete human disturbances, such as road construction and mineral and ROW development, would continue. This could result in a number of impacts on vegetation, as described under **Section 4.3.2**, Nature and Type of Effects.

***Impacts from Special Status Species—Greater Sage-Grouse Management***

There would be no impacts on vegetation resulting from GRSG management under Alternative A.

***Impacts from Vegetation Management***

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. Native species would be used when possible, but not required, allowing for some introduced species in areas where they are necessary for site stabilization, restoration, and protection from invasive plant species.

***Impacts from Wild Horse and Burro Management***

There would be no additional impacts on vegetation from wild horse and burro management under Alternative A. Impacts described under **Section 4.3.2** would continue.

***Impacts from Wildland Fire Management***

Under Alternative A, projects would be designed to minimize the size of wildfire and prevent the further loss of sagebrush, thereby retaining the extent of native vegetation over the short and long terms. In addition, prescribed burning can be used in support of resource management objectives, such as restoring grassland or shrubland, reducing conifer encroachment, or increasing age-class variety. As a result, vegetation condition and desired species composition would be improved in certain areas over the long term. Further, chemical weed treatments applied following prescribed burns would limit the expansion of weeds or invasive species in the burned area and would facilitate revegetation of native species. Impacts from fire, including those described under **Section 4.3.2**, would continue under Alternative A.

***Impacts from Livestock Grazing/Range Management***

Livestock grazing would continue to occur under Alternative A, with over 8.8 million acres of GRSG habitat open to grazing and over 120,000 acres closed to grazing on BLM-administered lands. Rangelands would continue to be managed to conform to the Oregon Standards for Rangeland Health, so vegetation communities would continue to be maintained and improved to some extent across the planning area over the short and long terms. Changes and adjustments would be considered on a case-by-case basis and would incorporate standards for rangeland health and guidelines for livestock grazing management to evaluate the ability to meet desired conditions.

Riparian and wetland areas would be managed to maintain or attain proper functioning condition. Plant communities that provide GRSG habitat that would be open and closed to livestock grazing in each alternative are presented in **Table 4-39**, GRSG Habitat1 Open and Closed to Livestock Grazing. Under Alternative A, over 8 million acres of vegetation communities used by GRSG within PPH and PGH would be open to grazing. Impacts described under

**Table 4-39**
**GRSG Habitat[1] Open and Closed to Livestock Grazing**

| Alternative | Open (acres) | Closed (acres) |
|---|---|---|
| Alternative A | | |
| PPH | 3,979,400 | 29,400 |
| PGH | 4,811,400 | 90,900 |
| Alternative B | | |
| PPMA | 3,979,400 | 29,400 |
| PGMA | 4,811,400 | 90,900 |
| Alternative C | | |
| PPMA | 0 | 4,009,600 |
| PGMA | 0 | 4,905,400 |
| Alternative D | | |
| PPMA | 3,924,500 | 84,300 |
| PGMA | 4,762,600 | 139,700 |
| Alternative E | | |
| Core | 3,979,400 | 29,400 |
| Low Density | 3,367,200 | 56,700 |
| Alternative F | | |
| PPMA | 3,979,400 | 29,400 |
| PGMA | 4,811,400 | 90,900 |

[1]GRSG habitat represents those vegetation communities that provide habitat for GRSG.
Source: Oregon/Washington BLM 2013

**Section 4.3.2** would continue in areas where rangeland health standards are not being met and livestock grazing is causing impacts on vegetation. Impacts, such as reduced acreage and condition of native vegetation and increased likelihood of weed spread, would be reduced in the areas where GRSG habitat would be closed to grazing (**Table 4-39**). Areas such as RNAs and ACECs could also be closed to grazing after assessment of rangeland health standards.

***Impacts from Travel Management***

Impacts from OHV use would continue under Alternative A over the short and long terms on over 5 million acres that would be open to cross-country motorized travel. Plant communities that provide GRSG habitat that would be open, closed, or limited to OHV use under each alternative are presented in **Table 4-40**, GRSG Habitat1 Open, Closed, or Limited to OHV Use. Under Alternative A, most GRSG habitat would be open or limited to existing routes. Route and trail modifications would be considered on a case-by-case basis. Impacts described under **Section 4.3.2** would continue to occur, particularly in areas open to OHV use.

**Table 4-40**
**GRSG Habitat[1] Open, Closed, or Limited to OHV Use**

| Alternative | Open (acres) | Closed (acres) | Limited (acres) |
|---|---|---|---|
| Alternative A | | | |
| PPH | 2,386,100 | 43,100 | 1,591,500 |
| PGH | 2,603,800 | 101,200 | 2,210,500 |
| Alternative B | | | |
| PPMA | 0 | 43,100 | 3,977,900 |
| PGMA | 2,603,800 | 101,200 | 2,210,500 |
| Alternative C | | | |
| PPMA | 0 | 43,100 | 3,977,900 |
| PGMA | 0 | 101,200 | 4,816,100 |
| Alternative D | | | |
| PPMA | 0 | 43,100 | 3,977,900 |
| PGMA | 2,603,800 | 101,200 | 2,210,500 |
| Alternative E | | | |
| Core | 0 | 33,000 | 2,532,900 |
| Low Density | 1,434,100 | 49,200 | 1,487,900 |
| Alternative F | | | |
| PPMA | 2,386,100 | 43,100 | 1,591,500 |
| PGMA | 2,603,800 | 101,200 | 2,210,500 |

[1]GRSG habitat represents those vegetation communities that provide habitat for GRSG.
Source: Oregon/Washington BLM 2013

***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. Plant communities that provide GRSG habitat that would be managed as ROW avoidance and exclusion under each alternative are presented in **Table 4-41**, GRSG Habitat1 Managed as ROW Avoidance and Exclusion. Under Alternative A, over 2.5 million acres of GRSG habitat would be managed as ROW avoidance areas, with nearly 500,000 acres of ROW exclusion areas. Impacts from ROW avoidance and exclusion areas would be similar to those described under **Section 4.3.2**.

**Table 4-41**
**GRSG Habitat[1] Managed as ROW Avoidance and Exclusion**

| Alternative | ROW Avoidance (acres) | ROW Exclusion (acres) |
|---|---|---|
| Alternative A | | |
| PPH | 1,157,000 | 233,900 |
| PGH | 1,425,900 | 222,100 |
| Alternative B | | |
| PPMA | 0 | 4,021,100 |

**Table 4-41**
**GRSG Habitat[1] Managed as ROW Avoidance and Exclusion**

| Alternative | ROW Avoidance (acres) | ROW Exclusion (acres) |
|---|---|---|
| PGMA | 4,917,400 | 0 |
| Alternative C | | |
| PPMA | 0 | 4,021,100 |
| PGMA | 0 | 4,917,400 |
| Alternative D | | |
| PPMA | 3,787,200 | 233,900 |
| PGMA | 1,425,900 | 222,100 |
| Alternative E | | |
| Core | 1,157,000 | 233,900 |
| Low Density | 1,198,900 | 121,000 |
| Alternative F | | |
| PPMA | 0 | 4,021,100 |
| PGMA | 0 | 4,917,400 |

[1]GRSG habitat represents those vegetation communities that provide habitat for GRSG.
Source: Oregon/Washington BLM 2013

***Impacts from Leasable Minerals Management***

Plant communities that provide GRSG habitat that would be open to leasing, open subject to NSO stipulation, and not available for leasing under each alternative are presented in **Table 4-42**, Leasable Minerals Management within GRSG Habitat by Alternative. Under Alternative A, over 1.5 million acres of plant communities that provide GRSG habitat would be open to leasing, while over 2 million acres would be closed. Stipulations and COAs would be applied in certain areas to reduce impacts from mineral leasing or development over the short and long terms, but these stipulations would not be applied consistently across the planning area. Impacts from leasable mineral development on vegetation, as described under **Section 4.3.2**, would continue to occur in areas open to leasing and development.

**Table 4-42**
**Leasable Minerals Management within GRSG Habitat by Alternative[1]**

| Alternative | Open (acres) | Open, with NSO (acres) | Not available (acres) |
|---|---|---|---|
| Alternative A | | | |
| PPH | 979,400 | 178,200 | 1,000,200 |
| PGH | 574,400 | 77,000 | 1,302,000 |
| Alternative B | | | |
| PPMA | 0 | 0 | 4,021,100 |
| PGMA | 574,400 | 77,000 | 1,302,000 |

**Table 4-42**
**Leasable Minerals Management within GRSG Habitat by Alternative[1]**

| Alternative | Open (acres) | Open, with NSO (acres) | Not available (acres) |
|---|---|---|---|
| Alternative C | | | |
| PPMA | 0 | 120 | 4,009,200 |
| PGMA | 2,800 | 60 | 4,864,800 |
| Alternative D | | | |
| PPMA | 0 | 2,439,800 | 1,000,600 |
| PGMA | 0 | 551,300 | 1,301,900 |
| Alternative E | | | |
| Core | 0 | 0 | 4,021,100 |
| Low Density | 469,600 | 54,500 | 1,062,100 |
| Alternative F | | | |
| PPMA | 0 | 0 | 4,021,100 |
| PGMA | 2,800 | 60 | 4,864,800 |

Source: Oregon/Washington BLM 2013
[1] Applies to both leasable fluid minerals and nonenergy leasable minerals. GRSG habitat represents those vegetation communities that provide habitat for GRSG.

***Impacts from Locatable Minerals Management***

Plant communities that provide GRSG habitat that would be withdrawn or recommended for withdrawal under each alternative are presented in **Table 4-43**, Locatable Mineral Withdrawals in GRSG Habitat1 by Alternative. Under Alternative A, over 600,000 acres of GRSG habitat would be withdrawn or recommended for withdrawal. Impacts from locatable mineral development on vegetation, as described under **Section 4.3.2**, would continue to occur in areas open to development.

**Table 4-43**
**Locatable Mineral Withdrawals in GRSG Habitat[1] by Alternative**

| Alternative | Withdrawn (acres) | Recommended for Withdrawal (acres) |
|---|---|---|
| Alternative A | | |
| PPH | 221,400 | 12,000 |
| PGH | 427,500 | 7,250 |
| Alternative B | | |
| PPMA | 80 | 4,020,600 |
| PGMA | 427,500 | 7,250 |
| Alternative C | | |
| PPMA | 0 | 4,021,100 |
| PGMA | 0 | 4,917,400 |
| Alternative D | | |
| PPMA | 221,400 | 12,000 |

**Table 4-43**
**Locatable Mineral Withdrawals in GRSG Habitat[1] by Alternative**

| Alternative | Withdrawn (acres) | Recommended for Withdrawal (acres) |
|---|---|---|
| PGMA | 426,900 | 7,250 |
| Alternative E | | |
| Core | 80 | 4,020600 |
| Low Density | 323,200 | 7,240 |
| Alternative F | | |
| PPMA | 90 | 4,019,100 |
| PGMA | 426,900 | 7,250 |

[1]GRSG habitat represents those vegetation communities that provide habitat for GRSG.
Source: Oregon/Washington BLM 2013

***Impacts from Mineral Materials (Salables) Management***

Plant communities that provide GRSG habitat that would be open, open subject to NSO, or closed to mineral materials development under each alternative are presented in **Table 4-44**, Salable Minerals Management within GRSG Habitat1 by Alternative. Under Alternative A, over 500,000 acres of GRSG habitat would be closed to mineral materials development, while over 300,000 acres would be open. NSO stipulations would be applied in some areas, which would reduce impacts over the short and long terms. Impacts from mineral materials development on vegetation, as described under **Section 4.3.2**, would continue to occur in areas open to development.

**Table 4-44**
**Salable Minerals Management within GRSG Habitat[1] by Alternative**

| Alternative | Open (acres) | Open, with NSO (acres) | Closed (acres) |
|---|---|---|---|
| Alternative A | | | |
| PPH | 2,804,100 | 117,100 | 277,100 |
| PGH | 3,233,200 | 358,400 | 230,400 |
| Alternative B | | | |
| PPMA | 0 | 0 | 4,020,900 |
| PGMA | 230,400 | 39,500 | 806,800 |
| Alternative C | | | |
| PPMA | 0 | 0 | 4,021,100 |
| PGMA | 0 | 0 | 4,917,400 |
| Alternative D | | | |
| PPMA | 0 | 0 | 4,019,600 |
| PGMA | 228,300 | 39,500 | 806,200 |
| Alternative E | | | |
| Core | 0 | 0 | 4,020,900 |

**Table 4-44**
**Salable Minerals Management within GRSG Habitat[1] by Alternative**

| Alternative | Open (acres) | Open, with NSO (acres) | Closed (acres) |
|---|---|---|---|
| Low Density | 216,000 | 27,300 | 638,300 |
| Alternative F | | | |
| PPMA | 160 | 40 | 4,019,400 |
| PGMA | 230,400 | 39,500 | 806,200 |

[1]GRSG habitat represents those vegetation communities that provide habitat for GRSG.
Source: Oregon/Washington BLM 2013

***Impacts from Nonenergy Leasable Minerals Management***
Impacts would be similar to those described for leasable minerals above (**Table 4-42**). Impacts from nonenergy leasable development on vegetation, as described under **Section 4.3.2**, 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 Designations Management***
Under Alternative A, the BLM would continue to manage 715,049 acres of ACECs. Existing ACECs likely protect vegetation over the short and long terms through use restrictions; 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 vegetation under this alternative.

***Impacts from Air Quality and Climate Change Management***
There would be no impacts on vegetation from air quality and climate change management under Alternative A.

***Impacts from Special Status Plants Management***
Impacts on vegetation are the same as those described under **Section 4.3.3**. There would be no additional impacts on vegetation from special status plant management under Alternative A.

### 4.3.5 Alternative B

Under Alternative B, the BLM would manage lands to conserve, enhance, and restore sagebrush ecosystems. Direct protection of sagebrush habitat to support GRSG would limit or modify uses in this habitat type, improving the acreage and condition of native vegetation communities. Use restrictions and a 3 percent disturbance cap on anthropogenic disturbances would reduce damage to native vegetation communities and special status plant populations. Likewise, use restrictions would minimize loss of connectivity and would be more likely to

retain existing age class distribution within these specific areas. Use restrictions could also minimize the spread of invasive species by limiting human activities that disturb the soil or introduce seed.

***Impacts from Special Status Species—Greater Sage-Grouse Management***

PPMA (4.5 million acres) and PGMA (5.5 million acres) would be designated. The BLM would apply a three percent human disturbance cap to activities in PPMA and would implement numerous conservation measures to reduce impacts from human activities in PPMA. This would reduce the likelihood for vegetation removal, degradation, or fragmentation and would maintain the acreage and condition of sagebrush vegetation over the short and long terms.

***Impacts from Vegetation Management***

Under Alternative B, vegetation management actions would aim to improve GRSG habitat and prioritize restoration to benefit GRSG habitats. The BLM would require the use of native seeds and would design post-restoration management to ensure the long-term persistence of the restoration. In addition, the BLM 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, reduce the likelihood of invasive weed introduction and spread, and reduce the extent of invasive weeds 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 sagebrush overstory cover.

Vegetation manipulations in riparian areas, such as weed 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 proper functioning condition over the long term.

***Impacts from Wild Horse and Burro Management***

Incorporating GRSG habitat objectives and conducting land health assessments within HMAs would improve vegetation management. These measures could lead to improved vegetation conditions over time if changes in HMA management were to result in certain areas.

***Impacts from Wildland Fire Management***

Fuels 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 seeds in 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 wildland fires over the long term. Furthermore, emphasizing the use of native seeds and noninvasive species would reduce the likelihood for weed invasion in burned or treated areas. The BLM would also prioritize suppression in PPMA, which would retain the existing conditions and trends of vegetation in these areas. Impacts from fuels treatments, ES&R, and suppression are similar to those described under **Section 4.3.2**.

***Impacts from Livestock Grazing/Range Management***

Under Alternative B, the BLM would not change acres open or closed to livestock grazing, compared to Alternative A (**Table 4-39**). However, the BLM would implement a number of management actions in PPMA to incorporate GRSG habitat objectives and management considerations into livestock grazing management. These include the following:

- Prioritizing completion of land health assessments
- Consideration of grazing methods and systems to reduce impacts on GRSG habitat
- Improved management of riparian areas and wet meadows
- Evaluation of existing 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 and could reduce the likelihood of nonnative invasive species introduction or spread over the long term. Together, these efforts would reduce, but would not eliminate, impacts from grazing on vegetation, such as reduced acreage and condition of native vegetation and increased likelihood for spread of noxious weeds, by implementing a more comprehensive approach to grazing with vegetation management as a priority.

***Impacts from Travel Management***

Under Alternative B, motorized travel would be limited to existing roads, primitive roads, and trails within PPMA not already closed to off-road use (**Table 4-40**). This would reduce the likelihood of impacts caused by roads, as described under **Section 4.3.2**, and would increase the acreage and connectivity of sagebrush vegetation.

***Impacts from Lands and Realty Management***

Managing PPMA as ROW exclusion and PGMA as ROW avoidance areas would reduce impacts on vegetation, as described under **Section 4.3.2** (**Table 4-41**)

(43 CFR 2805.12, 43 CFR 2807.19). In addition, the BLM would restore ROWs that are no longer in use. This would increase the extent and connectivity of sagebrush habitats and reduce the spread of weeds to these areas over the long term. Lands would be retained in federal ownership, with limited exceptions, which would reduce fragmentation over the long term as described under **Section 4.3.2**.

***Impacts from Leasable Minerals Management***

In addition to acres closed to fluid mineral leasing in PPMA (**Table 4-42**), the BLM would require numerous conservation measures in leased PPMA. Over the long term, closures and NSO stipulations would protect existing vegetation from removal, degradation, fragmentation, and nonnative invasive species introduction or spread in unleased areas. Conservation measures would help to reduce such impacts in leased areas; restoration would improve the condition and increase the extent of vegetation and, depending on the location, could remove nonnative invasive species and reduce fragmentation.

***Impacts from Locatable Minerals Management***

The BLM would recommend all PPMA for withdrawal from locatable mineral entry (43 CFR 2300) (**Table 4-43**), which would reduce the likelihood that vegetation would be removed, degraded, or fragmented in these areas over the short and long terms. This would also reduce the likelihood that weeds could be introduced or spread as a result of locatable mineral development.

***Impacts from Mineral Materials (Salables) Management***

In addition to acres closed to mineral material sales (**Table 4-44**), the BLM would restore salable mineral pits no longer in use. Over the long term, closures would protect existing vegetation from removal, degradation, fragmentation, and nonnative invasive species 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 species and reduce fragmentation.

***Impacts from Nonenergy Leasable Minerals Management***

Under Alternative B, PPMA would be closed to nonenergy leasable mineral leasing, 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 4.3.2**. It also would reduce impacts in leased areas.

***Impacts from Mineral Split-Estate Management***

Under Alternative B, conservation measures and RFDs would be applied on mineral split estate in PPMA where possible. This would reduce impacts on vegetation, as described for leasable minerals on these lands.

***Impacts from Special Designations Management***

Impacts from ACEC management on vegetation under Alternative B are the same as described for Alternative A.

***Impacts from Air Quality and Climate Change Management***

There would be no impacts on vegetation from air quality and climate change management under Alternative B.

***Impacts from Special Status Plants Management***

Impacts are the same as those described under **Section 4.3.3**. There would be no additional impacts on vegetation from special status plant management under Alternative B.

### 4.3.6 Alternative C

Under Alternative C, the BLM would manage lands to conserve, enhance, and restore sagebrush ecosystems. Designation of PPMA and PGMA would be the same as described for Alternative B. Management would focus on removing livestock grazing from occupied habitats and a zero percent disturbance cap would be implemented, with most other management similar to Alternative A.

***Impacts from Special Status Species—Greater Sage-Grouse Management***

Impacts from designation of PPMA 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 is restored to the reference state of the appropriate ecological site description.

***Impacts from Wild Horse and Burro Management***

Impacts from wild horse and burro management on vegetation are the same as those described for Alternative A.

***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/Range Management***

Under Alternative C, livestock grazing would be removed from all occupied GRSG habitats (**Table 4-39**). 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, such as introduction of invasive plant species, as described below and in **Section 4.3.2**.

There is evidence that 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 would relieve these impacts and allow for recovery of native understory perennials, as well as 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.

Other research suggests that understory herbaceous productivity does not increase in depleted sagebrush ranges when grazing is removed (Beck and Mitchell 2000). Furthermore, 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 proper functioning condition (PFC). However, impacts from wildlife use of riparian and wetland areas would continue.

In addition, removing grazing could also allow for buildup of fuel from grasses that could otherwise be consumed by livestock. This could increase the likelihood of a destructive fire over the short and long terms, which could result in stand replacement and permanent loss of vegetation over large areas. 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***

Impacts from travel and transportation management on vegetation under Alternative C are the same as those described under Alternative A (**Table 4-40**).

***Impacts from Lands and Realty Management***

Lands and realty management under Alternative C are similar to that described for Alternative B. However, ROW exclusion areas would be designated in all occupied habitats and ACECs. In addition, all occupied habitat, ACECs, and restoration areas would be retained in federal ownership. Impacts from ROW exclusion areas and retention of federal lands would be as described under **Section 4.3.2**.

***Impacts from Leasable Minerals Management***

Impacts from leasable minerals management under Alternative C are similar to those described for Alternative B, although both PPMA and PGMA would be closed to leasing (**Table 4-42**).

***Impacts from Locatable Minerals Management***

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

***Impacts from Mineral Materials (Salables) Management***

Impacts from salable minerals management on vegetation under Alternative C are the same as those described under Alternative A.

***Impacts from Nonenergy Leasable Minerals Management***

Impacts from nonenergy leasable minerals management on vegetation under Alternative C are similar to those described under Alternative A, although over 470,000 acres would be closed to nonenergy leasable exploration and development. Impacts would be reduced in those areas that would be closed, as described for Alternative B.

***Impacts from Mineral Split-Estate Management***

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

***Impacts from Special Designations Management***

Under Alternative C, the BLM would designate all PPMA as new ACECs covering 4.5 million acres (over 6 times more than under Alternative A). New ACEC management plans would be prepared to determine the necessary management to conserve GRSG in these areas. Impacts from management of ACECs would be as described under **Section 4.3.2**.

***Impacts from Air Quality and Climate Change Management***

There would be no impacts on vegetation from air quality and climate change management under Alternative C.

***Impacts from Special Status Plants Management***

Impacts are the same as those described under **Section 4.3.3**. There would be no additional impacts on vegetation from special status plant management under Alternative C.

### 4.3.7 Alternative D

Under Alternative D, the BLM would manage lands to maintain or enhance GRSG habitat to establish a mix of sagebrush classes. Management and impacts would be similar to Alternative B, though Alternative D would incorporate more flexibility to account for sub-regional conditions.

***Impacts from Special Status Species—Greater Sage-Grouse 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 identify focal 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 weed treatments. Weed 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 weed treatments, which would improve vegetation conditions over large areas and over the long term.

***Impacts from Wild Horse and Burro Management***

Impacts on vegetation from wild horse and burro management under Alternative D are similar to those described for Alternative B. Alternative D provides guidance for prioritizing land health evaluations, which would improve the efficiency and response time to improve vegetation conditions.

***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 and long terms, 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 over the short and long terms, and subsequent impacts on vegetation from wildland fire, as described under **Section 4.3.2**, would also be reduced.

***Impacts from Livestock Grazing/Range Management***

Under Alternative D, the BLM would reduce the acres open to grazing compared to Alternative A (**Table 4-39**), as RNAs would be closed to grazing based on certain criteria, including nonattainment of rangeland health standards (**Appendix J**, Table 2). Nearly two times more acres would be closed to grazing under Alternative D compared to Alternative A. In addition, the BLM would prioritize allotments for processing grazing permits and leases and would prioritize land health assessments, emphasizing use of the habitat assessment framework to improve rangeland for GRSG habitat. Changes to permits may

occur over the long term (more than 10 years). The impact of prioritizing land health assessments in GRSG habitat areas would be limited if these areas were already scheduled for land health assessments, or already provide GRSG habitat. Together, the provisions in this guidance could improve vegetation conditions if they led to expedited changes in livestock grazing management. Alternative D provides more detailed guidance for management during drought conditions. Together these measures would reduce the impacts from grazing, as described under **Section 4.3.2**, and would improve vegetation conditions on grazed lands.

***Impacts from Travel Management***

Impacts on vegetation from travel management under Alternative D are the same as those described for Alternative B (**Table 4-40**).

***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 two times more acres would be managed as ROW avoidance areas, providing additional protection to vegetation in these areas (**Table 4-41**).

***Impacts from Leasable Minerals Management***

Impacts from leasable minerals management under Alternative D are similar to those described for Alternative A. However, as shown in **Table 4-42**, 11 times more acres of plant communities that provide GRSG habitat would be open to leasing subject to NSO stipulations (2,991,100 acres compared to 255,200 acres).

***Impacts from Locatable Minerals Management***

Acres open to locatable mineral development under Alternative D would be 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, lands would be available to nonenergy leasable mineral, subject to an NSO stipulation. BMPs and restoration would be required on existing leases. This would reduce impacts on vegetation associated with nonenergy leasable mineral development in unleased and leased areas, as described under **Section 4.3.2**.

***Impacts from Mineral Split-Estate Management***

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

***Impacts from Special Designations Management***

ACECs managed under Alternative A would continue to be managed under Alternative D. However, the BLM would change management in some ACECs to reduce, modify, or eliminate vegetation impacts and fragmentation from resources uses and development (**Appendix J**, Table 2). As a result, large blocks of vegetation would be retained intact and the likelihood of weed invasion would be reduced over the short and long terms. Additional impacts on vegetation associated with such uses and development, as described under **Section 4.3.2**, would also be reduced.

***Impacts from Air Quality and Climate Change Management***

There would be no impacts on vegetation from air quality and climate change management under Alternative D.

***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 and long terms.

### 4.3.8 Alternative E

GRSG conservation guidelines under Alternative E are designed to maintain (at a minimum) or enhance the quality (the optimum) of current habitats. They will also assist resource managers in achieving the population and habitat objectives of the ODFW State Plan.

***Impacts from Special Status Species—Greater Sage-Grouse Management***

Management of Core Area and Low Density habitat under Alternative E would have impacts similar to those described for Alternative B. In addition, Alternative E would require no net loss of sagebrush habitat in Core Areas, thereby maintaining the acreage of this vegetation community in these areas.

***Impacts from Vegetation Management***

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

Invasive weed management includes systematic detection surveys, priorities for weed control, and establishing weed protection areas. It provides guidance for detection, control, prevention, containment, and rehabilitation and restoration. Some guidance is also provided for conducting vegetation treatments. Overall, Alternative E would likely substantially reduce the introduction and spread of weeds over the short and long terms, compared to Alternative A.

***Impacts from Wild Horse and Burro Management***

Impacts from wild horse and burro management on vegetation are similar to those described for Alternative B.

***Impacts from Wildland Fire Management***

Impacts from wildland fire management under Alternative E are similar to those described for Alternative D. However, Alternative E provides slightly less specific guidance overall, which could mean less effective fire management and greater impacts on vegetation from wildland fire.

***Impacts from Livestock Grazing/Range Management***

Impacts on vegetation from livestock grazing under Alternative E are similar to those described for Alternative A. Alternative E emphasizes adaptive management, which would be more likely to reduce impacts on vegetation compared to 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.

***Impacts from Lands and Realty Management***

Impacts on vegetation from lands and realty management under Alternative E are the same as those described for Alternative A.

***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***

Acres open to locatable mineral development 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 Designations Management***

Impacts on vegetation from special designations management under Alternative E are the same as those described for Alternative A.

***Impacts from Air Quality and Climate Change Management***

Alternative E includes a measure to identify and protect resilient sagebrush habitats from climate change. This would help to retain the acreage and condition of intact sagebrush vegetation, which is likely to persist as the climate changes.

***Impacts from Special Status Plants Management***

Impacts are the same as those described under **Section 4.3.3**. There would be no additional impacts on vegetation from special status plant management 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, including a 3 percent disturbance cap that includes fire.

***Impacts from Special Status Species—Greater Sage-Grouse 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 fire. This would further reduce the acreage of vegetation that would be removed or fragmented by anthropogenic disturbances within 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 Wild Horse and Burro Management***

Impacts on vegetation from wild horse and burro 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 B. Alternative F would require exclusions of grazing post-fire. This would reduce grazing pressure on and trampling of ES&R seedings, thus improving the likelihood of native vegetation restoration post-fire over the short and long terms.

***Impacts from Livestock Grazing/Range Management***

Impacts from livestock grazing management under Alternative F are similar to those described for Alternative B (**Table 4-39**), though Alternative F would reduce grazing by 25 percent and would incorporate more stringent guidance

and restrictive measures. This could further reduce impacts on vegetation in GRSG habitat areas, depending 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 under Alternative F. This is because no new road construction would be allowed within 4 miles of leks in PPMA 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 4-40**).

***Impacts from Lands and Realty Management***

Impacts from management of ROW avoidance and exclusion areas are the same as those described under Alternative B. Impacts from land tenure decisions are similar to those described under Alternative B, though Alternative F would not allow for exceptions to disposal criteria. This would reduce management flexibility and could have implications for vegetation connectivity.

***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 C.

***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 B.

***Impacts from Special Designations Management***

Impacts from management of ACECs are similar to those described under Alternative C. However, 10 percent fewer acres would be managed as ACECs under Alternative F compared to Alternative C, thereby providing slightly reduced protection to vegetation associated with ACEC management.

***Impacts from Air Quality and Climate Change Management***

There are no impacts on vegetation from air quality and climate change management under Alternative F.

***Impacts from Special Status Plants Management***

Impacts are the same as those described under **Section 4.3.3**. There are no additional impacts on vegetation from special status plant management under Alternative F.

## 4.4 FISH AND WILDLIFE

### 4.4.1 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 3.4**, Fish and Wildlife, would have negligible or no impacts on those resources and are not addressed in this analysis. Fish species might be of high economic and recreational value, but the proposed management alternatives within this EIS are not likely to have a substantial impact on fish species or their habitat. For sagebrush-obligate wildlife species, habitat improvements designed to enhance GRSG habitat and reduce anthropogenic disturbance activities would improve their habitat quality, quantity, and connectivity. Impacts on special status plant species are discussed in **Section 4.3**, 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.

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 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 methods 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 4.1.1**, 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 many special status species would potentially use habitats that are currently unoccupied and populations fluctuate, any quantitative analysis of occupied habitat would change over time as knowledge of species locations increases. Where appropriate, acreages from **Table 2-5**, Summary Comparison of Resource Alternatives in GRSG Habitats, are included to show a comparison between alternatives.
- Impacts on special status species would be more significant than impacts on common species because population viability would be already uncertain for special status species, and certain species.
- 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 any listed wildlife species or their habitat.

### 4.4.2 Nature and Type of Effects

Special status wildlife species including federally-listed species and BLM sensitive species are likely to 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 the condition of habitats is directly linked to vegetation conditions and progression towards land health standards (**Section 4.3**, Vegetation). Habitat loss or modification due to human activity is a substantial threat to ecosystems 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.

***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 weed 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 (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 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 results in alteration of fire cycles; 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***

Changes to habitat conditions could occur from vegetation and weed treatments; livestock grazing; GRSG habitat enhancements; fire; fuels treatments; and range improvements. Overall, the BLM would aim to achieve or trend toward achieving Rangeland Health Standard 5: Biodiversity, which would maintain and/or restore habitat values for fish and wildlife. Over the short-term, vegetation, fire, and weed treatments would remove habitat, and impacts would occur until the desired habitat was established. 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, fire can improve habitat for some species in the long-term.

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 noxious weeds and reduce fuel accumulations, protect intact sagebrush habitat, and increase habitat extent and continuity (NRCS 2011). If managed improperly, overutilization of forage by livestock could occur, leading to increased competition with wildlife for forage, and potentially reduced cover and nesting habitat for other species. Livestock could also spread weeds, 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. In general, the more acres that are open to grazing and AUMs available under a

given alternative, the greater the risk for impacts. Livestock could degrade riparian areas, which could impact riparian-dependent, aquatic, and fish species.

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

### 4.4.3 Impacts Common to All Alternatives

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

### 4.4.4 Alternative A

***Impacts from Special Status Species – Greater Sage-Grouse 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 listed. These actions would continue implement current management efforts to protect habitat for all special status species described in **Section 3.4**, 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***

There would be no new impacts on special status wildlife species resulting from Wild Horse and Burro Management under Alternative A.

***Impacts from Wildland Fire Management***

Alternative A would limit the number of projects in sage grouse 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 fire on special status wildlife species described in **Section 4.4.2**, Nature and Type of Effects, would continue under Alternative A.

***Impacts from Livestock Grazing/Range Management***

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 3.4**, Fish and Wildlife. Special status 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, over 6.8 million 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 4.4.2** would continue.

***Impacts from Lands and Realty Management***

Under Alternative A, lands and realty would continue to manage over 850,000 acres as ROW exclusion and nearly 3.5 million 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, over 7.4 million acres of GRSG habitat (3.4 million acres of PPMA and 4.1 million acres of PGMA) would continue to be open to mineral leasing; 2.7 million acres (1.2 million acres of PPM and 1.6 million acres of PGMA) 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 4.4.2**, 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 4.4.2**.

***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 4.4.2**.

***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 4.4.2**.

***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. Over 2.6 million acres would continue to remain open to locatable mineral exploration or development. Impacts on special status wildlife species would continue as described in **Section 4.4.2**.

***Impacts from Special Designations Management***

Management of 715,049 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***
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.

### 4.4.5 Alternative B

***Impacts from Special Status Species – Greater Sage-Grouse Management***
Under Alternative B, 4.5 million acres of PPMA and 5.6 million acres of PGMA would be designated and a three percent disturbance cap on human activities in PPMA would be applied. Compared to Alternative A, the actions proposed under Alternative B would increase habitat protection for special status wildlife species that occupy GRSG habitat listed in **Section 3.4**, 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 the no action alternative.

***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 Herd Management Areas (HMA). 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***
Fire management under Alternative B in PPMA would be designed and implemented to protect existing sagebrush communities. These actions would likely reduce impacts from fire on GRSG habitat as described in **Section 4.4.2** and therefore, increase protection from fire on special status wildlife species that overlap with GRSG habitat compared with to the no action alternative.

***Impacts from Livestock Grazing/Range Management***
The total number of acres open to livestock grazing would be the same as the no action alternative. 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 PPMA 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 to Alternative A, these actions would reduce impacts from grazing described in **Section 4.4.2** on special status wildlife species.

***Impacts from Travel Management***

Under Alternative B, 4.1 million acres would remain open to cross-country motorized travel and 4.5 million acres within PPMA would be limited to existing routes until travel management planning is complete. Actions proposed under Alternative B would reduce impacts described in **Section 4.4.2** on special status wildlife species compared to Alternative A.

***Impacts from Lands and Realty Management***

Under Alternative B, PPMA would be ROW exclusion areas (4.5 million acres) and PGMA would be ROW avoidance areas (5.6 million 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 4.4.2** on special status wildlife species compared to the no action alternative.

***Impacts from Leasable Minerals Management***

Management actions proposed under Alternative B would close all PPMA (4.5 million acres) to fluid mineral leasing; approximately 4 million acres would remain open in PGMA. Over 1.5 million acres of PGMA would be closed to fluid mineral leasing, similar to the no action alternative. The actions under Alternative B would reduce impacts from fluid mineral leasing (see **Section 4.4.2**) described under Alternative A on special status wildlife species that inhabit PPMA.

***Impacts from Locatable Minerals Management***

Under Alternative B, nearly 4.3 million acres would be petitioned for withdrawal from locatable mineral entry. Additionally, the BLM would recommend applying best management practices in PPMA from the NTT Report as COA. Actions described under this alternative would reduce the impacts described under permitted activities in **Section 4.4.2** on special status wildlife species in PPMA compared to Alternative A.

***Impacts from Mineral Materials (Salables) Management***

Alternative B would close all PPMA 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 4.4.2** (permitted activities) compared to the no action alternative.

***Impacts from Nonenergy Leasable Minerals Management***

Nonenergy leasable minerals management actions proposed under Alternative B would close PPMA to leasing; no new leases to expand would be issued. Additionally, best management practices and design features would be applied

during solution mining. Special status wildlife species within PPMA would receive increased habitat protection from these measures and reduce impacts described under permitted activities in **Section 4.4.2.**

***Impacts from Mineral Split-Estate Management***

Under Alternative B, where federal mineral estates occur under non-federal surface ownerships in PPMA, the BLM would apply conservation measures on public lands. Best management practices and design features would be applied to surface developments where the surface is federally owned and the mineral state is non-federal. These actions would reduce the potential for impacting special status wildlife species in PPMA compared to the no action alternative.

***Impacts from Special Designations Management***

Management actions proposed under Alternative B would be the same as those in the no action alternative. 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.

### 4.4.6 Alternative C

***Impacts from Special Status Species – Greater Sage-Grouse Management***

Proposed management actions under Alternative C would designate the same acreage of PPMA (4,547,043 acres) and PGMA (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 the no action alternative or Alternative B.

***Impacts from Vegetation Management***

Under Alternative C, vegetation management actions would be similar to those described under the no action alternative. 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 the no action alternative.

***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***

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

***Impacts from Livestock Grazing/Range Management***

All occupied GRSG habitat would be closed to grazing under Alternative C and there would be zero AUMs. Potential impacts on special status wildlife from proper and improper grazing management described under changes to habitat conditions in **Section 4.4.2** would be eliminated. The exclusion of livestock grazers from occupied habitat would likely result in increased fencing and thus would result in an increase in habitat fragmentation compared to all of the alternatives.

***Impacts from Travel Management***

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

***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 PPMA and PGMA. New corridors or infrastructure would be located outside of GRSG habitat. These actions would reduce impacts from permitted activities as described in **Section 4.4.2** 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 (10.6 million acres) would be closed to fluid mineral leasing. Management actions proposed under Alternative C would result in an increase of over 4 million acres of PGMA closed to leasing. Therefore, Alternative C would provide the greatest amount of habitat protection for sagebrush-obligate special status wildlife species from leasable mineral development compared to all alternatives.

***Impacts from Locatable Minerals Management***

Impacts on special status wildlife species from locatable minerals management proposed under Alternative C would be the same as those described under Alternative A.

***Impacts from Mineral Materials (Salables) Management***

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

***Impacts from Nonenergy Leasable Minerals Management***
Impacts on special status wildlife species from nonenergy leasable minerals management proposed under Alternative C would be the same as those described under Alternative A.

***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 B.

***Impacts from Special Designations Management***
Under Alternative C, all PPMA 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 PPMA as described in changes to habitat conditions (see **Section 4.4.2**).

***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.

### 4.4.7 Alternative D

***Impacts from Special Status Species – Greater Sage-Grouse 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 actions would prioritize Restoration Opportunity Areas (**Section 2.5.6**, Alternative D), throughout all occupied habitat that have a high probability for success. These actions would increase special status wildlife habitat quality and protection relative to the no action alternative.

***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 B.

***Impacts from Wildland Fire Management***
Alternative D provides the most comprehensive fire management direction of all the alternatives. 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 fire described in **Section 4.4.2** on special status wildlife species.

***Impacts from Livestock Grazing/Range Management***

Management actions proposed under Alternative D would result in 12,022,428 acres open for livestock grazing, which would be a reduction of less than 100 acres relative to the no action alternative. Also, nearly 100,000 acres of rangeland would be closed under Alternative D compared to the no action alternative. Also, Alternative D provides more comprehensive livestock grazing and range management actions aimed at protecting and restoring GRSG habitat compared the no action alternative. Therefore Alternative D would reduce impacts described in changes to habitat conditions in **Section 4.4.2** on special status wildlife compared to 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 A.

***Impacts from Lands and Realty Management***

Under Alternative D, lands and realty management actions would continue to manage current BLM ROWs in PPMA as exclusion areas. The remaining PPMA (4.3 million acres) would be managed as avoidance areas. PGMA 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 three 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 to the no action alternative; 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 (9,483,868 acres) and closed (3,134,159 acres) as the no action alternative. However, Alternative D would impose a 3 percent disturbance limitation and an authorization to limit impacts from permitted activities (**Section 4.4.2**) on GRSG. Therefore, special status wildlife species that occupy GRSG habitat would receive an increased level of habitat protection.

***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 the no action alternative. 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 to Alternative C, only 20 percent of PPMA and/or 50 percent of PGMA GRSG habitat would be managed for GRSG. Therefore, impacts on special status wildlife species would be less than those as a result of the no action alternative 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 to 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.

### 4.4.8 Alternative E

***Impacts from Special Status Species – Greater Sage-Grouse 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 (3.9 million acres) under Alternative E would provide 1.7 million fewer acres of protection for special status wildlife habitat in these areas compared to the no action alternative.

***Impacts from Vegetation Management***

Under Alternative E, vegetation management actions would recommend planting livestock forage (alfalfa) within expansive sagebrush areas but would recommend avoiding the conversion of GRSG habitat on public lands 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 4.4.2** compared to the no action alternative. In addition, compared to 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 4.4.2** on special status wildlife species compared to the no action alternative but to a lesser degree than Alternative D.

***Impacts from Livestock Grazing/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 to 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 (4.5 million acres) as ROW exclusion areas. The actions proposed under Alternative E would be more protective of special status

wildlife species within GRSG habitat compared to the no action alternative; 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 to 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.

### 4.4.9 Alternative F

***Impacts from Special Status Species – Greater Sage-Grouse 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 the no action alternative except that wild horse AMLs would be reduced by 25 percent for HMAs that contain PPMA and PGMA 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 weeds and resting recently treated vegetation areas from livestock grazing areas compared to Alternative B. These actions would reduce the impacts described in **Section 4.4.2** on special status wildlife species compared to the no action alternative but to a lesser degree than Alternative B.

***Impacts from Livestock Grazing/Range Management***
Alternative F would close 25 percent of PPMA and PGMA to livestock grazing. These actions would reduce impacts from livestock grazing on special status wildlife habitat described in **Section 4.4.2** compared to 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 PPMA and therefore would increase habitat protection for special status wildlife species that occupy those areas compared to 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, 4.5 million acres of PPMA would be closed to fluid mineral leasing (Alternative B) and 5.6 million acres of PGMA would also be closed to

leasing (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 to 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 WILD HORSES AND BURROS

### 4.5.1 Methods and Assumptions

***Indicators***

Indicators of impacts on wild horses and burros are as follows:

- Changes in Acres available
- Changes in permitted AMLs
- Changes in allotted forage (AUMs)
- 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/grass plant community. Encroachment of shrubs or pinyon-juniper onto established range lands are adverse, and increases in grasses and forbs are beneficial. Vegetation treatments, such as prescribed burns or weed control, can enhance the plant community composition and forage availability.
- Although the BLM cannot control when wild horses and burros use 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 improve wild horse distribution. Furthermore, human-made 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 go elsewhere for water.
- Fences and other disturbances can restrict wild horse movement and access. Fences are sometimes necessary to restrict horse distribution 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 priories is that short- and long-term holding facilities are at or near capacity, significantly reducing the number of excess wild horse 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.

### 4.5.2 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 also conducted in emergency situations when the health of the population is at risk due to lack of forage or water and in some situations wildland fire.

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 horse and burros and would limit human and surface disturbance.

Conversely, there could be impacts on wild horse and burros and the ability to support AMLs when management options for HMAs are restricted. 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.

### 4.5.3 Impacts Common to All Alternatives

Across all alternatives, there would be no direct change to AML levels or acres managed for wild horse and burros as HMAs. For the planning area as a whole, there are approximately 2,657,500 acres of HMAs, with approximately 800,800 acres overlapping PPMA and 1,562,100 acres overlapping PGMA. For HMAs entirely or partially within the occupied habitat, the combined total for AML range is from 1,340 to 2,655 individuals.

***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. As a result, impacts on wild horses and burros management would be negligible across all alternatives. For locatable minerals, potential is unknown, although some level of development may occur in the future impacts on wild horses and burros management 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***
Impacts on wild horse and burros from split-estate minerals are similar to those described above by category of minerals.

### 4.5.4 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. Most HMAs contain GRSG habitat within a sagebrush vegetation community. Overall management direction is to manage for healthy populations of wild horse 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.

***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/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.

### 4.5.5 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 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.

***Impacts from Wild Horse and Burro Management***

Wild horse and burro numbers within an HMA may need to be reduced to achieve GRSG habitat objectives or other management changes for overlapping HMAs. This would be the result of developing or amending HMAPs to incorporate GRSG habitat objectives and management considerations and prioritizing the evaluation of AMLs in PPMA.

Prioritizing wild horse and burro gathers in HMAs that overlap PPMA can reduce the funding for or the ability to manage populations on HMAs outside of PPMA. However, this plan would allow for exceptions for herd health, thereby limiting impacts. Modifying watering sites to conserve GRSG habitat could reduce water availability. This could result in the potential reduction of wild horse and burro numbers or develop alternative water sources within the HMA.

***Impacts from Wildland Fire Management***

Fuels projects and fire suppression to protect sagebrush ecosystems and associated PPMA would benefit wild horses and burros where HMAs overlap. This would be 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 or would increase the costs of management.

***Impacts from Livestock Grazing/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. This could result in 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 PPMA would reduce any conflicts between recreation and wild horse and burro management.

***Impacts from Travel Management***
Under Alternative B, limits to motorized travel in PPMA 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 and costs of population control 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 PPMA. This would indirectly reduce related disturbance to wild horses and burros.

***Impacts from Mineral Materials (Salable) Management***
Under Alternative B, PPMA 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.

### 4.5.6 Alternative C

***Impacts from Vegetation Management***
Restoration proposed under Alternative C includes removing water developments. This would reduce available water in HMAs and result in the need to reduce wild horse and burro AMLs within a HMAs in occupied habitat where no alternative source of water was available.

***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/Range Management***
Elimination of 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 in these areas. Elimination of livestock watering sites or failure to maintain water developments would reduce water availability. This would result in the need to reduce wild horse and burro numbers in HMAs in occupied habitat where no alternative sources of water were available.

***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.

### 4.5.7 Alternative D

***Impacts from Vegetation Management***
Under Alternative D, PPMA and PGMA would be prioritized for restoration treatment, with a particular emphasis on Restoration Opportunity Areas. Management for wild horses and burros is most likely to be impacted in HMAs that overlap these areas, including South Steen, Riddle Mountain, and portions of Sheepshead Health Creek, Kiger, Ligget Table, and Warm Springs. Other portions of PPMA, PGMA and other habitat deemed of importance for GRSG may also be treated. Impacts would likely occur if wild horses and burros are found to be causal factors in GRSG habitat not achieving or moving toward achieving objectives. If this is found to be the case, the adjustment of wild horse and burro populations to restore objectives would be assessed and the BLM may reduce AMLs in some HMAs in the long term. Measures to prevent and reduce invasive plants in GRSG habitat would improve habitat for wild horses and burros in the long term if forage quality and quantity were increased. Replacing annual grasses with perennial grasses would also reduce interannual variability in forage quantity in the long term.

***Impacts from Wild Horse and Burro Management***
Under Alternative D, total AML in the decision area would remain within the current range unless monitoring data warrants a change that benefits GRSG habitat suitability. In the long term, this may require additional population control measures compared with Alternative A. Assessment of AMLs would be prioritized for portions of HMAs in PPMA, followed by those from PGMA. As a result, changes to wild horse and burro management would follow these priorities. As discussed under Alternative B, management in these areas may result in reduced management in HMAs outside of GRSG habitat.

***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 PPMA and PGMA and other sensitive 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.

***Impacts from Livestock Grazing/Range Management***

Under Alternative D, a slight reduction in acres available for authorized livestock grazing (9,876,578 acres open to livestock grazing) would result in impacts on wild horse and burro management that would likely be minimal. 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 PPMA prioritized over PGMA. 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 meet AML.

In PPMA, forage enhancement treatments must also enhance GRSG habitat; therefore, there is a potential for reduced treatments for livestock, which could in turn impact forage availability for wild horses and burros. New structural range improvements would be the same as described for Alternatives B and E. Supplemental winter feeding for livestock would be avoided, but would be authorized as needed for resource objectives per BLM policy; this would impact wild horses and burros that may utilize these winter feedings.

***Impacts from Recreation Management***

Changes may occur to SRPs and RUPs in PPMA in order to reduce direct and indirect disturbance to GRSG. As a result, the potential for disturbance of wild horses and burros from recreation would be similarly reduced.

***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 PPMA. All other GRSG habitat, including PGMA, would be managed as open for ROWs, unless already managed as avoidance or exclusion by the existing planning. All new ROWs in PGMA 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 ,

***Impacts from Mineral Materials (Salables) Management***
Impacts are the same as described under Alternative B.

### 4.5.8 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. The intent of this plan is to improve and maintain habitat for GRSG. If minimization of fragmentation and habitat loss was improved by use of this model, this would also result in improvement of habitat for wild horse and burros by removal of barriers to movement.

***Impacts from Wild Horse and Burro Management***
Under Alternative E, limits on total AMLs would be applied as discussed under Alternative 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. Measures to reduce invasive species spread would improve habitat for wild horses and burros 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/Range Management***
Changes to livestock grazing systems under Alternative E would be required only when management resulted in livestock removing forage to the point that it would be detrimental to GRSG due to the decrease in cover.

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. These requirements may necessitate changes to water developments that would limit ability of wild horses and burros to use water, especially if dirt tanks or overflow ponds were removed. This may result in a need to reduce AMLs in HMAs where alterative

water sources are not available. Allowing the construction and use of some developments should result in some water availability for horse and burro use, thereby limiting overall impacts.

***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 horse 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 acres for gathers would be retained; however, closures or reduced maintenance on routes during comprehensive travel management planning would have the potential to impact time and costs of population control gathers.

***Impacts from Lands and Realty Management***

All Core Area habitat would be classified as an exclusion area, decreasing the risk of development and associated disturbance to wild horses and burros, compared with Alternative A.

***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.

### 4.5.9 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 these areas may result in more effective vegetation treatments, thereby improving habitat for GRSG and wild horse and burros as compared with Alternative A in the long term. 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 Alterative F, proposed management includes an objective for 25 percent reduction in wild horse and burro populations in GRSG habitat compared to

current AML levels. 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. 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. Closures in place for livestock grazing post-fire until woody and herbaceous cover achieve sage-grouse habitat objectives would result in long-term (10 to 50 years or longer) exclusion of from burned sites should wild horse and burros are be excluded. 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 of HMAs.

***Impacts from Livestock Grazing/Range Management***

Under Alternative F, 25 percent of the area in PPMA/PGMA open to livestock grazing would be rested each year and utilization would be limited to 25 percent of current levels, therefore. AUMs would be reduced accordingly. As described in Alternative C, a reduction in areas available for livestock grazing could result in additional forage available for wild horse and burros. In addition, a prohibition on new water developments and requirements to make modifications, including potential dismantling of developments would be in place As a result, there would likely be impacts on the availability of water sources for wild horses and burros. This would result in impacts on the ability to manage for AML in the long term, particularly for those HMAs with no alternate water source. Alternative F also calls for avoiding all new structural range developments in occupied GRSG habitat, unless independent peer-reviewed studies show that the range improvement structure benefits GRSG. In practice, this would result in few range developments being approved. The lack of new fences would benefit wild horses and burros by reducing barriers to movement across the range. The lack of water developments would restrict the ability to provide sufficient water for wild horses and burros and to manage for AML.

***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 population gathers, monitoring herd health and data acquisition to support gathers may be reduced. This would increase the time and costs for this 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 horse and burros.

***Impacts from Mineral Materials (Salables) Management***

Under Alternative F, impacts are as described under Alternative B.

## 4.6 WILDLAND FIRE MANAGEMENT

### 4.6.1 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 3.6.2**:

- Alteration of vegetative 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 wildland fire or appropriate treatments to prevent wildland fire

***Assumptions***

The analysis includes the following assumptions:

- Fire is an important, 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 wildland fires in order to protect values at risk.

### 4.6.2 Nature and Type of Effects

Impacts on wildland fire management are generally the result of the following:

- Activities that alter vegetative cover or composition
- The ability to respond to wildland fires or to implement appropriate treatment methods to prevent wildland fire
- Impacts from human-caused wildfires

Key types of impacts are detailed below. As discussed in Section 3.6, Wildland Fire Management, there have been a number of wildland fires in PPH and PGH habitat.

There is a high probability for wildland fires 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 fire 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 fire risk.

Various resource uses may introduce additional ignition sources into the planning area. These sources increase the probability of wildland fire and the need for fire prevention. Fire intensity can be affected by activities that decrease fuel loading, 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), and 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 level of risk of human-caused fires. The risk of ignition is increased where travel is less restrictive, particularly where motorized vehicles travel cross-country. All forms of travel encourage the spread of invasive weeds (CEC 2012), particularly cheat grass. This can shift fire regimes and increase fire

behavior potential, size, extent, and occurrence. If management restricts access, wildfire risk may be decreased and historic conditions may be restored. Yet, transportation management may impact fire suppression; when routes are closed and rehabilitated, they become unavailable for response to wildfires, limiting access.

Similarly, the level and type of recreation permitted can impact fire 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**, Threats to Greater Sage-Grouse and Their Habitat and Applicable BLM RMP Programs for Addressing Threats), 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 risk of human-caused ignition should construction of transmission lines, renewable energy projects, or other development occur. Permitted activities, such as construction of utility ROWs, involve vegetation removal. This reduces the condition of native vegetation communities and individual native plant species and encourages the spread of invasive species. These situations can increase wildland fire occurrence and extent and alter fire condition class.

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 could then be more likely to result in fire starts. ROW exclusion areas would prohibit all development of ROWs in areas where they are designated. This would limit alteration of vegetative cover or composition that is likely to result in a shift in fire regime condition class (FRCC.).

However, constructing roads and removing weeds associated with developments may facilitate wildland fire response and help limit the size or extent of a wildland fire. These activities would create fire breaks and staging areas for fire suppression. 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 increases the risk of wildfires by introducing new ignition sources (Shlisky et al. 2007). Associated facilities, infrastructure, and transmission lines can increase fire and fuels program costs while decreasing fire suppression options. Energy development also poses hazards to firefighters from unknown toxins and 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 risk of human-ignited fire. Limitations on mineral development would have an indirect effect of decreasing fires. However, as stated previously, constructing roads and removing weeds associated with energy and minerals developments may facilitate wildland fire response and help limit the size or extent of a

wildland fire. These activities would also create fire breaks and staging areas for fire suppression.

The development of federal minerals underlying nonfederal surface ownership may impact fire management on BLM-administered lands. This would be the case particularly when ownership is in a patchwork pattern because fires ignited on nonfederal lands may quickly spread onto and impact BLM-administered lands.

Range grazing management can impact the ability to manage fire 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, generally, although it might play a role with certain species. However, removing grazing could also allow for annual grasses to build up that could otherwise be consumed by livestock. This could increase the size, extent, or frequency of wildland fires. 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, such as low fuel moisture and relative humidity, high temperature, and wind speed (Strand and Launchbaugh 2013).

Grazing may reduce resistance to invasion from cheat grass (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 (Strand and Launchbaugh 2013), Recent research indicates that the increase in fine fuel loading, particularly the build-up 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 preserves herbaceous vegetation that provides side cover for sage-grouse 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 sage-grouse 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 spreads by promoting healthy bunchgrass plants that can survive a fire and preserves needed side cover for successful sage-grouse nesting.

Big sagebrush ecosystems of the intermountain west evolved with little herbivore utilization prior to the introduction of livestock grazing (Mack & Thompson 1982). These communities are susceptible to invasions by cheatgrass even in the absence of fire, and cheatgrass may, under some circumstances, dominate the herbaceous understory community (Miller et al. 2011). Once cheatgrass sufficiently dominates the understory it creates a continuous, highly flammable fuel that significantly increases the risk of fire (Pyke 2011). Once a fire

occurs, cheatgrass increases the frequency of fires. This change in fire regime can transform native shrub-steppe communities in annual grasslands dominated by cheatgrass (Miller et al. 2011).

Vegetation and weed treatments that decrease standing vegetation could decrease the intensity of wildland fires and allow fires to be more easily controlled. For example, efforts to reduce incursion of invasive plant species (primarily cheatgrass) and the proliferation of other noxious and invasive weeds would promote healthy plant communities and lower the risk of high-intensity wildfire (USGS 2006). Used appropriately, prescribed fire would also be compatible with noxious weed control; however, the presence of noxious weeds and the potential of weeds to spread after a prescribed fire would need to be monitored on a site-specific basis. Conversely, management actions that retain shrub and cover may increase fuel loading and the likelihood and intensity of wildland fire.

Special designations such as ACECs and the management of sensitive resources can restrict fuels treatments on a site-specific basis. For example, in areas where preservation of particular species or habitats is emphasized, management options and fuels treatments may be limited.

Implementing management for the following resources would have negligible or no impact on wildland fire management for all alternatives; therefore, they are not discussed in detail:

- Wild horses and burro
- Special designations
- Air quality and climate change
- Special status plants
- Recreation

### 4.6.3 Impacts Common to All Alternatives

***Impacts from Vegetation Management***

Under all alternatives, policies and practices outlined in the Record of Decision for the Vegetation Treatments Using Herbicides on BLM Lands in Oregon EIS (BLM 2010a) would be followed and would provide guidance on which treatments and chemicals could be used. Application of these policies would improve vegetation management in sagebrush habitat, thereby likely reducing the fire potential in these areas.

***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.

### 4.6.4 Alternative A

***Impacts from Special Status Species—Greater Sage-Grouse Management***
There would be no impacts on wildland fire management resulting from special status species—GRSG management under Alternative A.

***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-intensity wildfire. Vegetation could also be managed to alter fuel loads.

***Impacts from Wildland Fire Management***
Under Alternative A, projects would be designed to prevent the further loss of sagebrush, thereby retaining native vegetation and minimizing wildland fire potential. This could reduce the size, extent, and occurrence of wildland fires. In addition, prescribed burning may be used in support of resource management objectives, such as restoring grassland or shrubland, reducing conifer encroachment, or increasing age-class variety. As a result, alteration of vegetative cover or composition that is likely to contribute to a shift in FRCC would be reduced. Further, chemical weed treatments applied following prescribed burns would limit the expansion of weeds or invasive species in the burned area and further reduce the potential for wildland fire.

***Impacts from Livestock Grazing/Range Management***
Livestock grazing would continue to occur under Alternative and more than 9.9 million acres would be open to grazing in PPH and PGH on BLM-administered lands. Allowing grazing throughout most of the planning area may decrease the risk of wildfire due to the reduction in fuel load caused by livestock grazing. Rangelands would continue to be managed to conform to the Oregon 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 reduce fuels and the risk of wildland fire 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 4.6.2**, 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 PPH and 1,672,025 in PGH).. 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 4.6.2**.

***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 applied consistently 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 ignition under this alternative would continue and could indirectly effect fire management through increased fire risk. However, based on the most recent approvals, the risk of high acreage fires would be reduced because water storage for fire suppression is required to be on-site. As described in **Section 4.6.2**, minerals developments could act as staging areas and fire breaks for fires suppression 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 wildland fire management from increased human activity and as described under **Section 4.6.2** would continue to occur in areas open to development.

***Impacts from Mineral Materials (Salables) Management***

More than 2 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 wildland fire management, as described under **Section 4.6.2**, 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 wildland fire management, as described under **Section 4.6.2**, 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 likely protect vegetation through use restrictions.

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.

### 4.6.5 Alternative B

***Impacts from Special Status Species—Greater Sage-Grouse Management***

PPMA and PGMA would be designated and would encompass over 4.5 million acres and over 5.5 million acres, respectively. The BLM would apply a three percent human-caused disturbance cap to activities in PPMA. It also would implement numerous conservation measures to reduce impacts from human activities in PPMA, which would reduce the likelihood for human-caused fires. Limited vegetation removal under this alternative could lead to increased fuel loads and increased occurrence or extent of wildland fires, as described under **Section 4.6.2**. It also could reduce development-related roads and fire breaks used for fire suppression.

***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 seeds 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 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. These management actions could increase fuel loads and fire size or extent, as discussed under **Section 4.6.2**.

***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 seeds 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 wildland fires. Furthermore, emphasizing the use of native seeds and noninvasive species would reduce the likelihood for weed invasion in burned or treated areas. The BLM would also prioritize suppression in PPMA, which would 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 4.6.2**.

***Impacts from Livestock Grazing/Range Management***

Under Alternative B, the BLM would not change acres open or closed to livestock grazing. Impacts on wildland fire would be similar to Alternative A. However, the BLM would implement a number of management actions in PPMA 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 nonnative invasive species introduction or spread, thereby reducing fire 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 PGMA (an 52 percent decrease from Alternative A for GRSG habitat), Related increases would occur in areas limited to existing routes (7,075,386 total acres in GRSG habitat, a 60 percent increase from Alternative A). Additionally, in PPMA, 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 4.6.2**, but would also reduce access for fire response.

***Impacts from Lands and Realty Management***

Managing the majority of PPMA as ROW exclusion (over 4 million acres) and PGMA as ROW avoidance (over 5 million acres) would reduce impacts on wildland fire management associated with human activities, as described under **Section 4.6.2**. Decreased development due to exclusion areas could also reduce development-related vegetation and weed removal and construction of roads that would provide fire breaks and access for wildland fire 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 PPMA would be closed to fluid mineral leasing, while the PGMA 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 fire breaks that could be used for fire suppression. 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 nonnative invasive species introduction or spread. This would result in impacts on wildland fire management, as described under **Section 4.6.2**.

***Impacts from Locatable Minerals Management***

Under this alternative, approximately 5.5 million acres, most of the PPMA and PGMA, would be withdrawn or be proposed for withdrawal from locatable minerals. These actions would reduce the likelihood that vegetation would be removed and that weeds could be introduced, resulting in impacts on wildland fire management, as discussed under **Section 4.6.2**. The remaining areas (almost 7 million acres) would remain open to locatable minerals and would allow for human activities that could lead to human-caused fires. When compared with other alternatives, this alternative allows for more development and thus more human-related activities that can result in increased fire risk.

***Impacts from Mineral Materials (Salables) Management***

Approximately 5.8 million acres, all of the PPMA, would be closed to mineral material sales. The BLM would restore salable mineral pits no longer in use, which would protect vegetation from removal and reduce nonnative invasive species introduction or spread. 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 4.6.2**.

***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 to Alternative A, could increase fire frequency and human-caused fires and other impacts, as described under **Section 4.6.2**.

***Impacts from Special Designations Management***

Impacts from ACEC management on vegetation under Alternative B would be the same as described for Alternative A.

### 4.6.6 Alternative C

***Impacts from Special Status Species—Greater Sage-Grouse Management***

Impacts from designating PPMA would be similar to those described for Alternative B. The exception is that they would apply to a larger area (all occupied habitat) and thus would protect more vegetation. Impacts on wildland fire management would be similar to those for Alternative B, with an even further reduction in the likelihood for human-caused fires but increased fuel loads and other impacts, as described under **Section 4.6.2**.

***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/Range Management***

Under Alternative C, no PPMA or PGMA areas would be open 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 4.6.2**. In particular, grazing may reduce resistance to invasion from cheat grass 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 annual grasses 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 4.6.2**, 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 PPMA and PGMA. Additionally, new road construction would be prohibited. Impacts from travel and transportation management on wildland fire management under Alternative C would be the same as those described under Alternative B.

***Impacts from Lands and Realty Management***

Impacts from lands and realty management under Alternative C would be similar to those described for Alternative B; however, a significant increase in the acres that would be managed as ROW exclusion (10,682, 124 acres) 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 suppression. In addition, all occupied habitat, ACECs, and restoration areas would be retained in federal ownership.

***Impacts from Leasable Minerals Management***

Impacts from leasable minerals management under Alternative C would be similar to those described for Alternative B; however, a significant 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 suppression.

***Impacts from Locatable Minerals Management***

Impacts from locatable minerals management on wildland fire management under Alternative C would be the same as those described under Alternative B. However, a significant increase in the acres petitioned for withdrawal (over 9

million acres) and the decrease in acres open (2.2 million 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 suppression.

***Impacts from Mineral Materials (Salables) Management***

Impacts from salable minerals management on wildland fire management under Alternative C would be the same as those described under Alternative B. However, a significant increase in the acres closed to mineral materials disposal (over 10 million acres) and the decrease in acres open (1.9 million 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 suppression.

***Impacts from Nonenergy Leasable Minerals Management***

Impacts from nonenergy leasable minerals management on wildland fire management under Alternative C would be the same as Alternative B. However, a significant increase in the acres closed to nonenergy 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 suppression.

***Impacts from Special Designations Management***

Under Alternative C, the BLM would designate all PPMA 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 4.6.2**.

### 4.6.7 Alternative D

***Impacts from Special Status Species—Greater Sage-Grouse 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, though the BLM would identify focal 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 weed treatments. Weed 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 weed treatments. This would improve vegetation conditions 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 4.6.2**, would also be reduced.

***Impacts from Livestock Grazing/Range Management***

Under Alternative D, a slight reduction in acres available for authorized grazing (approximately 9.8 million acres open 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 RNAs to grazing. In addition, the BLM would prioritize allotments for processing grazing permits and leases and would prioritize land health assessments. Use of the HAF would be emphasized, and Alternative D provides more detailed guidance for management during drought conditions. Together these measures would reduce the impacts on wildland fire management from grazing, described under **Section 4.6.2**.

***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 as ROW avoidance areas.

***Impacts from Leasable Minerals Management***

Impacts from leasable minerals management under Alternative D would be the same as those described for Alternative B.

***Impacts from Locatable Minerals Management***

Acres open to locatable mineral development 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 weed 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 4.6.2**, would also be reduced.

### 4.6.8 Alternative E

***Impacts from Special Status Species—Greater Sage-Grouse 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 weed 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. Overall, Alternative E would substantially reduce the introduction and spread of weeds, compared to Alternative A.

***Impacts from Wildland Fire Management***

Impacts from wildland fire management under Alternative E would be similar to those described for Alternative D. However, Alternative E provides slightly less specific guidance overall, which could mean less effective fire management and greater impacts from wildland fire.

***Impacts from Livestock Grazing/Range Management***

Impacts on wildland fire management from livestock grazing under Alternative E would be similar to those described for Alternative A as acres open and closed to grazing would be the same. However, this alternative would 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 on wildland fire management from lands and realty management under Alternative E would be the same as those described for Alternative C.

***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***
Acres open to 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.

### 4.6.9 Alternative F

***Impacts from Special Status Species—Greater Sage-Grouse 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. This would further reduce the acreage of vegetation that would be removed and could reduce impacts on wildland fire management.

***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. 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/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 open to grazing in GRSG habitat would be rested per year (7,495,716 acres open to grazing), and utilization level would be reduced in order to not exceed 25 percent of current use. This could further reduce impacts on wildland fire management, depending on where livestock management is app.

***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 B.

***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 B. However, 10 percent fewer acres would be managed as ACECs under Alternative F.

## 4.7 LIVESTOCK GRAZING/RANGE MANAGEMENT

### 4.7.1 Methods and Assumptions

***Indicators***

Indicators of impacts on livestock grazing/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 or PGH within the sub-regional planning area, and Alternative A would neither result in the designation of PPH or PGH nor assign additional management actions to PPH or PGH areas
- .All new and renewed leases and permits would be subject to terms and conditions determined by the Authorized Officer to achieve the management and resource condition objectives for BLM-administered lands and to meet BLM Oregon Public Land Health Standards
- Range improvements (e.g., fences, pipeline, water wells, troughs, and reservoirs) could create a localized loss of vegetation cover throughout the improvements' useful life. To the extent possible, vegetation would be reestablished through reclamation along water pipelines and naturally along fence lines within five years; a portion of the disturbed areas with water wells, troughs, and reservoirs could remain disturbed during their useful life and would be revegetated only if abandoned.
- 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 distribution and management.
- By definition in this in the Oregon GRSG RMPA/EIS, livestock grazing is not considered a surface-disturbing activity, but it could affect the surface in areas where livestock concentrate, such as around range improvements.

### 4.7.2 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/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, retiring grazing privileges in some areas, 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 in the long term. This would be especially true in cases where current conditions are not meeting land health standards. 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 for livestock, 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 species.

Under the Fundamentals of Rangeland Health regulations grazing permittees and lessees must not impair watershed function, riparian habitat, water quality, or wildlife habitat. The Fundamentals of Rangeland Health regulations require that BLM must revise livestock grazing management "as soon as practicable," and in any event no later than the start of the next grazing season, upon making determinations that the Fundamentals of Rangeland Health Standards and

Guidelines are not being met upon an allotment due to livestock grazing (43 CFR 4180.1 and 4180.2(c)). Therefore, changes may be required to livestock grazing management in order to meet these standards and guidelines. 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 standards for rangeland health and guidelines for livestock grazing. 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 dispersing or trespassing. This would be the result of gates left open 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 could 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 to 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 the area is rehabilitated or 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 species (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 vegetative 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 noxious weeds) 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 noxious weeds 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 a permit or lease were retired from grazing in order to devote the BLM-administered lands covered by the permit or lease to another public purpose, 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/range management for all alternatives; therefore, they are not discussed in detail.

### 4.7.3 Impacts Common to All Alternatives

***Impacts from Livestock Grazing 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.

At the request of permittees with allotments containing priority habitat on BLM-administered lands, candidate conservation agreements or their successors will

be implemented. These agreements are on a voluntary basis and would, therefore, not impact permittees/lessees.

***Impacts from Travel Management***

Access to allotments for authorized use for the BLM and permittees/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 Split-Estate Management***

For the purposes of impacts on livestock, split-estate minerals would be similar to that described above by category of minerals.

### 4.7.4 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. Standards and guidelines for rangeland health would apply across all plans, and livestock grazing practices would be modified should standards for vegetation not be met as a result of livestock grazing. Management actions for invasive species would continue under the direction of current RMPs, with the focus on areas not meeting land health standards.

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.

***Impacts from Wild Horse and Burro Management***

Overall management direction is to manage for healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Under Alternative A, horses would continue to be managed within established HMAs and under established appropriate management levels. Existing competition between wild horses and livestock would continue at current levels. Wild horse and burro management is included in the multiple use decision process for forage allocation. This process could decrease current permitted use in the planning area by reallocating forage resources to livestock, wild horses and burros, and wildlife Range improvement construction and maintenance could be increased if a need for additional water sources were identified for current populations of wild horses and burros.

***Impacts from Wildland Fire Management***

Under Alterative A, wildfire suppression is not specifically prioritized in PPMA. 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 plant and weed species. 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 would be required on BLM-administered lands after any major vegetative 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/Range Management***

Under Alternative A, range management would be based on individual RMPs in the planning area. Approximately 924,617 AUMs would be permitted and 9,994,288 acres would be open to grazing in PPH and 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. 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 set renewal schedule. 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 land 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.

Retirement of grazing privileges would remain an option in priority habitat. However, based on past rate of voluntary retirement 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 rangeland management would be directed first to allotments not meeting land health standards 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. 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***

Under Alternative A, there would be no new restrictions on SRPs in the decision area; therefore, livestock could be disturbed by recreation or groups in the planning area. Some limited potential for disturbance from general recreation is possible, as described in **Section 4.7.2**, Nature and Type of Impacts.

***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 open to grazing in PGH. Impacts would occur where areas open overlap with areas open 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 open to grazing. Access to allotments 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).

***Impacts from Energy and Mineral Development***

In general, Alternative A is the least restrictive on energy and mineral development of all the alternatives. As a result, the indirect impacts of development on livestock grazing as discussed in **Section 4.7.2** (including spread of noxious weeds, disturbance of livestock, and potential for increased access for permittees/lessees) would be the greatest under this alternative. Quantitative analysis here focuses only on mineral materials due to the lack of impacts on range management across alternatives and/or unknown potential for other mineral and energy resources; for mineral materials 9,026,017 acres would be open to consideration for development in PPH and PGH.

### 4.7.5 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 PPMA, particularly in important seasonal habitats and in areas post-restoration.

Actions for invasive species 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 PPMA would be a higher priority for gathers. For the livestock grazing allotments that overlap HMAs in PPMA, 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 PPMA would be categorized as a low priority for future gathers. As a result, forage availability would potentially decrease in the long term due to 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 PPMA 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 PPMA or PGMA 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 late fall or early spring to target cheatgrass. 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. Impacts would likely be minimal overall due to the limited nature of this use of livestock grazing.

***Impacts from Livestock Grazing/Range Management***

Under Alternative B, no management actions would result in direct changes to acres open to grazing and permitted AUMs. The number of AUMs would be the same as Alternative A (924,617 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 assessment would include indicators specific to achieving GRSG habitat objectives, 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 4.7.2**, 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), Hagen et al. (2007) are in line with those currently used to assess land health, as they focus on maintenance or improvement of land health and grassland vegetation. Completion of land health assessments and permits and leases would be prioritized within PPMA. 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 PPMA due to the emphasis of management actions in this habitat. In the long term, livestock grazing in priority habitat would be reduced under compared to 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. Retirement of grazing privileges would remain an option for priority habitat, 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 PPMA could be reduced and the ability to fully use permitted AUMs could be impacted 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 PPMA, 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 or similar standards 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 flagging to lessen risk for GRSG impacts, so the cost of building or maintaining these structures would increase, compared to Alternative A.

Similarly, new water developments from diverting springs or seeps would be permitted only when GRSG habitat would also benefit. For this reason, these new developments would be limited, and permittees and lessees would not be able to fully use permitted AUMs, particularly in cases where water is limited on a given allotment.

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 PGMA (an 52 percent decrease from Alternative A for GRSG habitat). Similarly, areas limited to existing routes would increase compared to Alternative A (7,075,386 total acres in GRSG habitat, a 60 percent increase from Alternative A). Additionally, in PPMA, 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 PPMA. 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, 4,866,030 acres of PPMA and PGMA would be managed as ROW exclusion areas (more than 8 times higher than Alternative A); 5,662,632 acres open to livestock grazing would be managed as ROW avoidance areas in PPMA and PGMA (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 to Alternative A.

***Impacts from Energy and Mineral Development***

As described in **Section 4.7.3**, Impacts Common to All Alternatives, the potential for development and related impacts would be minimal for most of the energy and minerals resources; therefore analysis here focuses only on mineral materials. Under Alternative B, 6,224,557 acres (30 percent decrease from Alternative A) would be open to consideration for mineral material development.

Due to the increase in restrictions on development, impacts on livestock grazing management would be reduced under Alternative B. The 3 percent disturbance cap to anthropogenic disturbances in PPMA would specifically limit disturbance of livestock grazing from development in this area.

### 4.7.6 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/Range Management***

Alternative C would eliminate livestock grazing from all allotments completely or partially within occupied 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 4.7.2**, 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 next to federal lands, 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 PPMA 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 closed 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 the boundaries of occupied habitat could be required to prevent livestock from trespassing on lands where grazing is excluded. This would be a potential additional cost for permittees and lessees.

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 could 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***

Under Alternative C, SRP management would be the same as described under Alternative A. 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 PPMA and PGMA. 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 PPMA and increased 18 fold over Alternatives A for PGMA. Avoidance areas would be as described under Alternative B for PPMA and decreased to zero for

PGMA. However, due to the elimination of grazing in GRSG habitat, these actions would not impact livestock management.

***Impacts from Mineral and Energy Development***

Under Alternative C, additional restrictions would be applied to mineral and energy development. No impacts would occur from energy and mineral development on livestock grazing due to the elimination of grazing in occupied GRSG habitat.

### 4.7.7 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 species 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 objectives and would not exceed the current range. As a result, any conflict with livestock or competition for forage would be similar or reduced in scale, compared to Alternative A.

***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 30 percent of GRSG habitat 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. Specific suppression priorities would be applied in PPMA and PGMA, with emphasis on nesting, winter habitat and PPMA. 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/Range Management***

Under Alternative D, a slight reduction in acres available for authorized grazing (9,897,743 acres open to grazing in GRSG habitat, approximately 1 percent reduction from Alternative A) and AUMs (915,624 permitted AUMs, approximately 1 percent reduction compared to Alternative A) would occur in GRSG habitat due to the closure of specific areas of RNAs 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 the "I" category. 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 analyze all grazing allotments where permit/leases are coming up for renewal within 10 years. As stated in **Chapter 2**, the emphasis is on allotments in GRSG habitat, with priorities for land health assessments as follows:

1. Allotments or pastures in PPMA that have never been evaluated
2. Allotments or pastures in PPMA that have not been reevaluated in 10 or more years
3. Allotments or pastures in PGMA that have never been evaluated.

As a result, changes to grazing management are likely to occur in PPMA first and PGMA 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.

Land assessment would incorporate habitat indicators and associated values that are consistent with the HAF or with values adjusted for regional conditions. A more standardized approach would be in place, compared to 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 rangeland health standards or conforming to the guidelines and 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.

Management for riparian and wetlands areas would be similar to that described under Alternative B, but with an emphasis on site specific ecological conditions. Therefore, required changes to grazing management and impacts on permittees and lessees may be reduced.

Under Alternative D, new and existing range improvements would be allowed to enhance functionality when livestock are absent. Range improvements would be modified to prevent danger of GRSG or other wildlife entrapment. In cases where water improvements have population limiting implications, modifications or removal could occur. 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.

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 be more restrictive on use of supplements during the winter. While this may not prevent winter grazing it would likely affect livestock performance and health, and have a financial impact on grazing operators.

***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 to Alternative A, particularly near leks.

***Impacts from Travel Management***

Under Alternative D, travel management plans would be implemented within five 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 would be retained in PPMA; all other GRSG habitat, including PGMA, would be managed as open for ROWs, unless already managed as avoidance or exclusion by the existing planning. All new ROWs in PGMA 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 to Alternative A,

***Impacts from Mineral and Energy Development***

As described in **Section 4.7.3**, Impacts Common to All Alternatives, the potential for development and related impacts would be minimal for most of the energy and minerals resources; therefore, quantitative analysis here focuses only

on mineral materials. Under Alternative D, PPMA would be closed to development of new mineral sites. Existing permitted sites would not be closed but reclaimed upon exhaustion of resource. As a result, development and associated livestock disturbance from development of minerals would also be reduced.

### 4.7.8 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 species 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 cheat grass in understory and overstory sagebrush, and in reducing the spread of invasive species. 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 to 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/Range Management***

Under Alternative E, AUMs open to grazing would be the same as under Alternative A (924,617 AUMs). Acre open to grazing in GRSG habitat would be slightly reduced compared to Alternative A (8,316,730 acres, a 16.8 percent reduction). The difference in acreage in this alternative is due to the difference an increase in PPH 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 Rangeland Health Standards and Guidelines. 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 restrictions 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 PPMA/Core Area habitat and decreased to 1,610288 in PGMA/Low Density habitat (45 percent reduction from Alternative A in PGMA). 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 mitigate impacts on GRSG habitat caused by BLM activities. As a result, disturbance from development in Core Area and Low Density habitat would decrease.

***Impacts from Energy and Mineral Development***

Under Alternative E, as discussed in **Section 4.7.3**, impacts would primarily be from mineral material development. Mineral materials would be open for

development with impacts as described in Alternative B. Under this alternative, a zero percent surface disturbance cap to anthropogenic disturbances (not would be applied in Core Areas, unless non-habitat, specifically limiting the disturbance of livestock grazing from development.

### 4.7.9 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 in the areas would be managed with the objective a 25 percent from current AML levels in GRSG habitat, resulting reduced forage use by wild horses and burro.

***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/Range Management***

Under Alternative F, 25 percent of areas open to grazing in GRSG habitat would be rested per year (7,495,716 acres open 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 350,208 (approximately 37.5 percent reduction as compared to 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 billed AUM 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 prohibitions on grazing after fire and restriction on all vegetation treatments). As a result, management options would be limited and time and costs for permittees would be increased compared to Alternative A.

Alternative F includes increased restriction on the ability to construct or modify 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; PPMA exclusion areas would be as described for Alternative B and PGMA 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 to Alternative A.

***Impacts from Energy and Mineral Development***

As described in **Section 4.7.3**, Impacts Common to All Alternatives, the potential for development and related impacts would be minimal for most of the energy and minerals resources. Under Alternative F, impacts from mineral materials would be as described for Alternative B.

## 4.8 RECREATION

### 4.8.1 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 Forest Service-administered 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.

### 4.8.2 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 3.4.5**, 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 – Greater Sage-Grouse
- Vegetation
- Wild horses and burros
- Wildland fire management
- Livestock grazing/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

### 4.8.3 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.

### 4.8.4 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.

### 4.8.5 Alternative B

***Impacts from Recreation***

Restricting issuance of SRPs in PPMA to those activities that have neutral or beneficial impacts on PPMA 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 PPMA over the long term.

***Impacts from Travel and Transportation Management***

Limiting motorized travel to existing routes in PPMA 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 PPMA. Big game hunters would need to retrieve game by foot or mechanized means (e.g., game carts) instead of using OHVs. Seasonal closures in PPMA would restrict motorized travel on specific roads during the GRSG breeding season.

Limits on road construction in PPMA 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.

### 4.8.6 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.

### 4.8.7 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.

***Impacts from Travel and Transportation Management***
Impacts are the same as those under Alternative B.

### 4.8.8 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.

### 4.8.9 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 TRAVEL MANAGEMENT

### 4.9.1 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.
- 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

### 4.9.2 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 3.4.4**, 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 closed or limited to motorized travel and limiting seasonal travel. New travel and transportation management actions in response to GRSG habitat protection strategies would impact the number of acres where motorized travel is allowed.

Travel management decisions impact other resources and uses, such as closing routes or limiting travel to protect sensitive resources. As such, impacts of travel management actions on other resources and uses are discussed in the respective resource sections of this chapter. Impacts on travel and transportation management from other program areas do occur and are considered a part of implementation level transportation management planning.

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/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

### 4.9.3 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.

### 4.9.4 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.

### 4.9.5 Alternative B

***Impacts from Travel Management***

A shift in OHV designations would reduce cross-country motorized travel opportunities. Compared to 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. 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 PPMA, meaning the BLM would have more flexibility to respond to any localized congestion and user conflicts if motorized travel were to increase in popularity.

### 4.9.6 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 to 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 PPMA, meaning the BLM would have more flexibility to respond to any localized congestion and user conflicts if motorized travel were to increase in popularity.

### 4.9.7 Alternative D

***Impacts from Travel Management***

Impacts are the same as those under Alternative B.

### 4.9.8 Alternative E

***Impacts from Travel Management***

Compared to 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.

### 4.9.9 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 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 3.10**.

### 4.10.1 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). 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).
- 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 Westwide 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, such as electric transmission facilities, pipelines, communication lines, and transportation systems.

### 4.10.2 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, 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 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).

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/range management
- Coal
- Leasable minerals
- Locatable minerals
- Mineral materials (salables)
- Nonenergy leasable minerals
- Mineral split-estate

### 4.10.3 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.

### 4.10.4 Alternative A

***Impacts from Special Status Species—Greater Sage-Grouse 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 4.9**, 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 4.12**, Special Designations, for further analysis.

### 4.10.5 Alternative B

***Impacts from Special Status Species—Greater Sage-Grouse 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 to 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/cable lines
- Residential and farm access ROWs

***Impacts from Travel Management***

Alternative B would limit motorized travel to existing roads and trails in PPMAs (4,498,600 acres) and PGMAs (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 PPMAs and 143,600 acres in PGMAs 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 4.9**, Travel Management, for further analysis.

***Impacts from Lands and Realty Management***

*Land Use Authorizations*

Under Alternative B, PPMAs (4,547,000 acres) would be designated as ROW exclusion. The BLM would not authorize new ROWs in PPMAs unless the infrastructure could be located entirely within an existing ROW footprint. Additionally, PGMAs (5,662,600 acres) would be designated as ROW avoidance areas. As noted in **Section 4.10.2**, Nature and Types 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 PPMA and PGMA 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 I, or lands identified for retention. Retention lands in PPMAs would increase by 1,049,500 acres, compared to Alternative A. The BLM would retain ownership of public land in GRSG habitat, except 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 GRSG habitat. Impacts would be consistent with those described in **Section 4.10.2**.

*Withdrawals*

Under Alternative B, the BLM would not recommend land withdrawals for reasons other than mineral activity. Impacts on mineral development are described in Section 4.11, Minerals.

***Impacts from Special Designations***

Impacts from ACECs on lands and realty are the same as those for Alternative A.

### 4.10.6 Alternative C

***Impacts from Special Status Species—Greater Sage-Grouse Management***

Management actions under Alternative C to protect GRSG habitat would impact lands and realty through the designation of all PPMAs and PGMAs (10,682,100 acres) as ROW exclusion. Compared to 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 4.9**, 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 PPMAs or PGMAs 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 PPMAs and PGMAs 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 4.10.2**.

*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 PPMAs 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 PPMAs and PGMAs, the designation of PPMAs 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 4.12**, Special Designations, for further analysis.

### 4.10.7 Alternative D

***Impacts from Special Status Species—Greater Sage-Grouse Management***

Management proposed under Alternative D would enable the BLM to accommodate ROW development in PGMAs. It would allow opportunities for new ROWs in PPMAs 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 to 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 4.9**, Travel Management, for further analysis.

***Impacts from Lands and Realty Management***

*Land Use Authorizations*

ROW exclusion areas in PPMAs and PGMAs under Alternative D would be the same as under Alternative A. In PPMAs, 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 PGMAs 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 PPMAs 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 4.10.2**.

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.

### 4.10.8 Alternative E

***Impacts from Special Status Species—Greater Sage-Grouse 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 4.9**, 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/Landownership*

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.

### 4.10.9 Alternative F

***Impacts from Special Status Species—Greater Sage-Grouse Management***

Management actions under Alternative F to protect GRSG habitat would be similar to Alternative B and consistent with **Section 4.10.2**. 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 4.9**, 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 non-habitat 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 to 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/Landownership*

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 PPMAs and 1,492,800 acres in PGMAs. 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 4.12**, Special Designations, for further analysis.

## 4.11 FLUID LEASABLE MINERALS

### 4.11.1 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 authorizing 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 lands overlying federal mineral estate. This includes federal mineral estate underlying BLM-administered lands and lands not administered by the BLM. There are 15,257,000 acres of federal mineral estate within the decision area (12,618,000 acres of BLM-administered surface with federal minerals and 2,639,000 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 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 would 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.

### 4.11.2 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. 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 3.11.1**, Trends – Fluid Leasable Minerals, 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 3 percent cumulative disturbance cap 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 3 percent, 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 3 percent 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. Additionally, because it is not feasible to use directional drilling for wildcat wells, an NSO stipulation would preclude drilling of such wells. 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/range management
- Recreation
- Travel management
- Coal

- Locatable minerals
- Nonenergy leasable minerals
- Special designations
- Air quality and climate change
- Special status plants

### 4.11.3 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.

### 4.11.4 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 4.11.2**, 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 4-45**, 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 4-45**
**Fluid Mineral Leasing Categories in the Decision Area, Alternative A**

| Leasing Category | Acres |
|---|---|
| Closed to Leasing | 3,134,200 |
| *Leased* | *0* |
| *Unleased* | *3,134,200* |
| Open Subject to NSO Stipulations | 906,000 |
| *Leased* | *10,600* |
| *Unleased* | *895,400* |

**Table 4-45**
**Fluid Mineral Leasing Categories in the Decision Area, Alternative A**

| Leasing Category | Acres |
|---|---|
| Open Subject to CSU/TL Stipulations | 2,703,000 |
| *Leased* | *114,900* |
| *Unleased* | *2,588,100* |
| Open Subject to Standard Terms and Conditions | 8,513,900 |
| *Leased* | *34,200* |
| *Unleased* | *8,479,700* |

Source: Oregon/Washington BLM. 2013.

Under Alternative A, 3,134,200 acres (21 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 4.11.2**. 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 906,000 acres (6 percent) of federal mineral estate in the decision area would remain subject to NSO stipulations. Of the acres subject to NSO stipulations, 895,400 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 11,665,000 acres (76 percent) of federal mineral estate within the decision area would remain open to mineral material disposal under Alternative A. Approximately 2,752,500 acres (18 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 4.11.2**.

### 4.11.5 Alternative B

***Impacts from Lands and Realty Management***

Under Alternative B, all BLM-administered surface in PPMAs (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 PPMAs would be closed to fluid mineral leasing under Alternative B, managing PPMAs as ROW exclusion areas would have no impact on fluid minerals.

All BLM-administered surface in PGMAs (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 4.11.2**. Approximately 288,200 acres in PGMAs would have been managed as ROW exclusion under Alternative A but would be managed as ROW avoidance under Alternative B. While management of these 288,200 acres would be less restrictive under Alternative B than under Alternative A, 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, 6,762,920 acres (44 percent of the federal mineral estate decision area), including all federal mineral estate within PPMAs would be closed to fluid mineral leasing. All acres closed would be unleased; therefore this management would close 54 percent of the 12,408,200 unleased acres in the decision area. Closure of these acres would directly impact the fluid minerals program in the manner described under **Section 4.11.2**. 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 5,732,500 acres of federal mineral estate within PGMAs (38 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 4-46**, 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.

A 3 percent 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 to Alternative A.

Geophysical exploration would be allowed on the 4,756,900 acres of federal mineral estate within PPMAs but would be subject to TLs and other restrictions. Most notably, geophysical exploration within PPMAs would be allowed only for gathering information about fluid mineral resources outside PPMAs. Because of these limitations and the fact that PPMAs would be closed to fluid mineral leasing, geophysical exploration in PPMAs would decrease under this alternative. Decreases in geophysical exploration in PPMAs would impact the fluid minerals program as described under **Section 4.11.2**.

Under Alternative B, conservation measures in addition to RDFs would be applied as COAs to the 10 existing federal leases in PPMAs. These RDFs and

**Table 4-46**
**Fluid Mineral Leasing Categories in the Decision Area, Alternatives B and E**

| Leasing Category | Acres |
|---|---|
| Closed to Leasing | 6,762,920 |
| *Leased* | *2,520* |
| *Unleased* | *6,760,400* |
| Open Subject to NSO Stipulations | 796,800 |
| *Leased* | *10,500* |
| *Unleased* | *786,300* |
| Open Subject to CSU/TL Stipulations | 2,464,000 |
| *Leased* | *113,100* |
| *Unleased* | *2,350,900* |
| Open Subject to Standard Terms and Conditions | 5,395,700 |
| *Leased* | *33,600* |
| *Unleased* | *5,362,100* |

Source: Oregon/Washington BLM. 2013.

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 7,105,500 acres of federal mineral estate in PPMA (47 percent of the federal mineral estate decision area) would be closed to mineral material disposal. However, because all PPMAs would be closed to fluid mineral leasing under this alternative, closing PPMAs to mineral material disposal would not impact fluid minerals.

### 4.11.6 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, 10,895,300 acres (71 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 10,892,780 acres (88 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 4.11.2**. 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 4-47**, 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.

**Table 4-47**
**Fluid Mineral Leasing Categories in the Decision Area, Alternatives C and F**

| Leasing Category | Acres |
|---|---|
| Closed to Leasing | 10,895,300 |
| *Leased* | *2,520* |
| *Unleased* | *10,892,780* |
| Open Subject to NSO Stipulations | 791,800 |
| *Leased* | *10,500* |
| *Unleased* | *781,300* |
| Open Subject to CSU/TL Stipulations | 1,249,500 |
| *Leased* | *113,100* |
| *Unleased* | *1,136,400* |
| Open Subject to Standard Terms and Conditions | 2,328,900 |
| *Leased* | *33,600* |
| *Unleased* | *2,295,300* |

Source: Oregon/Washington BLM. 2013.

Under Alternative C, geophysical exploration would be prohibited on the 10,489,400 acres of federal mineral estate within occupied habitat. This prohibition would impact fluid minerals, as described under **Section 4.11.2**. Because geophysical exploration would be unrestricted under Alternative A, impacts would increase under Alternative C.

The 50 existing oil and gas leases in GRSG habitat would be subject to TLs with the types of impacts described under **Section 4.11.2**. 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 4.11.2**.

***Impacts from Mineral Materials (Salables) Management***

Under Alternative C, approximately 11,511,900 acres of federal mineral estate (75 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.

### 4.11.7 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 PPMAs 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 4.11.2**. 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 PPMAs, a three percent disturbance limit and 640-acre spacing requirements. The stipulations that would apply can be summarized as follows:

- Within PPMA, apply a 4-mile NSO buffer from active leks.
- Within PPMA, beyond 4 miles of active leks, apply CSU/TL stipulations.
- Within PGMA, apply a 1-mile NSO buffer from active leks.
- Within PGMA, beyond 1 mile of active leks, apply CSU/TL stipulations.
- Where the 4-mile lek buffer extends outside PPMA to PGMA, apply CSU stipulations.

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 4.11.2**. 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. The BLM would also close areas of split-estate under Alternative D to correspond with areas of federal mineral estate beneath BLM-administered surface that would be closed under this alternative.

**Table 4-48**, 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.

**Table 4-48**
**Fluid Mineral Leasing Categories in the Decision Area, Alternative D**

| Leasing Category | Acres |
|---|---|
| Closed to Leasing | 3,604,400 |
| *Leased* | *0* |
| *Unleased* | *3,604,400* |
| Open Subject to NSO Stipulations | 3,787,900 |
| *Leased* | *11,400* |
| *Unleased* | *3,776,500* |
| Open Subject to CSU/TL Stipulations | 3,658,600 |
| *Leased* | *114,700* |
| *Unleased* | *3,543,900* |
| Open Subject to Standard Terms and Conditions | 4,206,300 |
| *Leased* | *33,700* |
| *Unleased* | *4,172,600* |

Source: Oregon/Washington BLM. 2013.

Under Alternative D, there would be a 15 percent increase in unleased acres closed to fluid mineral leasing compared with Alternative A. Additionally, 3,787,900 acres, or 25 percent of the federal mineral estate decision area would be subject to NSO stipulations. These stipulations would cover 3,776,500 acres (30 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 4.11.2**. Because four times more acres would be subject to NSO stipulations under Alternative D than under Alternative A, the magnitude of the impacts would increase under Alternative D.

Like under Alternative B, a 3 percent disturbance cap would apply to all anthropogenic activity in GRSG habitat with the same impacts on fluid minerals.

Geophysical exploration would be allowed on the 10,489,400 acres of federal mineral estate within PPMAs and PGMAs, 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 10 existing leases overlying federal mineral estate in PPMAs. 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 4.11.2**, 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 4.11.2**.

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 PPMAs to mineral materials disposal. Fluid mineral development on the 819,800 acres within PPMA 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 4.11.2**. Because more areas within PPMA 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.

### 4.11.8 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 (see **Table 4-46**, Fluid Mineral Leasing Categories in the Decision Area, Alternatives B and E). 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.

### 4.11.9 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 (see **Table 4-47**, Fluid Mineral Leasing Categories in the Decision Area, Alternatives C and 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 anthropogenic 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 to 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 4.11.2**.

Under Alternative F, the 10 existing leases in PPMA 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 PPMA would be closed to mineral material disposal. However, because all PPMA would be closed to fluid mineral leasing under Alternative E, closing PPMA to mineral material disposal would not impact fluid minerals.

## 4.12 LOCATABLE MINERALS

### 4.12.1 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. An indirect impact would result from removing a road, which would change the economic feasibility of developing a site. 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. 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 or to prevent unnecessary or undue degradation 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 15,257,000 acres of federal mineral estate within the decision area (12,618,000 acres of BLM-administered surface with federal minerals and 2,639,000 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.

### 4.12.2 Nature and Type of Effects

Withdrawing or closing an area to mining development removes the possibility of mineral resources 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.

Existing mining claims in areas withdrawn from locatable mineral entry would have to undergo a validity exam in order to be accepted for notices or approved for plans of operations. 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 of the decision area 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, the claim contained a discovery of a valuable mineral deposit and/or 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. The need to perform validity exams in areas withdrawn from locatable mineral entry would also greatly increase the BLM's burden of processing mining claims, notices, and plans of operations.

Management actions creating ROW exclusion or avoidance areas would indirectly impact locatable mineral extraction by limiting the available means for accessing mineral resources and transporting locatable minerals to processing facilities and markets. For example, new roads to access a mine could not be built in a ROW exclusion area. Locatable 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.

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, 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 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/range management
- Recreation
- Travel management
- Coal
- Leasable minerals
- Mineral materials (salables)
- Nonenergy leasable minerals
- Mineral split-estate
- Air quality and climate change
- Special status plants

### 4.12.3 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 4-49**, 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.

**Table 4-49**
**Quantitative Impacts on Locatable Minerals**

| Locatable Minerals | Alternative A | Alternative B | Alternative C | Alternative D | Alternative E | Alternative F |
|---|---|---|---|---|---|---|
| Total federal mineral estate for locatable minerals | 15,257,000 | 15,257,000 | 15,257,000 | 15,257,000 | 15,257,000 | 15,257,000 |
| Total acreage withdrawn from locatable mineral entry | 996,800 | 996,800 | 996,800 | 996,800 | 996,800 | 996,800 |
| Total acreage petitioned for withdrawal from locatable mineral entry | 20,500 | 4,490,500 | 9,653,400 | 20,500 | 4,490,500 | 4,490,500 |
| *Increase from Alternative A* | N/A | 4,470,000 | 9,632,900 | 0 | 4,470,000 | 4,470,000 |
| Total acreage open to locatable mineral exploration or development | 14,239,700 | 9,769,700 | 4,606,800 | 14,239,700 | 9,769,700 | 9,769,700 |

Source: Oregon/Washington BLM 2013

The management actions being considered in this RMPA could affect both existing and future mining claims. Developers would have to submit a notice to the BLM for exploration and development on mining claims with a cumulative surface disturbance of five or fewer acres. Additionally, they would have to submit a plan of operations for exploration and development for areas of greater than five acres or for any development (regardless of size) within special management areas, as outlined in 43 CFR, Part 3809.

### 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 locatable minerals program as described under **Section 4.11.2**, Nature and Type of Effects.

***Impacts from Locatable Minerals Management***

Under Alternative A, 20,500 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 996,800 acres currently withdrawn (see **Section 4.12.3**, 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. Exploration and mining would be allowed on existing, valid mining claims. Impacts on existing and future mining claims are similar to those described under **Section 4.12.2**, Nature and Type of Effects.

There are 671 locatable mineral claims in occupied habitat, 137 plans of operations (136 authorized and 1 pending) covering 29,400 acres, and 128 notices covering 18,600 acres in occupied habitat. None of these are in areas petitioned for withdrawal.

No additional BMPs to protect GRSG are identified under Alternative A.

***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 4.12.2**.

### 4.12.5 Alternative B

***Impacts from Lands and Realty Management***

Under Alternative B, all BLM-administered surface in PPMA (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 PPMA would be recommended for withdrawal from locatable mineral entry under Alternative B, managing PPMA as ROW exclusion areas would have no impact on locatable minerals.

***Impacts from Locatable Minerals Management***

Under Alternative B, 4,490,500 acres of federal mineral estate in the decision area (including all PPMAs) would be petitioned for withdrawal from locatable mineral entry under the Mining Law of 1872. Combined with the additional 996,800 acres previously withdrawn (see **Section 4.12.3**), the availability of locatable minerals would be limited on 5,487,300 acres. This represents 36 percent of the federal mineral estate decision area, or five times the acreage under Alternative A. The types of impacts would be the same as those described under **Section 4.12.2**.

Under this alternative, 293 claims, 45 plans of operations (7,440 acres), and 65 notices (9,550 acres) would be within PPMAs. As such, all would be within the area to be petitioned for withdrawal. This represents 43 percent of the 936 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 4.12.2**. 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 BMPs listed in **Appendix D**. However, mining operations and practices could be affected if an operator were to agree to apply any of the BMPs 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 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 4.12.2**. However, if all PPMAs were withdrawn as recommended under Alternative B, no new locatable mineral operations would be allowed in these areas; therefore, ACEC designation in PPMAs would not impact locatable 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 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, 9,653,400 acres would be petitioned for withdrawal. Combined with the additional 996,800 acres previously withdrawn (see **Section 4.12.3**), the availability of locatable minerals would be limited on 10,650,200 acres. This represents 70 percent of the federal mineral estate decision area, or ten times the acreage under Alternative A. The types of impacts would be the same as those described under **Section 4.12.2**.

Under this alternative, all of the 671 claims, 137 plans of operations (29,400 acres), and 128 notices (18,600 acres) 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 4.12.2**. 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 PPMAs) would be designated as new ACECs, in addition to the 200,399 acres of PPMA 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 4.12.2**. However, if all occupied habitat were withdrawn as recommended under Alternative C, no new locatable mineral operations would be allowed in these areas; therefore, ACEC designation in PPMAs would not impact locatable 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 PPMAs 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 4.11.2**. 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 PPMAs would be requested to change mining operations and practices to limit surface disturbance to three percent of PPMAs 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.

### 4.12.8 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 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, 4,490,500 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 4.12.2**.

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 4.12.2**. 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.

### 4.12.9 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, PPMAs would be recommended for withdrawal from locatable mineral entry; therefore, management of PPMAs as ROW exclusion areas would have no impact on locatable minerals.

Locatable mineral operations outside PPMAs would be impacted as described under **Section 4.12.2**. 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 4.12.2**. However, if all PPMAs were withdrawn as recommended under Alternative F, no new locatable mineral operations would be allowed in these areas.

## 4.13 MINERAL MATERIALS (SALABLE MINERALS)

### 4.13.1 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 also apply to mineral material development on lands overlying federal mineral estate, which includes federal mineral estate underlying BLM-administered lands and lands not administered by the BLM. There are 15,257,000 acres of federal mineral estate within the decision area (12,618,000 acres of BLM-administered surface with federal minerals and 2,639,000 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.

### 4.13.2 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, 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.

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/range management
- Recreation
- Travel management
- Coal
- Leasable minerals
- Locatable minerals
- Nonenergy leasable minerals
- Mineral split-estate
- Special designations
- Air quality and climate change
- Special status plants

### 4.13.3 Alternative A

***Impacts from Lands and Realty Management***

Under Alternative A, 8,314,700 acres (66 percent) of BLM-administered surface within the decision area would continue to be open to ROW location. However, construction of new roads would likely decrease on the 4,303,300 acres (34 percent) of BLM-administered surface in the decision area that would continue to be managed as ROW avoidance or exclusion under this alternative. Impacts of this management would be the same type as those described under

**Section 4.13.2**, 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 2,752,500 acres (18 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 4.13.2**. The remainder of the decision area (12,504,500 acres, or 82 percent) would remain open to mineral material disposal.

### 4.13.4 Alternative B

***Impacts from Lands and Realty Management***

Under Alternative B, all BLM-administered surface in PPMAs (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 PPMAs would be closed to mineral materials disposal under Alternative B, managing PPMAs as ROW exclusion would have no impact on mineral materials.

All BLM-administered surface in PGMAs (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. Mineral materials beneath those acres of BLM-administered surface in PGMAs would be impacted by the ROW avoidance area described under **Section 4.13.2**. Because 288,200 acres in PGMAs would have been managed as ROW exclusion under Alternative A but would be managed as ROW avoidance under Alternative B, impacts on mineral materials would be reduced in these areas compared with Alternative A. Overall, 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 7,105,500 acres of federal mineral estate in PPMAs (47 percent of the federal mineral estate decision area) would be closed to mineral material disposal. The types of impacts from these closures are the same as those discussed under **Section 4.13.2**. Because three times more 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 PPMAs would be the same as that under Alternative A except that a 3 percent disturbance cap would apply to all anthropogenic 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 to Alternative A.

### 4.13.5 Alternative C

***Impacts from Lands and Realty Management***

Under Alternative C, all BLM-administered surface in occupied habitat (totaling 10,682,100 acres, or approximately 85 percent of BLM-administered surface in the decision area) would be managed as ROW exclusion areas. These areas would impact mineral materials as described under **Section 4.13.2**. Because 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 11,511,900 acres (75 percent) of federal mineral estate in the decision area (including all occupied habitat) would be closed to mineral material disposal. The types of impacts from these closures are the same as those discussed under **Section 4.13.2**. Because four times more acres of federal mineral estate would be closed under Alternative B compared with Alternative A, the magnitude of these impacts would increase.

### 4.13.6 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 PPMAs not already managed as exclusion areas, would be managed as ROW avoidance areas. However, because all PPMAs would be closed to mineral materials disposal under Alternative D, management of ROW exclusion or avoidance areas within PPMAs would not impact new mineral materials disposal. Existing permitted sites would be impacted by decreases in demand as described under **Section 4.13.2**. 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 PPMAs would be the same as that under Alternative A, including 1,960,200 acres managed as ROW exclusion or avoidance in PGMAs. Where these ROW exclusion or avoidance areas outside PPMAs were to overlap with areas open to mineral materials disposal, impacts would be the type as those described under **Section 4.13.2**.

***Impacts from Mineral Materials (Salables) Management***

Management of mineral materials under Alternative D would be the same as that under Alternative B, with the same impacts.

### 4.13.7 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 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. The acres impacted by these closures, and the impacts themselves, would be the same as those under Alternative B.

### 4.13.8 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 PGMAs would be open to mineral materials disposal under Alternative F, these areas would be impacted by ROW exclusion areas as described under **Section 4.13.2**. Demand for mineral materials in PGMAs would greatly decrease because all PGMAs 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 anthropogenic 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 to 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 NONENERGY LEASABLE MINERALS

### 4.14.1 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 15,257,000 acres of federal mineral estate within the decision area (12,618,000 acres of BLM-administered surface with federal minerals and 2,639,000 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 deposits could be discovered and developed in the future on other federal mineral estate.

### 4.14.2 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/range management
- Recreation
- Travel management
- Coal
- Leasable minerals
- Locatable minerals
- Mineral materials (salables)
- Mineral split-estate
- Special designations

- Air quality and climate change
- Special status plants

### 4.14.3 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 nonenergy solid leasable minerals program as described under **Section 4.14.2**, Nature and Type of Effects.

***Impacts from Nonenergy Leasable Minerals Management***

Under Alternative A, 12,122,900 acres (62 percent) of federal mineral estate in the decision area would remain open to nonenergy solid mineral prospecting and leasing; 3,134,200 acres (21 percent) would remain closed to prospecting and leasing. These closures would impact nonenergy leasable minerals as described under **Section 4.14.2**, Nature and Type of Effects.

### 4.14.4 Alternative B

***Impacts from Lands and Realty Management***

Under Alternative B, all BLM-administered surface in PPMA (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 PPMA would be closed to nonenergy solid mineral leasing under Alternative B, managing PPMA as ROW exclusion areas would have no impact on nonenergy solid leasable minerals.

***Impacts from Nonenergy Leasable Minerals Management***

The BLM would close all PPMA to nonenergy solid mineral leasing under Alternative B. This would result in 7,157,800 acres (47 percent) of federal mineral estate in the decision area being closed to prospecting and leasing. Alternative B would close twice the acreage, compared to Alternative A. The types of impacts from these closures described under **Section 4.14.2** would increase under Alternative B.

A 3 percent disturbance cap would apply to all anthropogenic 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 to Alternative A.

### 4.14.5 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 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 11,085,800 acres (73 percent) of federal mineral estate in the decision area being closed to prospecting and leasing. Alternative C would close four times the acreage, compared to Alternative A. The types of impacts from these closures described under **Section 4.14.2** would increase under Alternative C.

### 4.14.6 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 PPMA 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 4.14.2**. Because 73 percent more acres would be managed as ROW avoidance under Alternative D compared with Alternative A, the magnitude of impacts would increase.

PGMA 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 PGMA. This could increase stipulations and mitigation that applicants have to apply to ROWs located within PGMA, making them less likely to locate ROWs in PGMA. Impacts on nonenergy leasable minerals would increase compared to Alternative A; however, this management of PGMAs would be less restrictive than that for other action alternatives that designate PGMA avoidance areas.

***Impacts from Nonenergy Leasable Minerals Management***

Under Alternative D, the BLM would apply NSO stipulations to nonenergy solid mineral leases in PPMA. These stipulations would apply on 4,756,900 acres (31 percent) of the federal mineral estate decision area. Like Alternative A, 3,134,200 acres (21 percent) of the decision area would remain closed to nonenergy solid mineral leasing. The remaining 7,365,900 acres (48 percent) of 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 4.14.2** would increase under Alternative D.

Like under Alternative B, a 3 percent disturbance cap would apply to all anthropogenic activity in GRSG habitat with the same impacts on nonenergy leasable minerals.

### 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 (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 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.

### 4.14.8 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, under Alternative F, PPMA would be closed to nonenergy solid mineral leasing; therefore, management of PPMA as ROW exclusion areas would have no impact on nonenergy solid leasable minerals.

Nonenergy solid leasable mineral operations outside PPMA would be impacted as described under **Section 4.14.2**. 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 anthropogenic 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 to 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 SPECIAL DESIGNATIONS

### 4.15.1 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 within GRSG PPMA, PGMA, and non-habitat

*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 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 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 for existing ACECs 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 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.

### 4.15.2 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 4.15.1**, 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 4.15.1**, Methods and Assumptions.

***National Trails***

Implementing management proposed in the various alternatives would have no or negligible effects on National Historic Trail resources, qualities, values, and associated settings, and the primary use or uses. This is because the National Trail is managed according to the policy listed under **Section 4.15.1**, Methods and Assumptions.

***ACECs***

Impacts on the relevant and important values of ACECs would mainly be from surface-disturbing activities. 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 4.2**, Special Status Species – Greater Sage-Grouse, 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.

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 critical 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 vegetative 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 could impact ACEC values 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 would 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.

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). Greater Sage-Grouse 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 – Greater Sage-Grouse
- Vegetation
- Wild horses and burros
- Wildland fire management
- Livestock grazing/range management
- Recreation
- Travel Management
- Lands and realty

- Coal
- Leasable minerals
- Locatable minerals
- Mineral materials (salables)
- Nonenergy leasable minerals
- Mineral split-estate
- Air quality and climate change
- Special status plants

### 4.15.3 Impacts Common to All Alternatives

All of the action alternatives (B through F) 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 4.15.2**, Nature and Types of Effects.

Under all alternatives, the 92 existing ACECs and RNAs would continue to be managed for the values for which they were designated. Of those 92 existing ACECs, 76 ACECs occur wholly or partially within GRSG habitat (See **Appendix I**, Greater Sage-Grouse Habitat Density in Areas of Critical Environmental Concern). The 76 ACECs occurring in GRSG habitat would likely experience indirect protections from GRSG management actions. Additionally, 59 of these ACECs (42 of which are RNAs) have been identified as having large amounts of GRSG habitat and/or active leks. These ACECs would receive special management protection under all alternatives. This special management attention is described in **Appendix I**. Under all alternatives, the 92 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 in **Section 4.15.4**, Alternative A, through **Section 4.15.9**, Alternative F.

### 4.15.4 Alternative A

The existing ACECs experience varying degrees of protection under the current management. As noted in **Table 2-6**, Detailed Comparison of Alternatives by BLM Resource Program, 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 92 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 59 ACECs identified in **Appendix I** 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 PPMA and PGMA open to livestock grazing (12,121,600 acres) under Alternatives A and B than under any of the other alternatives. Therefore, compared to 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 (545,300 acres) in PPMA and PGMA 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. It also manages more acres (2,940,000) 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 4.15.2**, Nature and Type of Effects.

### 4.15.5 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.

Under Alternative B, cross-country motorized travel would not be permitted in PPMA. This would result in indirect protections to ACECs that contain PPMA.

These ACECs would experience protections from the types of impacts caused by motorized travel that are described in **Section 4.15.2**, Nature and Type of Effects.

### 4.15.6 Alternative C

Under Alternative C the most acres are closed to livestock grazing (11,686,800 acres). 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 4.15.2**, Nature and Type of Effects.

All PPMA would be closed to cross-country motorized travel. Impacts would be the same as those described under Alternative B.

Under Alternative C all PPMA 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.

### 4.15.7 Alternative D

Alternative D has the same number of acres of ROW exclusion areas (545,300 acres) in PPMA and PGMA as Alternative A. Therefore, impacts on ACECs are similar as those described under Alternative A. All PPMA under this alternative would be closed to cross-country motorized travel. Impacts would be the same as those described under Alternative B.

Additionally, under Alternative D, ACECs and RNAs with large proportions of GRSG habitat (ACECs and RNAs occurring in over 30 percent PPMA and 50 percent PGMA) 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 4.15.2**, 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 and would minimize the risk that GRSG management actions would damage RNAs in the planning area.

### 4.15.8 Alternative E

Under Alternative E, 124,400 acres of PPMA and PGMA 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 4.15.2**, Nature and Type of Effects.

Additionally, all PPMA would be closed to cross-country motorized travel, resulting in indirect protections to ACECs that contain PPMA. Impacts would be the same as those described under Alternative B.

### 4.15.9 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.

All PPMA would be closed to cross-country motorized travel under this alternative, resulting in indirect protections to ACECs that contain PPMA. Impacts would be the same as those described under Alternative B.

## 4.16 SOIL RESOURCES

### 4.16.1 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 3.13, 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/acceptable levels thus preventing physical or chemical degradation. Proposed surface-disturbing projects will be analyzed to determine suitability of soils to support or sustain such projects and will be designed to minimize soil loss.
- Achieving or maintaining Standards for Rangeland Health and Guidelines for Livestock Grazing Management (described in **Section 3.7**, Livestock Grazing/Range Management) generally are effective in managing the effects on soils from livestock grazing. 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.

### 4.16.2 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 health. Impacts on soil resources from surface disturbing activities can result from a number of causes, including improper livestock grazing, some allowed forms of recreation, mineral resource activities, and road improvement or construction. The intensity and extent of impacts on soil resources 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, disturb the upper soil horizons, or that may compact the surface and thus erode 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.

Surface-disturbing activities and surface occupancy can impact soil resources by compacting soil. In some cases, soil compaction aids in water retention and thus plant establishment and growth. However, too much compaction decreases water infiltration rates and gas exchange rates. Decreased gas exchange rates can cause aeration problems, induce nitrogen and potassium deficiency, and negatively impact root development, which is a key component of soil stabilization. As soil compaction increases, the soil's ability to support vegetation diminishes. 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 vegetative 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 any means can result in vegetation loss, loss of biotic crusts, soil compaction, and 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. There are a number of activities that have minimal impacts. 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. Lands and realty management decisions affect where ground-disturbing activities can and cannot occur. Ground-disturbing activities could result in the compaction of soils, 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 to 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 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. At

unsustainable levels, grazing from livestock or wild horses can lead to loss of vegetative cover, reduced water infiltration rates and nutrient cycling, decreased plant litter and water quality, and 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 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. 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 often permanently changed 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—Greater Sage-Grouse
- Recreation
- Coal
- Special designations
- Air quality and climate change
- Special status plants

### 4.16.3 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 native 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 species under all alternatives. Displacement of native plants by invasive species 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 weeds 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 heavily infested with cheatgrass have a rapid fire regime when compared to areas composed of native vegetation. Increased fire patterns 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 would be limited.

***Impacts from Locatable Minerals Management***

All locatable minerals could exist within the planning area, but exploration has been minimal and the potential is unknown across all alternatives.

***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 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, unsustainable levels of wild horse management results in impacts on soil resources through the overgrazing, resulting in bare ground, and

through trampling or removing vegetation and compacting soils 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, and may increase the soils susceptibility to invasive weeds 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.

### 4.16.4 Alternative A

***Impacts from Livestock Grazing/Range Management***

Under Alternative A, 12,122,000 acres, or 96 percent of the planning area is open to livestock grazing; 346,000 acres or 3 percent of the planning area is closed to livestock grazing. Of the acres open to livestock grazing, 4,492,000 acres are within PPH and 5,502,000 acres 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 3.7**, Livestock Grazing/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.

Alternative A, B, and E have the most acreage that would be managed as open to livestock grazing. This would subject the most acreage of soil resources to the possible impacts of livestock grazing as outline in **Section 4.16.2**, including potential loss of vegetative cover, and increased bare ground and soil erosion.

***Impacts from Travel Management***

Alternative A would manage 6,812,000 acres (54 percent) of the planning area as open to cross-country motorized travel, 300,300 acres (2 percent) of the

planning area as closed to cross-country motorized travel, and 5,325,000 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 acreage of soil resources to the possible impacts caused by overland travel. Potential effects of travel management on soil resources include vegetation loss, loss of biotic crusts, soil compaction, or soil erosion.

***Impacts from Lands and Realty Management***

Under Alternative A, 857,600 acres (7 percent of the planning area) would continue to be managed as ROW exclusion areas, and 3,446,000 acres (27 percent) would continue to be managed as ROW avoidance areas. Alternative A would manage 8,314,000 acres (66 percent) of the planning area as open to potential ROW authorizations. Of the acres managed as ROW exclusion areas, 257,200 acres are located within PPH and 288,200 acres are located within PGH. Of the acres managed as ROW avoidance areas, 1,336,000 acres are located within PPH and 1,672,000 acres are managed within PGH.

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 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***

Under Alternative A, 997,000 of BLM-administered acres (8 percent of the planning area) are managed as withdrawn from locatable mineral entry and 11,601,000 acres (92 percent) are managed as open to locatable mineral exploration or development. An additional 21,000 acres would be recommended for withdrawal. Mineral material disposal would manage 2,753,000 of BLM-administered acres (22 percent) as closed to mineral material disposal consideration, and 9,026,000 acres (72 percent) would be managed as open for mineral material disposal consideration. 3,134,000 BLM-administered acres (25 percent) would be managed as closed to nonenergy solid leasable mineral exploration or development, and 9,484,000 acres (75 percent) would be managed as open to nonenergy solid leasable mineral exploration or development.

On BLM-administered lands, 3,134,000 acres (25 percent of the planning area) would be closed to fluid mineral leasing, of which 2,728,000 are located on PPH or PGH. 9,484,000 acres (75 percent) would be managed as open to fluid mineral leasing, of which 7,481,000 are located on PPH and PGH. Of the acres open to fluid mineral leasing, 906,000 would be subjected to NSO stipulations, and 2,703,000 would be subjected to CSU stipulations.

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 4.16.2** (including soil compaction and excavation, and the clearing of vegetation) would be the greatest under this alternative.

### 4.16.5 Alternative B

***Impacts from Livestock Grazing/Range Management***

Under Alternative B, management actions would not result in direct changes to the amount of acres open or closed to livestock grazing. Potential effects on soil resources from livestock grazing would remain the same as those under Alternative A.

***Impacts from Travel Management***

Under Alternative B, 4,142,000 acres (33 percent of the planning area) would be managed as open to unrestricted cross-country motorized travel, 300,300 acres (2 percent) would be managed as closed to cross-country motorized travel, and 7,996,000 acres (63 percent) would be limited to existing roads and trails. Additionally, route construction would be limited to realigning existing routes, new roads would be built to the absolute minimum standard necessary, and 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 replacing cleared vegetation, and correcting areas where soils are compacted or eroding beyond natural levels.

Alternative B would managed the same amount of acreage as closed to cross-county motorized travel as Alternative A, would managed 2,670,000 less acres as open to travel management than Alternative A, and 2,671,000 more acres as 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, which 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 B would manage 4,866,000 acres (39 percent of the planning area) as ROW exclusion areas, 6,107,000 acres (48 percent) as ROW avoidance areas, and 1,645,000 acres (13 percent) as open to ROW authorizations. PGMA would

be managed as a ROW avoidance area on 5,663,000 acres and PPMA would be managed as a ROW exclusion area on 4,547,000 acres. Compared to 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 4,008,000 acres or 32 percent, would increase the acreage managed as ROW avoidance areas by 2,661,000 acres or 21 percent, and would decrease the acreage open to ROW authorizations by 6,669,000 acres, or 53 percent compared to 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.

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 have the same number of acreage closed to locatable mineral entry as Alternative A, would increase the number of acres recommended for withdrawal from locatable mineral entry from 21,000 acres under Alternative A to 4,292,000 acres, and would reduce the amount of acreage open to locatable mineral entry from 11,601,000 to 7,321,000. Alternative B would also have a greater number of acres closed to mineral material disposal consideration, nonenergy solid leasable mineral entry, and areas available for fluid mineral leasing. The greater amount of acreage closed to mineral entry under Alternative B equates to a smaller amount of acreage open and available for potential impacts on soil resources from mineral exploration and development. Alternative B would be more protective of soil resources from vegetation clearing, soil compaction, and soil excavation than Alternative A. Specific acreage differences under the various mineral resources are detailed below.

Availability for locatable mineral entry would be withdrawn on 997,000 of BLM-administered acres and would be open for mineral exploration or development on 7,321,000 acres. This is the same acreage of current withdrawal from locatable mineral entry as Alternative A, and a decrease of acreage open to locatable mineral entry by 4,280,000 acres.

Mineral material disposal would be managed as closed to mineral material disposal on 6,373,000 BLM-administered acres, and open for mineral material disposal consideration on 6,245,000 acres. This is a 3,620,000 acre increase in

areas closed to mineral material disposal over Alternative A, and a 2,781,000 acre decrease in lands available for mineral material disposal consideration, compared to Alternative A.

Nonenergy solid leasables would be managed as closed to mineral exploration and development on 6,531,000 BLM-administered acres, and open to mineral entry exploration and development on 6,087,000 acres. This is a 3,397,000 acre increase in areas closed to nonenergy solid leasable exploration and development and a 3,397,000 acre decrease in areas open to nonenergy solid leasable exploration and development compared to Alternative A.

On BLM-administered lands, 6,531,000 acres would be closed to fluid mineral leasing, of which 6,125,000 acres are located on PPMA or PGMA. 6,087,000 acres would be managed as open to fluid mineral leasing, of which 4,085,000 are located on PGMA. Of the acres open to fluid mineral leasing, 600,700 would be subjected to NSO stipulations, and 1,830,000 acres would be subjected to CSU stipulations. This is a 3,397,000 acre increase in acres closed to fluid mineral leasing over Alternative A, and a 3,397,000 decrease in acres open to fluid mineral leasing.

### 4.16.6 Alternative C

***Impacts from Livestock Grazing/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 completely remove the potential for improper livestock grazing and the associated impacts on soil resources, including vegetation clearing, and soil trampling or compaction.

***Impacts from Travel Management***

Under Alternative C, 1,203,000 acres (9 percent of the planning area) would be managed as open to cross-country motorized travel, 300,300 acres (3 percent) would be managed as closed to cross-country motorized travel, and 10,937,000 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 managed 5,609,000 less acres as open to travel management than Alternative A, and 5,612,000 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 soil resources from the potential effects of cross country motorized travel than Alternative A and B.

***Impacts from Lands and Realty Management***

Alternative C would manage 10,682,000 acres as ROW exclusion areas (85 percent of the planning area), 293,000 acres (2 percent) as ROW avoidance

areas, and 1,643,000 acres (13 percent) as open to ROW authorizations. This includes managing 4,547,000 acres of PPMA and 5,669,000 acres of PGMA as ROW exclusion areas. Compared to Alternative A, 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.

Alternative C would increase the acreage managed as ROW exclusion areas by 9,825,000 acres (78 percent), but would decrease the acreage managed as ROW avoidance areas by 3,153,000 acres (25 percent), and would decrease the acreage open to ROW authorizations by 6,671,000 acres (52 percent) compared to 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***

Availability for locatable mineral entry would be withdrawn on 997,000 acres of BLM-administered lands and would be open for mineral exploration or development on 2,229,000 acres. An additional 9,392,000 acres 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. This is the same acreage of current withdrawal from locatable mineral entry as Alternative A, and a decrease of acreage open to locatable mineral entry by 9,372,000 acres. Alternative C would prevent the most potential soil impacts from locatable mineral management of all the alternatives.

Mineral material disposal would be managed as closed to mineral material disposal on 10,726,000 BLM-administered acres, and open for mineral material disposal consideration on 1,891,843 acres. This is a 7,973,000 acre increase in areas closed to mineral material disposal over Alternative A, and a 7,134,000 acre decrease in lands available for mineral material disposal consideration. Alternative C would prevent the most potential soil impacts from mineral material disposal of all the alternatives.

Nonenergy solid leasables would be managed as closed to mineral exploration and development on 10,616,000 BLM-administered acres, and open to mineral entry exploration and development on 2,002,000 acres. This is a 7,482,000 acre increase in areas closed to nonenergy solid leasable exploration and development and a 7,482,000 acre decrease in areas open to nonenergy solid

leasable exploration and development. Alternative C would prevent the most potential soil impacts from nonenergy solid leasables of all the alternatives.

On BLM-administered lands, 10,616,000 acres would be closed to fluid mineral leasing, of which 10,210,000 acres are located on PPMA or PGMA. 2,002,000 acres would be managed as open to fluid mineral leasing. No acres within PPMA and PGMA would be open to fluid mineral leasing. Of the acres open to fluid mineral leasing, 195,000 would be subjected to NSO stipulations, and 631,000 acres would be subjected to CSU stipulations. This is a 7,482,000 acre increase in acres closed to fluid mineral leasing over Alternative A, and a 7,481,000 acre decrease in acres open to fluid mineral leasing. Alternative C would prevent the most potential soil impacts from fluid mineral leasing of all the alternatives.

Alternative C has the most acres closed to, and is the most restrictive of mineral development of all the alternatives. As such, due to the amount of acreage closed, Alternative C would provide the most protection for soil resources from disturbance from mineral exploration and development.

### 4.16.7 Alternative D

***Impacts from Livestock Grazing/Range Management***

Under Alternative D, 12,022,000 acres or 95 percent of the planning area would be managed as open to livestock grazing and 445,000 acres or 4 percent of the planning area would be managed as closed to livestock grazing. Of the acres open to livestock grazing, 4,418,000 acres are located within PPMA and 5,480,000 acres are located within PGMA. This is a 22,000 acre reduction in acres open to livestock grazing within PGMA, and a 75,000 acre reduction in acres open to livestock grazing within PPMA in comparison with Alternative A. 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 PGMA and PPMA and an additional closure of 99,000 acres of non-habitat lands to livestock grazing.

***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 2,670,000 less acres as open to travel management than Alternative A, and 2,671,000 more acres as 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, which 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 857,600 acres as ROW avoidance areas and 5,965,000 acres as ROW exclusion areas. This includes managing 257,000 acres of PPMA and 288,000 acres of PGMA as ROW exclusion areas and managing 4,290,000 acres of PPMA and 1,672,000 acres of PGMA as ROW avoidance areas. ROW exclusion areas under Alternative D would be the same as Alternative A, and ROW avoidance areas would increase by 2,519,000 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 soil resources.

***Impacts from Mineral and Energy Development***

Under Alternative D, mineral and energy development management would be similar to that described under Alternative A.

Acres withdrawn from, open to, and will be recommended for withdrawal from locatable mineral entry under Alternative B are the same as under Alternative A, therefore potential effects on soil resources from locatable mineral entry would be the same.

Mineral material disposal management under Alternative D would be the same as Alternative B. Alternative D and B would manage 6,373,000 acres as closed to mineral material disposal, and 6,245,000 acres as open for mineral material disposal consideration. This is a 3,620,000 acre increase in areas closed to mineral material disposal over Alternative A, and a 2,781,000 acre decrease in lands available for mineral material disposal consideration.

Nonenergy solid leasable mineral management is the same under Alternative B as Alternative A. Therefore, the potential effects on soil resources from locatable mineral entry would be the same.

Acres open and closed to fluid mineral leasing under Alternative D would be the same as under Alternative A. Acres open to fluid mineral leasing, but subject to NSO or CSU increase under Alternative D. Under Alternative D, 3,463,000 acres open to fluid mineral leasing would be managed as NSO, which is a 2,557,000 acre increase over Alternative A. Alternative D would also manage 2,990,000 acres open to fluid mineral leasing as CSU, which is a 287,000 acre increase over Alternative A.

Due to increased acres closed and decreased acres open for mineral material disposal consideration, and due to more acreage open to fluid mineral leasing subject to NSO and CSU, Alternative D would provide for more protection

from the potential effects to soil resources from mineral development than Alternative A.

### 4.16.8 Alternative E

***Impacts from Livestock Grazing/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 would manage PPH. Alternative E would manage 3,824,000 acres as open to livestock grazing, which is a 1,678,000 acre reduction in lands open to livestock grazing in Low Density habitat compared to Alternative A, which would manage 5,502,000 acres as open to livestock grazing within PGH. Effects of livestock grazing on soil resources under Alternative E would be the similar to those expected under Alternative A, with potential impacts reduced in Low Density habitat due to greater closure to livestock grazing.

***Impacts from Travel Management***

Alternative E would manage 3,914,000 acres (31 percent of the planning area) as open to cross-country motorized travel, 275,000 acres (2 percent) as closed to cross-country motorized travel, and 6,044,000 acres (48 percent) as limited to existing road and trails. This would be a 2,898,000 acre or 23 percent reduction in acres open to cross-country travel, a 25,400 acre or 0.2 reduction in acres closed to cross-county travel, and a 718,000 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 soil resources than Alternative A, due to less acreage open and available for soil compaction 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 soil resources from overland travel during this time.

***Impacts from Lands and Realty Management***

Under Alternative E, 4,547,000 acres of Core Area habitat would be managed as ROW exclusion areas and 1,336,000 acres of Core Area habitat would be managed as ROW avoidance areas. In addition, 157,000 acres of Low Density habitat would be managed as ROW exclusion areas and 1,384,000 acres of Low Density habitat would be managed as ROW avoidance areas. Alternative E would manage more acres as ROW exclusion areas than Alternatives A, B, and D, and would manage more acres as ROW exclusion areas than Alternatives C and F, and less than Alternatives B and D.

***Impacts from Energy and Mineral Development***

Acres withdrawn from and open to locatable mineral entry under Alternative E are the same as under Alternative A. Under Alternative E, 4,292,000 acres open

to locatable mineral entry would be recommended for withdrawal, which would reduce the potential for impacts on soil resources from locatable mineral exploration and development once the withdrawals are complete. Alternative E would provide more protection to soil resources than Alternative A.

Under Alternative E mineral material disposal would be managed as closed to mineral material disposal on 6,373,000 BLM-administered acres, and open for mineral material disposal consideration on 6,245,000 acres, which is the same as Alternative B. This is a 3,620,000 acre increase in areas closed to mineral material disposal over Alternative A, and a 2,781,000 acre decrease in lands available for mineral material disposal consideration, compared to Alternative A.

Nonenergy solid leasables would be managed as closed to mineral exploration and development on 6,531,000 BLM-administered acres, and open to mineral entry exploration and development on 6,087,000 acres, which is the same as Alternative B. This is a 3,397,000 acre increase in areas closed to nonenergy solid leasable exploration and development and a 3,397,000 acre decrease in areas open to nonenergy solid leasable exploration and development compared to Alternative A.

Under Alternative E, on BLM-administered lands, 6,531,000 acres would be closed to fluid mineral leasing, of which 5,810,00 acres are located on Core Area or Low Density habitat. 6,087,000 acres would be managed as open to fluid mineral leasing, of which 4,085,000 are located within Low Density habitat. Of the acres open to fluid mineral leasing, 600,700 would be subjected to NSO stipulations, and 1,830,000 acres would be subjected to CSU stipulations. This is a 3,397,000 acre increase in acres closed to fluid mineral leasing over Alternative A, and a 3,397,000 decrease in acres open to fluid mineral leasing.

Alternative E would have a greater number of acres closed to mineral material disposal consideration, nonenergy solid leasable mineral entry, and areas available for fluid mineral leasing. The greater amount of acreage closed to mineral entry under Alternative E equates to a smaller amount of acreage open and available for potential impacts on soil resources from mineral exploration and development. Alternative E would be more protective of soil resources from vegetation clearing, soil compaction, and soil excavation than Alternative A.

### 4.16.9 Alternative F

***Impacts from Livestock Grazing/Range Management***

Under Alternative F 7,496,000 acres, or 59 percent, of the planning area would be managed as open to livestock grazing; 2,499,000 acres, or 20 percent, of the planning area would be managed as closed to livestock grazing. Alternative F would result in a 4,627,000 acreage reduction, or a 37 percent decrease in lands open to grazing over Alternative A. Alternative F would also result in a 2,153,000 acre or 17 percent increase in lands managed as closed to livestock grazing. Of

the acres closed to livestock grazing, 1,123,000 acres are located in PPMA and 1,375,000 acres are located in PGMA. Alternative F is the second most restrictive alternative for livestock grazing, behind Alternative C, and would therefore be the second most protective of soil resources from potential effects of improper livestock grazing.

***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 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 4.16.2**.

Alternative F would manage the same amount of acreage as closed to cross-county motorized travel as Alternative A, 2,670,000 less acres as open to travel management than Alternative A, and 2,671,000 more acres as 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, which 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 F would have the same potential for impacts on soil resources as Alternative C, and manage the same acreage as ROW exclusion (10,682,000 acres) and ROW avoidance (293,000 acres) areas. Alternative F would increase the acreage managed as ROW exclusion areas by 9,825,000 acres (78 percent), but would decrease the acreage managed as ROW avoidance areas by 3,153,000 acres (25 percent), and would decrease the acreage open to ROW authorizations by 6,671,000 acres (52 percent) compared to Alternative A. Of the acres managed as ROW exclusion areas, 4,547,000 acres are located within PPMA and 5,669,000 are located in PGMA.

***Impacts from Energy and Mineral Development***

Acres withdrawn from and open to locatable mineral entry under Alternative F are the same as under Alternative B. Alternative F and B would have the 997,000 number of acreage withdrawn from locatable mineral entry, which is the same as Alternative A. Alternative F would increase the number of acres recommended for withdrawal from locatable mineral entry from 21,000 acres under Alternative A to 4,292,000 acres, which would protect soil resources from potential effects of mineral resources in these areas once the petition is complete. Under Alternative F, 7,321,000 acres would be opened to locatable mineral exploration, which is a 4,280,000 acre reduction in acres open to locatable mineral exploration compared with Alternative A. Due to less acres open for mineral entry, and more acres recommended for withdrawal,

Alternative F would provide more protection to soil resources from locatable mineral activity than Alternative A.

Under Alternative F, mineral material disposal would be managed as closed to mineral material disposal on 6,373,000 BLM-administered acres, and open for mineral material disposal consideration on 6,245,000 acres, which is the same as Alternative B and E. This is a 3,620,000 acre increase in areas closed to mineral material disposal over Alternative A, and a 2,781,000 acre decrease in lands available for mineral material disposal consideration, compared to Alternative A.

Nonenergy solid leasables would be managed as closed to mineral exploration and development on 6,531,000 BLM-administered acres, and open to mineral entry exploration and development on 6,087,000 acres, which is the same as Alternative B and E. This is a 3,397,000 acre increase in areas closed to nonenergy solid leasable exploration and development and a 3,397,000 acre decrease in areas open to nonenergy solid leasable exploration and development compared to Alternative A.

Under Alternative F, on BLM-administered lands, 10,615,593 acres would be closed to fluid mineral leasing, of which 10,210,000 acres are located within PPMA or PGMA. 2,002,000 acres would be managed as open to fluid mineral leasing, of which 0 are located within PPMA or PGMA. Of the acres open to fluid mineral leasing, 195,000 would be subjected to NSO stipulations, and 631,000 acres would be subjected to CSU stipulations. This is a 7,482,000 acre increase in acres closed to fluid mineral leasing over Alternative A, and a 7,482,000 decrease in acres open to fluid mineral leasing.

Alternative F would have a greater number of acres recommended for withdrawal from locatable mineral entry, and a greater number of acres closed to mineral material disposal consideration, nonenergy solid leasable mineral entry, and areas available for fluid mineral leasing. The greater amount of acreage closed to mineral entry under Alternative F equates to a smaller amount of acreage open and available for potential impacts on soil resources from mineral exploration and development. Alternative F would be more protective of soil resources from vegetation clearing, soil compaction, and soil excavation than Alternative A.

## 4.17 WATER RESOURCES

### 4.17.1 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 at which these resources are not properly functioning or sustainable
- Restore water sources for GRSG
- Alter water resources for mosquito-breeding habitat
- Alter the condition of riparian and wetland vegetation

***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 authorizing 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.

### 4.17.2 Nature and Type of Effects

Surface water quality is influenced by both natural and human factors. Aside from the natural factors of weather-related erosion of soils into waterways, surface water quality can be temporarily affected by the additional transport of eroded soils into streams due to improperly managed recreational activities or livestock grazing, introduction of waste matter into streams from domestic livestock, and 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 leaks, accidents, and 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).

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 active 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 to reduce the likelihood of chemical spills onto the ground, which can then sink into the earth and contaminate groundwater. Areas where ROWs are authorized are permitted with COAs which include 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 and wild horses often use riparian and wetland areas for water and shade and may congregate around water developments which results in compacted soil, decreased water quality due to fecal coliforms, trampled nearby vegetation, and can reduce riparian community conditions and hydrologic functionality. At unsustainable levels, grazing from livestock or wild horses can lead to loss of vegetative cover, reduced water infiltration rates and nutrient cycling, decreased plant litter and water quality, and 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. Drought management is also available during drought years to respond to specific environmental needs during drought, including maintaining the water quality of lower water levels in ponds, lakes, and streams, and assessing for appropriate recommendations concerning 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 also often provide drinking water sources for GRSG. GRSG will use free water, but they do not require is since 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 is unknown (USFWS 2010a). Range improvements that increase drinking water sources can also increase competition from other species, add new water sources for mosquitoes carrying West Nile virus, and attract predators and subsequently increase predation risks to GRSG. Management actions could also change the availability of water sources to serve as mosquito breeding habitat. This could in turn change the risk of West Nile virus transmission to GRSG.

Travel across land by any means 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 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 have a greater chance of resulting in some of the detrimental effects than lower impact, lower number recreation areas.

Potential impacts from locatable mineral, mineral material, nonenergy leasable, and fluid leasable mineral activity often result from violation of mineral regulations and 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 hydrographs 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 – Greater Sage-Grouse
- Coal
- Recreation management
- Special designations
- Air quality and climate change
- Special status plants

### 4.17.3 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 may temporarily decrease water quality through increased sedimentation into water ways from undesirable vegetation clearing or burning. Long term effects of vegetation management would in protect water quality by reducing runoff and sedimentation into surface waters through stabilizing soils with vegetation.

Vegetation management would also aim to reduce and prevent the spread of invasive species under all alternatives. Displacement of native plants by invasive species results in changes in the soil properties such as soil water distribution, which 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. Quick growing weeds like cheatgrass and medusa head 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 heavily infested with cheatgrass have a rapid fire regime when compared to areas composed of native vegetation. Increased fire patterns may result in frequent short term decreases in water quality due to increase

particulate loads, and increased streamflow and average stormflow discharge as a result of lower vegetation density and reduction in litter cover.

***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 would be limited. The differences in potential management effects to 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 to 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 impact.

***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 to 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 impact.

***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.

***Wild Horses and Burros***

Under all alternatives unsustainable levels of wild horse and burro management can result in impacts on riparian and wetland areas used for water and shade, which can reduce riparian community conditions and hydrologic functionality. Horses and burros may also congregate around water developments which results in compacted soil, decreased water quality due to fecal coliforms, and trampled nearby vegetation. Appropriate management levels 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***

Effects of fire on water resources are determined largely by the severity of the fire, decisions made relative to any suppression activities, and the immediate post-fire precipitation regime. Effects of fire on water resources can occur under all alternatives and can include short term decrease in water quality due to increase particulate loads, and increased streamflow and average stormflow discharge as a result of lower vegetation density and reduction in litter cover (Forest Service 2005).

### 4.17.4 Alternative A

***Impacts from Livestock Grazing/Range Management***

Under Alternative A, 12,122,000 acres, or 96 percent of the planning area is open to livestock grazing; 346,000 acres or 3 percent of the planning area is closed to livestock grazing. Of the acres open to livestock grazing 4,492,000 acres are within PPH and 5,502,000 acres 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 3.7**, Livestock Grazing/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.

Alternative A, B, and E have the most acreage that would be managed as open to livestock grazing. This would subject the most acreage of water resources to the possible impacts of livestock grazing as outline in **Section 4.16.2**, including compacted soil, decreased water quality due to fecal coliforms, trampled nearby vegetation, and reduce riparian community conditions and hydrologic functionality.

***Impacts from Travel Management***

Alternative A would manage 6,812,000 acres (54 percent) of the planning area as open to cross-country motorized travel, 300,300 acres (2 percent) of the planning area as closed to cross-country motorized travel, and 5,325,000 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. Potential effects of travel management on water resources include point

source temporary degradation from stream crossing and increased soil deposition into waterways.

***Impacts from Lands and Realty Management***

Under Alternative A, 857,600 acres (7 percent of the planning area) would continue to be managed as ROW exclusion areas, and 3,446,000 acres (27 percent) would continue to be managed as ROW avoidance areas. Alternative A would manage 8,314,000 acres (66 percent) of the planning area as open to potential ROW authorizations. Of the acres managed as ROW exclusion areas, 257,200 acres are located within PPH and 288,200 acres are located within PGH. Of the acres managed as ROW avoidance areas, 1,336,000 acres are located within PPH and 1,672,000 acres are managed within PGH.

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. The BLM would analyze impacts from individual ROW authorizations upon receipt of applications and as part of subsequent implementation-level environmental analyses.

### 4.17.5 Alternative B

***Impacts from Livestock Grazing/Range Management***

Under Alternative B, management actions would not result in direct changes to the amount of acres open or closed to livestock grazing. Potential effects on water resources from livestock grazing would remain the same as those under Alternative A.

Alternative B would provide for range improvements including developing new water diversions from springs and seeps only if the water developments would benefit PPMA and improve GRSG habitat.

***Impacts from Travel Management***

Under Alternative B, 4,142,000 acres (33 percent of the planning area) would be managed as open to unrestricted cross-country motorized travel, 300,300 acres (2 percent) would be managed as closed to cross-country motorized travel, and 7,996,000 acres (63 percent) would be limited to existing roads and trails. Additionally, route construction would be limited to realigning existing routes, new roads would be built to the absolute minimum standard necessary, and roads and trails not designated in travel management plans would be restored using appropriate seed mixes. Restoration of roads would benefit water

resources by reducing total overall acres of cleared vegetation and increased soil erosion affected by travel management through replacing vegetation communities, stabilizing soils and reducing the potential for increased run off through wind and water erosion.

Alternative B would managed the same amount of acreage as closed to cross-county motorized travel as Alternative A, would managed 2,670,000 less acres as open to travel management than Alternative A, and 2,671,000 more acres as 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, which would be more protective of water resources from the potential effects of cross country motorized travel than Alternative A.

***Impacts from Lands and Realty Management***

Alternative B would manage 4,866,000 acres (39 percent of the planning area) as ROW exclusion areas, 6,107,000 acres (48 percent) as ROW avoidance areas, and 1,645,000 acres (13 percent) as open to ROW authorizations. PGMA would be managed as a ROW avoidance area on 5,663,000 acres and PPMA would be managed as a ROW exclusion area on 4,547,000 acres. Compared to 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 4,008,000 acres or 32 percent, would increase the acreage managed as ROW avoidance areas by 2,661,000 acres or 21 percent, and would decrease the acreage open to ROW authorizations by 6,669,000 acres, or 53 percent compared to 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, 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. 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 potential for soil erosion and runoff into water ways.

### 4.17.6 Alternative C

***Impacts from Livestock Grazing/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 completely remove the

potential for improper livestock grazing and the associated impacts on water resources.; Alternative C would also reduce the amount of water resources available to GRSG due to active restoration and removal of water developments for livestock, which may also reduce the amount of mosquito habitat and the potential for West Nile virus transfer.

***Impacts from Travel Management***

Under Alternative C, 1,203,000 acres (9 percent of the planning area) would be managed as open to cross-country motorized travel, 300,300 acres (3 percent) would be managed as closed to cross-country motorized travel, and 10,937,000 acres (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, 5,609,000 less acres as open to travel management than Alternative A, and 5,612,000 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 B.

***Impacts from Lands and Realty Management***

Alternative C would manage 10,682,000 acres as ROW exclusion areas (85 percent of the planning area), 293,000 acres (2 percent) as ROW avoidance areas, and 1,643,000 acres (13 percent) as open to ROW authorizations. This includes managing 4,547,000 acres of PPMA and 5,669,000 acres of PGMA as ROW exclusion areas. Compared to Alternative A, 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.

Alternative C would increase the acreage managed as ROW exclusion areas by 9,825,000 acres (78 percent), but would decrease the acreage managed as ROW avoidance areas by 3,153,000 acres (25 percent), and would decrease the acreage open to ROW authorizations by 6,671,000 acres (52 percent) compared to 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. The BLM would analyze impacts from individual ROW authorizations upon receipt of applications and as part of subsequent implementation-level environmental analyses.

### 4.17.7 Alternative D

***Impacts from Livestock Grazing/Range Management***

Under Alternative D, 12,022,000 acres or 95 percent of the planning area would be managed as open to livestock grazing and 445,000 acres or 4 percent of the planning area would be managed as closed to livestock grazing. Of the acres open to livestock grazing, 4,418,000 acres are located within PPMA and 5,480,000 acres are located within PGMA. This is a 22,000 acre reduction in acres open to livestock grazing within PGMA, and a 75,000 acre reduction in acres open to livestock grazing within PPMA in comparison with Alternative A. Alternative D would be slightly more protective of water resources from the potential effects of livestock grazing than Alterative A due to the reduction of acres open to livestock grazing in PGMA and PPMA and an additional closure of 99,000 acres of non-habitat lands to livestock grazing. Under Alternative D, new and existing range improvements would be authorized to enhance the functionality of seeps and springs for wildlife within PPMA and PGMA. 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.

Alternative D would manage the same amount of acreage as closed to cross-county motorized travel as Alternative A, 2,670,000 less acres as open to travel management than Alternative A, and 2,671,000 more acres as 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, which would be more protective of water resources from the potential effects of cross country motorized travel than Alternative A.

***Impacts from Lands and Realty Management***

Alternative D would manage 857,600 acres as ROW avoidance areas and 5,965,000 acres as ROW exclusion areas. ROW exclusion areas under Alternative D would be the same as Alternative A, and ROW avoidance areas would increase by 2,519,000 acres. This includes managing 257,000 acres of PPMA and 288,000 acres of PGMA as ROW exclusion areas and managing 4,290,000 acres of PPMA and 1,672,000 acres of PGMA as ROW avoidance areas. 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.

### 4.17.8 Alternative E

***Impacts from Livestock Grazing/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 would manage PPH. Alternative E would manage 3,824,000 acres as open to livestock grazing, which is a 1,678,000 acre reduction in lands open to livestock grazing in Low Density habitat compared to Alternative A, which would manage 5,502,000 acres as open to livestock grazing within PGH. Effects of livestock grazing on water resources under Alternative E would be the similar to those expected under Alternative A, with potential impacts reduced in Low Density habitat due to greater closure to 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 3,914,000 acres (31 percent of the planning area) as open to cross-country motorized travel, 275,000 acres (2 percent) as closed to cross-country motorized travel, and 6,044,000 acres (48 percent) as limited to existing road and trails. This would be a 2,898,000 acre or 23 percent reduction in acres open to cross-country travel, a 25,400 acre or 0.2 reduction in acres closed to cross-county travel, and a 718,000 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 compaction 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 time.

***Impacts from Lands and Realty Management***

Under Alternative E, 4,547,000 acres of Core Area habitat would be managed as ROW exclusion areas and 1,336,000 acres of Core Area habitat would be managed as ROW avoidance areas. In addition, 157,000 acres of Low Density habitat would be managed as ROW exclusion areas and 1,384,000 acres of Low Density habitat would be managed as ROW avoidance areas. Alternative E would manage more acres as ROW exclusion areas than Alternatives A, B, and D, and would manage more acres as ROW exclusion areas than Alternatives C and F, and less than Alternatives B and D.

### 4.17.9 Alternative F

***Impacts from Livestock Grazing/Range Management***

Under Alternative F 7,496,000 acres, or 59 percent, of the planning area would be managed as open to livestock grazing; 2,499,000 acres, or 20 percent, of the planning area would be managed as closed to livestock grazing. Alternative F would result in a 4,627,000 acreage reduction, or a 37 percent decrease in lands open to grazing over Alternative A. Alternative F would also result in a 2,153,000 acre or 17 percent increase in lands managed as closed to livestock grazing. Of the acres closed to livestock grazing, 1,123,000 acres are located in PPMA and 1,375,000 acres are located in PGMA. 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 improper 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 alter stream channels that can cause bank erosion. However, it would also prevent the addition of GRSG drinking sources within their habitat.

***Impacts from Travel Management***

Alternative F would manage the same amount 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 4.17.2**.

Alternative F would manage the same amount of acreage as closed to cross-county motorized travel as Alternative A, 2,670,000 less acres as open to travel management than Alternative A, and 2,671,000 more acres as 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, which would be more protective of water resources from the potential effects of cross country motorized travel than Alternative A.

***Impacts from Lands and Realty Management***

Alternative F would have the same potential for impacts on water resources as Alternative C, and manage the same acreage as ROW exclusion (10,682,000 acres) and ROW avoidance (293,000 acres) areas. Alternative F would increase the acreage managed as ROW exclusion areas by 9,825,000 acres (78 percent), but would decrease the acreage managed as ROW avoidance areas by 3,153,000 acres (25 percent), and would decrease the acreage open to ROW authorizations by 6,671,000 acres (52 percent) compared to Alternative A. Of the acres managed as ROW exclusion areas, 4,547,000 acres are located within PPMA and 5,669,000 are located in PGMA.

## 4.18 LANDS WITH WILDERNESS CHARACTERISTICS

### 4.18.1 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 roadless 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 could provide additional protections of wilderness characteristics and, at a minimum, would provide complementary management.

### 4.18.2 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 lands with 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 protect opportunities for unconfined recreation.

Allowing travel on existing routes could reduce opportunities for solitude by increasing sights and sounds of other people. 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 protect those characteristics by restricting activities that could impact natural appearance and opportunities for solitude and primitive and unconfined recreation. On a more regular basis,

motorized and mechanized use 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.

Managing for wildland fire could impact lands with wilderness characteristics. In areas where suppression is a priority, vegetation modification could prevent the spread of fires, potentially reducing the naturalness of appearance. Fire suppression, prescribed burns, and fire breaks could all have short-term impacts on wilderness characteristics by disturbing naturalness.

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 lands with wilderness characteristics are possible from livestock grazing, particularly from new developments in these areas (e.g., water developments and fences). This could lessen the naturalness of appearance or could limit unconfined recreation. Existing range improvements used for livestock grazing, such as fences, stock trails, springs, and stock ponds, would continue to be maintained. Structures, as well as livestock grazing itself, could diminish the naturalness characteristic of lands with wilderness characteristics. Maintaining range improvements could result in short-term impacts on solitude and naturalness. Where PPMA and PGMA were closed to livestock grazing, lands with wilderness characteristics that overlapped with PPMA and PGMA would experience protection from these impacts.

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 lands with wilderness characteristics for all alternatives; therefore, they are not discussed in detail:

- Special status species—Greater Sage-Grouse
- Wild horses and burros
- Wildland fire management
- Air quality and climate change
- Special status plants

### 4.18.3 Impacts Common to All Alternatives

All of the action alternatives (B through F) 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 lands with wilderness characteristics, and wilderness characteristics in those areas could be maintained. Lands with wilderness characteristics would likely experience either increased protection or no impacts from GRSG management and restrictions. Impacts would vary in degree across alternatives.

### 4.18.4 Alternative A

Under Alternative A, 192,100 acres of PPMA and PGMA are closed to off-road use under. Alternative A would also limit travel to existing routes on 4,405,800 acres of PPMA and PGMA, 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, 2,728,200 acres of PPMA and PGMA 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 has the fewest acres closed to oil and gas leasing on BLM-administered lands and consequently offers the least protection of lands with wilderness characteristics.

There would be more acres of PPMA and PGMA open to livestock grazing (9,994,300 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*. Additionally, Alternatives A and D would have fewer acres of ROW exclusion areas (545,300 acres) in PPMA and PGMA 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 4.18.2**, Nature and Types of Effects.

### 4.18.5 Alternative B

The number of PPMA and PGMA acres closed to off-road use would be the same as under Alternative A, and impacts would be the same as Alternative A. Alternative B would also limit travel to existing routes on 7,075,400 acres of PPMA and PGMA, 61 percent more areas 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 more of the impacts from such use as discussed in *Nature and Type of Effects*.

Under Alternative B, 6,125,000 acres of PPMA and PGMA are closed to fluid mineral leasing, 125 percent more acres than under Alternative A and the most of the action alternatives. 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.

More than 8 times more acres of PPMA and PGMA would be ROW exclusion areas under Alternative B (4,547,000 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*.

### 4.18.6 Alternative C

The number of PPMA and PGMA acres closed to off-road use is the same as under Alternative A; impacts would be the same as Alternative A. Alternative C would also limit travel to existing routes on 10,017,600 acres of PPMA and PGMA, more than double the acres of Alternative A and the most of any of the alternatives. 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 more of the impacts from such use as discussed in *Nature and Type of Effects*.

Under Alternative C, 10,209,700 acres of PPMA and PGMA would be closed to fluid mineral leasing, almost three times more acres than Alternative A and the most of all the alternatives. 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 reduce naturalness. The effects of closing acres to livestock grazing on lands with wilderness characteristics are described in *Nature and Type of Effects*.

The same amount of PPMA would be ROW exclusion areas under Alternative C as under Alternative B. In addition, 5,669,400 acres of PGMA would be ROW exclusion areas. Management under Alternative C would have greatest potential to maintain wilderness characteristics on lands with wilderness characteristics. Such allowable uses as livestock grazing and ROWs for corridors and towers would be prohibited in occupied GRSG habitat. These types of 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 4.18.2**, Nature and Type of Effects. Precluding these types of activities would help protect wilderness characteristics. In addition, all PPMA would be designated as a new ACEC, which would likely provide incidental protection of the 697,900 acres of PPMA within lands with wilderness characteristics.

### 4.18.7 Alternative D

The number of PPMA and PGMA 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 PPMA and PGMA acres limited to existing routes would be the same as under Alternative B; impacts would be the same as Alternative B.

The number of PPMA and PGMA acres closed to fluid mineral leasing would be the same as under Alternative A, and impacts would be the same as Alternative A.

There would be slightly fewer acres of PPMA and PGMA open to livestock grazing (9,987,700 acres) under Alternative D than under Alternative A. Effects on lands with wilderness characteristics that overlap livestock grazing open areas would be similar to those described under Alternative A. There would be three times more acres of PPMA and 15 percent more acres of PGMA closed to livestock grazing under Alternative D than under Alternative A, resulting in more indirect protection of lands with wilderness characteristics on these closed lands. The effects of closing acres to livestock grazing on lands with wilderness characteristics are described in *Nature and Type of Effects*.

Alternative D has the same amount of ROW exclusion areas (545,300 acres) in PPMA and PGMA as Alternative A. Therefore, impacts on lands with wilderness characteristics would be the same as those described under Alternative A.

Juniper treatments under Alternatives D and E could temporarily impact lands with wilderness characteristics; however, this could enhance wilderness characteristics in the long term, as discussed in *Nature and Type of Effects*.

### 4.18.8 Alternative E

There would be 119,000 acres of PPMA and PGMA closed to off-road use under Alternative E, 51 percent fewer acres than under Alternative A and the fewest acres of any of the alternatives. Alternative E would limit travel to existing routes on 6,209,000 acres of PPMA and PGMA, 41 percent more acres

than under Alternative A and the fewest acres of any of the actions alternatives. Lands with wilderness characteristics that overlap these areas would experience the least 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, 5,810,100 acres of PPMA and PGMA would be closed to fluid mineral leasing, 113 percent more acres than Alternative A but the least of the action alternatives. Types of effects are discussed in *Nature and Type of Effects*.

There would be the same number of acres of PPMA and 30 percent fewer acres of PGMA open to livestock grazing under Alternative E as under Alternative A. There would be the same acres of PPMA and 38 percent fewer acres of PGMA 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 of lands with wilderness characteristics.

The same amount of PPMA would be ROW exclusion areas under Alternative E as under Alternative B. In addition, 156,500 acres of PGMA would be ROW exclusion areas. Impacts on lands with 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.

### 4.18.9 Alternative F

The number of PPMA and PGMA 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 PPMA and PGMA acres limited to existing routes would be the same as under Alternative B, and impacts would be the same as Alternative B.

The number of PPMA and PGMA 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 31 times more acres of PPMA and over 9 times more acres of PGMA closed to livestock grazing under Alternative F than under Alternative A. This is the second-largest number of acres closed to livestock grazing of all the action alternatives and would result in more incidental protections of lands with wilderness characteristics than all the other alternatives except Alternative C because lands with 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 4.18.2**, Nature and Type of Effects.

The same number of acres of PPMA and PGMA would be ROW exclusion areas under Alternative F as under Alternative C, so impacts on lands with 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 1,241,600 additional acres of PGMA and 2,560,400 additional acres of PPMA. The protections and restrictions on uses within these new ACECs could provide indirect protections of lands with wilderness characteristics where they overlap with the new ACECs, and wilderness characteristics in those areas could be maintained.

## 4.19 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 3.18**, 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. The section is divided in three parts, addressing economic, social, and environmental justice impacts separately. Even though they are interrelated, this analytical separation facilitates discussion of impacts. Rather than discussing all impacts under each alternative, impacts are discussed by type of economic activity or social impact. This facilitates comparison of alternatives.

### 4.19.1 Methods and Assumptions

***Indicators***

Conservation measures related to sage-grouse 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***

The IMPLAN model, which captures the indirect and induced economic effects of management alternatives in the study area, was used to estimate impacts on outcomes, employment, and earnings in the study area. This 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.

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.

### 4.19.2 Nature and Types 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

### 4.19.3 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 3.18**, 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 3-68** 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. 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.[1] The high impact scenario represents the case where ranchers maintain a constant billed to active AUM ratio and where they reduce billed AUMs in proportion to the reduction in active AUMs. Further details are provided in **Appendix K**, Economic Impact Analysis Methodology. **Table 4-50**, Annual Impact of Management Actions Affecting Livestock AUMs on Output, Employment, and Earnings, Compared to 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.

*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, there would be some increase in restrictions on the ability of livestock operators to improve infrastructure or treat vegetation. These restrictions could increase livestock operators' costs or lead to other adverse economic impacts.

*Alternative C*

There would be a reduction in economic impact of grazing due to the closure of all allotments in PPMA and PGMA. The BLM estimates this loss of AUMs to correspond to approximately $68 million annually in output, $24 million

[1] The low impact scenario does not allow for reallocation of livestock to AUMs outside of GRSG habitat.

**Table 4-50**
**Annual Impact of Management Actions Affecting Livestock AUMs on Output, Employment, and Earnings, Compared to Alternative A**

| | Alternatives B and E[1] | | Alternative C | | Alternative D | | Alternative F | |
|---|---|---|---|---|---|---|---|---|
| | Low | High | Low | High | Low | High | Low | High |
| **Primary Study Area** | | | | | | | | |
| Output | See notes | See notes | -$67.5 | -$67.5 | $0 | -$0.8 | -$33.8 | -$42.4 |
| Employment | See notes | See notes | -746 | -746 | 0 | -9 | -373 | -466 |
| Earnings | See notes | See notes | -$23.5 | -$23.5 | $0 | -$0.3 | -$11.8 | -$14.7 |
| **Primary and Secondary Study Area** | | | | | | | | |
| Output | See notes | See notes | -$68.7 | -$68.7 | $0 | -$0.8 | -$34.3 | -$42.9 |
| Employment | See notes | See notes | -760 | -760 | 0 | -9 | -380 | -475 |
| Earnings | See notes | See notes | -$23.9 | -$23.9 | $0 | -$0.3 | -$12.0 | -$15.0 |

Source: Calculated using the IMPLAN model, applied to active AUMs for each alternative (BLM 2013b), as explained in the text and in **Appendix K**, 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.

annually in labor earnings, and 746 in annual jobs in the primary study area. These impacts would likely fall largely on the three counties where livestock is of greater importance: Lake, Malheur, and Harney.

*Alternative D*

Under Alternative D, RNAs with at least 20 percent PPMA or 50 percent PGMA would be closed to grazing voluntarily or by termination. This would result in 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. The loss would correspond to up to an estimated $0.8 million annually in output, $0.3 million annually in labor earnings, and 9 annual jobs in the primary study area.

*Alternative F*

Under Alternative F, at least 25 percent of the area for livestock grazing in GRSG habitat is rested every year and no longer available for grazing. The BLM estimates this loss of AUMs to correspond to between $34 million and $42 million annually in output, between $12 million and $15 million annually in labor earnings, and between 373 and 466 in annual jobs in the primary study area.

*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 3.20** 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.

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 has become increasingly more important for the economy of various counties in the study area, where other economic activities have grown at a slower pace. Although management activities included in the proposed alternatives could affect recreation, for example, by restricting motorized travel, the effects are not projected to be substantial. Seasonal restrictions, for example, would often not coincide with recreation seasons, such as that for hunting. BLM recreation specialists predict the alternatives will not result in measurable impacts on recreation visitor days.

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.

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. Also, the net direction (positive or negative economic effect) is uncertain.

*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.

*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 3.18**, 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 believe 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 0.4 percent of total private employment, slightly below the national average of 0.5 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 3.18**, 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 be most impacted under Alternatives C and F, under which all GRSG habitat would be closed for exploration. Alternatives B and E would impose fewer closures than C and F (all PPMA in the case of Alternative B, Core Area habitat in the case of Alternative 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. Because no development of oil and gas are projected for the study area, no impacts of alternatives on output, employment, and earnings are expected.

The main locatable mineral produced in the study area is gold in Baker County. According to 2011 County Business Patterns data from the US Census Bureau, employment in gold in Baker County was less than 5 employees (US Census Bureau 2013). 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 and C, 96 percent of the federal mineral estate decision area would remain open for development of locatable minerals, with 4 percent petitioned for withdrawal. Petitions for withdrawal require that validity exams be conducted on mining claims when a Notice or Plan of Operation is proposed. This delays the start of mining operations and increases costs.

Alternatives B, E, and F would increase the federal mineral estate petitioned for withdrawal to approximately 24 percent of the area. To the extent that these limitations affect gold or other mining producing areas, they could hamper future mining developments. Alternative D is similar to Alternatives A and C, but it would recommend limits on surface disturbance and mitigation of impacts on GRSG habitat.

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 2011 County Business Patterns data from the US Census Bureau, approximate levels of employment in the salable minerals industry ranged from a low of fewer than five people in Lake County to a high of between 100 and 250 people in Baker County; for the seven counties, the total is between 135 and 320 (US Census Bureau 2013).

Under Alternatives A and C, approximately 21 percent of the federal mineral estate would be closed to salable minerals development. This percentage would increase to approximately 44 percent under Alternatives B, D, E, and F. 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 39 and 93 jobs under Alternatives B, D, E, and F. The impacts of Alternative B, D, E, and F would likely be larger, however, for several reasons. ROW avoidance increases in several of these alternatives could further decrease construction and derived demand for mineral materials. Because salable minerals from BLM-administered lands are typically available to local governments free of charge, these alternatives could have a cost impact on public projects in the study area.

### *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 PEIS 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 4-51**, Reasonable Foreseeable Development Scenario for Geothermal Energy on BLM-Administered Lands, below shows the projects identified in the reasonably foreseeable development scenario that are in the 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 4-51**
**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

Nonetheless, to provide some estimate of economic impact that would be associated with the development of the above projects, the BLM made reasonable assumptions based on available information[2]. Using default parameters from the National Renewable Energy Laboratory's Jobs and Economic Development Impact model (NREL 2012), the BLM estimated that three 50-megawatt plants and one 20-megawatt plant would generate 61 jobs full-time equivalent (FTE) in the operation phase. It would generate 877 temporary construction jobs. These represent direct jobs only, and do not include indirect or induced jobs in the manner of output from the IMPLAN model.

The geothermal reasonably foreseeable development scenario also 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 adjusted the employment estimates above by the proportion of acres open to geothermal leasing under each alternative. However, depending on specific locations and project parameters, the impact of management alternatives may not be proportional to the acres open for geothermal leasing and the estimates below may overestimate or underestimate the impacts.

*Alternative A*

Under Alternative A, current management, the BLM projects the 170 megawatts of geothermal energy shown in **Table 4-2** to be in place by 2025. This development would be estimated to support 61 full-time operations jobs in study area and 877 temporary jobs during the construction period.

[2] The BLM assumed the capacity estimates from the October 2008 Geothermal PEIS, 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 plants would be developed using conventional hydrothermal, binary cycle technology, with an average resource temperature of 300 degrees at a depth of 3000 feet, which is roughly consistent with the currently operating commercial energy plant at Neal Hot Springs (Clutter 2010; ODEQ 2010b).

*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 to Alternative A. If the reduction is proportional to the reduction in acres open to leasing, Alternatives B and E would imply a loss of about 21 full-time jobs during operations and about 299 temporary construction jobs, compared to 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 B and E would imply a loss of about 46 full-time jobs during operations and about 658 temporary construction jobs, compared to Alternative A.

*Alternative D*

Based on acres open to leasing, projected employment under Alternative D would be the same as under Alternative A with 61 full-time jobs during operations and 877 temporary construction jobs. However, some decrease relative to Alternative A could occur due to NSO stipulations in buffer areas around leks.

### *Impacts from Management Actions Affecting Wind Energy Development*

*Overall Employment, Earnings, and Output per Job Impacted by Management Alternatives*

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, and F. This installed capacity corresponds to two existing applications in Harney County that overlap sage-grouse habitat. Additional wind energy development could also be affected by the choice of management alternatives as described further below. **Tables 4-52**, Average Annual Impact on Wind Energy Development on Output, Employment, and Earnings by Alternative, Construction, and **4-53**, Average Annual Impact on Wind Energy Development on Output, Employment, and Earnings by Alternative, Operations, show the estimated impacts of the choice of management alternative on output, employment and earnings generated by these two projects in Harney County.

**Table 4-52**
**Average Annual Impact on Wind Energy Development on Output, Employment, and Earnings by Alternative, Construction[1,3]**

| | Alternatives B, C and F | Alternatives D and E[2] |
|---|---|---|
| ***Primary Study Area*** | | |
| Output | -$6.9 | See notes |
| Employment | -43 | See notes |
| Earnings | -$1.9 | See notes |
| ***Primary and Secondary Study Area*** | | |
| Output | -$7.1 | See notes |
| Employment | -44 | See notes |
| Earnings | -$2.0 | See notes |

Source: Calculated using the IMPLAN model as explained in the text and in Appendix K, Economic Impact Analysis Methodology.

1. Average annual impacts of construction calculated distributing impacts over a 10 year period
2. Base 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 4-53**
**Average Annual Impact on Wind Energy Development on Output, Employment, and Earnings by Alternative, Operations[1,3]**

| | Alternatives B, C and F | Alternatives D and E[2] |
|---|---|---|
| ***Primary Study Area*** | | |
| Output | -$1.4 | See notes |
| Employment | -17 | See notes |
| Earnings | -$0.8 | See notes |
| ***Primary and Secondary Study Area*** | | |
| Output | -$1.4 | See notes |
| Employment | -17 | See notes |
| Earnings | -$0.8 | See notes |

Source: Calculated using the IMPLAN model as explained in the text and in Appendix K, Economic Impact Analysis Methodology.

1. Average annual impacts of operations calculated assuming capacity installed 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

*Alternative A*

Under Alternative A, the BLM projects the 182 megawatts of installed capacity planned for Harney County would be in place by 2025. In addition, exclusion and avoidance areas would not impede additional wind energy investments in most of the planning area.

*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 loss of 60 annual jobs over a 10 year period (between construction and operations). Additional investments in wind energy could also be affected due to PPMA exclusion and PGMA 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 loss of 60 annual jobs 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 PPMA. Increased costs to investors could occur due to impacts of PPMA 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 PPMA 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.

### *Impacts from Management Actions Affecting Land 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 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.

*Alternative B*

Management actions under Alternative B to protect GRSG habitat would impact lands and realty through the closure of PGMA to new ROW authorizations. 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 to Alternative A.

*Alternative C*

All GRSG habitat, PGMA, and PGMA would be closed to new ROW authorizations. This alternative would impose the greatest restrictions on new infrastructure development. 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. 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 A for land use authorizations. Impacts also are similar to Alternative A for travel management, given that only seasonal limits would be imposed near leks. Together with Alternative A, Alternative E would impose the least restrictions on infrastructure development and transport in the study area.

*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.

### *Impacts from Management Actions Affecting Special Status Species*

*Other Values Associated with Populations of GRSG*

As described in **Section 3.18**, 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 3.18** 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 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 3.18** 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 4.2**, Special Status Species – Greater Sage-Grouse, most of the management actions under the alternatives would be beneficial for 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.

***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 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. Although specific impacts on local government tax revenues could not be quantified, the anticipated reductions in economic activity suggest that the local communities that may be most affected by reductions in local tax revenues under this alternative would be communities where grazing forms a major basis for the local economy in Malheur, Harney, and Lake Counties.

### 4.19.4 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 0.7 percent of the current employment in the study area. Compared to the employment in Harney, Lake, and Malheur Counties, where the impact is more likely to be felt, the adverse impact corresponds to approximately 1.9 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). Depending on the distribution of impacts within these counties, 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*

Housing demand would not be affected in a substantial way by any of the alternatives. Reductions in employment opportunities could affect population, but 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.

*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. 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 GRSG habitat, such as rockhounding groups.

Specific communities will also 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), 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 development. However, the BLM's analysis shows wind energy development would be unaffected by the choice of alternatives.

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 4.19.5**, 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.

### 4.19.5 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 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 McDemitt Paiute and Shoshone in Malheur County) and the two tribes with traditional interests in the Socioeconomic Study Area (Confederate Tribes of the Warm Spings 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.

## 4.20 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. 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 nonrecognition, 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 plant species, noxious weeds, encroachment of juniper, or changes in the age 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 wildland fire and the need for its suppression. These activities, combined with continued fire suppression, would also affect the overall composition and structure of vegetation communities; this could increase the potential for high-intensity wildland fires. Restrictions on development under 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.

## 4.21 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.

Laws protecting cultural resources would mitigate irreversible and irretrievable impacts on cultural resources from permitted activity. BLM OHV use areas open to cross-country use could have some resources destroyed. This would be especially true in areas of high cultural sensitivity. Such destruction would be irreversible and irretrievable. Alternative A would have the greatest potential for loss of cultural resource information.

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.

## 4.22 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 species 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. 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, 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.

# CHAPTER 5
# CUMULATIVE IMPACTS

## 5.1 CUMULATIVE IMPACTS

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

Cumulative impacts are effects on the environment that result from the impact of implementing any one of the Oregon Greater Sage-Grouse RMPA/EIS alternatives. These effects are in combination with other actions outside the scope of this plan, either within the planning area or next to it. Cumulative impact analysis is required by CEQ regulations because environmental conditions result from many different factors that act together. The total effect of any single action cannot be determined by considering it in isolation but must be determined by considering the likely result of that action in conjunction with many others.

The evaluation of potential impacts considers incremental impacts that could occur from the proposed project, as well as impacts from past, present, and reasonably foreseeable future actions. Management actions could be influenced by activities and conditions on adjacent public and non-public lands beyond the planning area boundary; therefore, assessment data and information could span multiple scales, landownerships, and jurisdictions. These assessments involve determinations that often are complex and, to some degree, subjective.

### 5.1.1 Cumulative Analysis Methodology

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

Because of the broad nature of the RMPA and cumulative assessment, the analysis tends to be broad and generalized to address effects that could occur from a reasonably foreseeable management scenario, combined with other reasonably foreseeable activities or projects. Consequently, this assessment is primarily qualitative for most resources because of a lack of detailed information that would result from project-level decisions and other activities or projects.

Quantitative information is used whenever available and as appropriate to portray the magnitude of an impact. The analysis assesses the magnitude of cumulative impacts by comparing the environment in its baseline condition with the expected impacts of the alternatives and other actions in the same geographic area. The magnitude of an impact is determined through a comparison of anticipated conditions against the naturally occurring baseline in the affected environment (see **Chapter 3**, Affected Environment) or the long-term sustainability of a resource or social system.

The following factors were considered in this cumulative impact assessment:

- Federal, nonfederal, and private actions
- Potential for synergistic effects or synergistic interaction between effects
- Potential for effects across political and administrative boundaries
- Other spatial and temporal characteristics of each affected resource
- Comparative scale of cumulative impacts across alternatives

Temporal and spatial boundaries used in the cumulative analysis are developed on the basis of resources of concern and actions that might contribute to an impact. The baseline date for the cumulative impacts analysis is 2012; the temporal scope of this analysis is a 20-year planning horizon. Land use planning documents are generally evaluated on a ten-year cycle.

In 1954 the Western Association of Fish and Wildlife Agencies (WAFWA) formed a technical committee to monitor the distribution and abundance of GRSG. WAFWA formalized a program of interstate coordination and cooperation in 1995 to address the issues of GRSG population losses and degradation of sagebrush ecosystems. The BLM, USFWS, and US Forest Service formally joined with WAFWA in range-wide conservation efforts in 2000 (Stiver et al. 2006).

WAFWA entered into a contract with the USFWS in 2002 to produce a complete conservation assessment for GRSG and its habitat. *Greater Sage-Grouse Comprehensive Conservation Strategy* (Stiver et al. 2006) is one of the results of the assessment and is a conservation strategy for GRSG and sagebrush habitats. Seven WAFWA Management Zones are established based on GRSG populations within floristic provinces. Floristic provinces (Connelly et al. 2004)

were used to delineate Management Zones because they reflect ecological and biological issues and similarities, not political boundaries. In addition, the vegetation communities found in the floristic provinces, as well as the management challenges, within a Management Zones are similar; GRSG and their habitats are likely responding similarly to environmental factors and management actions (Stiver et al. 2006).

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

### 5.1.2 Past, Present, and Reasonably Foreseeable Future Actions

Past, present, and reasonably foreseeable future actions are considered in the analysis to identify the following:

- Whether and to what extent the environment has been degraded or enhanced
- Whether ongoing activities are causing impacts
- What are the trends for activities in and impacts on the area

Projects and activities are evaluated on the basis of the following:

- Proximity
- Connection to the same environmental systems
- Potential for subsequent impacts or activity
- Similar impacts
- The likelihood a project will occur
- Whether the project is reasonably foreseeable

Projects and activities considered in the cumulative analysis were identified through meetings held with cooperators and BLM employees with local knowledge of the area. Each was asked to provide information on the most influential past, present, or reasonably foreseeable future actions. Additional information was obtained through discussions with agency officials and review of publicly available materials and Web sites.

Past actions within the geographic scope are taken into consideration to provide context for the cumulative effects analysis (40 CFR, Part 1508.7). Effects of past actions and activities are manifested in the current condition of the resources, as described in **Chapter 3**, Affected Environment.

Present actions within the geographic scope are also considered (40 CFR, Part 1508.7). Present actions are those that are ongoing at the time of the analysis.

Reasonably foreseeable future actions are those that have been committed to or known proposals that would take place within a 20-year planning period and would be typically reviewed during the five-year evaluation. Reasonably foreseeable future actions within the geographic scope and the timeframe of the analysis are also considered (40 CFR, Part 1508.7); they are not limited to those that are approved or funded.

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

A reasonably foreseeable development (RFD) scenario is the basis for analyzing environmental impacts from future leasing and development of mineral resources in 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 BLM-administered 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 developing geothermal resources in the Oregon Sub-region are based on the RFD scenario described in **Section 4.1.1**, Analytical Assumptions, 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 this Final EIS is provided on the BLM website at http://www.blm.gov/wo/st/en/prog/energy/geothermal/geothermal_nationwide/Documents/Final_PEIS.html.

Excluding geothermal resources, RFD scenarios for minerals and mineral potential reports were not completed for this RMPA/EIS. All future looking estimates are based on broad-scale "trends" review, which is an opinion, as opposed to a methodological approach.

Other potential future actions have been considered and eliminated from further analysis. This was because there is a small likelihood these actions would be pursued and implemented within the life of the plan or because so little is known about the potential action that formulating an analysis of impacts is premature.

In addition, potential future actions protective of the environment (such as new regulations related to fugitive dust emissions) have less likelihood of creating major environmental consequences alone, or in combination with this planning effort.

Such federal actions as species listing would require the BLM to reconsider decisions created from this action because the consultations and relative impacts might no longer be appropriate. These potential future actions may have greater capacity to affect resource uses within the planning area; however, until more information is developed, no reasonable estimation of impacts could be developed.

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

Projects and activities identified as having the greatest likelihood to generate potential cumulative impacts when added to the Oregon Greater Sage-Grouse RMPA/EIS alternatives are displayed in **Table 5-1**, Reasonably Foreseeable Future Actions. In addition, there are on-going planning efforts both within (e.g. Baker RMP) and adjacent to the sub-region (e.g. Nevada/California Sub-region GRSG LUPA/EIS) with which this planning effort has been coordinated and aligns. The collective actions proposed in these ongoing efforts could result in cumulative effects throughout the Great Basin Region, including on this Oregon Greater Sage-Grouse RMPA/EIS.

**Table 5-1**
**Reasonably Foreseeable Future Actions**

| Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions | | | | | |
|---|---|---|---|---|---|
| **Name** | **Description** | **Location** | **Developed Area** | **Status of Action** | **GRSG Population** |
| Boardman to Hemingway (B2H) Transmission Line EIS | B2H is an approximately 300-mile 500-kV transmission line proposal. | From Boardman, Oregon, to Melba, Idaho | Multiple population areas, including Morrow, Umatilla, Union, and Malheur Counties in Oregon and Owyhee and Canyon Counties in Idaho<br><br>Shoshone-Paiute Tribes of the Duck Valley Indian Reservation, the Confederated Tribes of the Umatilla Indian Reservation, the Shoshone-Bannock and the Burns Paiute Tribes | Project under NEPA review, estimated ROD in 2014. | Baker |
| **Burns District** | | | | | |
| North Steens Ecosystem Restoration Project | Treat expansion western juniper on a landscape scale, encompassing approximately 336,000 acres CMPA to return vegetation communities to historic | Steens Mountain Cooperative Management and Protection Area | Steens Mountain Cooperative Management and Protection Area | Ongoing | Western Great Basin |

**Table 5-1**
**Reasonably Foreseeable Future Actions**

| Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions | | | | | |
|---|---|---|---|---|---|
| **Name** | **Description** | **Location** | **Developed Area** | **Status of Action** | **GRSG Population** |
| | compositions and reduce hazardous fuel loads. | | | | |
| Lake Creek/Boone Canyon Forest Restoration Project | Thin, pile, and burn expansion juniper and ponderosa pine. Future planning includes an underburn. | Three Rivers Resource Area | Three Rivers Resource Area | Ongoing | Central Oregon |
| Three Rivers Underburning Project | Prescribed fire to control expansion juniper and ponderosa pine. | Three Rivers Resource Area | Three Rivers Resource Area | Ongoing | Central Oregon/Northern Great Basin |
| Forks of Poison Creek/Devine Ridge Vegetation Management Restoration: | Prescribed fire to control expansion juniper and ponderosa pine. The burned area was seeded in spring 2011. Ongoing work includes maintaining several aspen fences in the burn area. | Three Rivers Resource Area | Three Rivers Resource Area | Ongoing | Central Oregon/ Northern Great Basin |
| Slick Ear/Claw Creek Forest Restoration Project | The goals of the project are to reduce hazardous fuels, restore plant communities, and improve wildlife habitat diversity. The | Three Rivers Resource Area | Three Rivers Resource Area | Ongoing | Central Oregon |

**Table 5-1**
**Reasonably Foreseeable Future Actions**

| Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions | | | | | |
|---|---|---|---|---|---|
| **Name** | **Description** | **Location** | **Developed Area** | **Status of Action** | **GRSG Population** |
| | emphasis on treatments will be in forested areas. | | | | |
| The SHED Forest Restoration Project | Implementation plans include thinning, piling, pile burning, and implementing a forest underburn. | Three Rivers Resource Area | Three Rivers Resource Area | Ongoing | Northern Great Basin |
| Camp Harney/Cow Creek Ecological Restoration Project | Implementation plans include thinning, piling, pile burning, and implementing a forest underburn. | Three Rivers Resource Area | Three Rivers Resource Area | Ongoing | Northern Great Basin |
| Dry Lake Ecological Restoration Project: | Implementation plans include thinning, piling, pile burning, and implementing a forest underburn. | Three Rivers Resource Area | Three Rivers Resource Area | Ongoing | Central Oregon |
| Five Creeks Rangeland Restoration Project | A landscape-scale vegetation treatment encompassing approximately 73,500 acres (approximately 26,000 acres in the CMPA) to return | Three Rivers and Andrews/Steens Resource Areas | Three Rivers and Andrews/Steens Resource Areas | Ongoing | Western Great Basin/ Northern Great Basin |

**Table 5-1**
**Reasonably Foreseeable Future Actions**

| Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions | | | | | |
|---|---|---|---|---|---|
| **Name** | **Description** | **Location** | **Developed Area** | **Status of Action** | **GRSG Population** |
| | vegetation communities to historic compositions and reduce hazardous fuel loads. Various forms of prescribed fire and mechanical treatments have been used to reduce influence of encroaching western juniper. | | | | |
| North Steens 230-kV Transmission Line Project | North Steens is a 29-mile 230-kV transmission line that would convey 104 MW of power generated from wind farms proposed on private land on the north side of Steens Mountain. | Project in Harney County on the north side of Steens Mountain | Harney County | Project approved and ROD signed in December 2011; in litigation. | Western Great Basin/ Northern Great Basin |
| District-wide noxious weed treatments | Ongoing interagency efforts with Oregon Department of Agriculture and Harney County. | Harney County | Wide spread across Harney County | Ongoing | Western Great Basin/ Northern Great Basin/Central Oregon |

**Table 5-1**
**Reasonably Foreseeable Future Actions**

| Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions | | | | | |
|---|---|---|---|---|---|
| **Name** | **Description** | **Location** | **Developed Area** | **Status of Action** | **GRSG Population** |
| Steens Mountain Comprehensive Recreation Plan | Multiyear plan to manage recreation on Steens Mountain, including maintaining facilities, creating new facilities and trails, closing roads, and providing interpretation. | Steens Mountain Cooperative Management and Protection Area | Steens Mountain Cooperative Management and Protection Area | EA to go out for public comment summer of 2013. | Western Great Basin |
| Wild Horse gathers | Gather wild horses. | District-wide | District-wide | Ongoing | Western Great Basin/Northern Great Basin/Central Oregon |
| Holloway ES&R | Rehabilitation following wildland fire. | Trout Creek Mountain | Andrews Resource Area | Some implementation complete. | Western Great Basin |
| Miller Homestead ES&R | Rehabilitation following wildland fire. | Catlow Valley | Andrews Resource Area | Some implementation complete. | Western Great Basin |
| District-wide Vegetation Management (Weed EA) | Use new chemicals to treat noxious and invasive species. | Harney County | Harney County | EA in process. | Western Great Basin/Northern Great Basin/Central Oregon |
| Wagon Tire Wind Energy Development Project | Develop a wind farm. | Harney County | Harney County | Beginning studies and consultation, initiating NEPA analysis; decision expected 2016. | Western Great Basin/Central Oregon |

**Table 5-1**
**Reasonably Foreseeable Future Actions**

| Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions | | | | | |
|---|---|---|---|---|---|
| **Name** | **Description** | **Location** | **Developed Area** | **Status of Action** | **GRSG Population** |
| Buckskin Mountain Wind Energy Development Project | Develop a wind farm. | Harney County | Harney County | Beginning studies and consultation, initiating NEPA analysis; decision expected 2016. | Western Great Basin |
| **Lakeview District** | | | | | |
| Locatable mining | Two areas in the Lakeview RA, where locatable mining activity is ongoing, either will continue or will expand in the near future; Tucker Hill and Rabbit Basin Sunstone areas<br><br>Tucker Hill, active 23-acres perlite mine, authorized to expand to 75 acres.<br><br>Rabbit Basin Sunstone area; approximately 43 open notices and plans of operations for sunstone mines currently affecting 61 acres. Three to five new open | Lake, Oregon | | Ongoing | Western Great Basin |

**Table 5-1**
**Reasonably Foreseeable Future Actions**

| Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions | | | | | |
|---|---|---|---|---|---|
| **Name** | **Description** | **Location** | **Developed Area** | **Status of Action** | **GRSG Population** |
| | notices received or plans of operations approved each year, for up to 25 acres of additional disturbance added each year. | | | | |
| Pacific Direct Intertie Upgrade and Maintenance | Maintain and upgrade the existing Bonneville Power Administration power line from Columbia River south to the northern Nevada border. | Deschutes and Lake, Oregon | | 2013-2015 | Western Great Basin and Central Oregon |
| South Warner Sagebrush Sage-Grouse Habitat Restoration | Juniper removal from a 50,000-acre South Warner Rim project area adjacent to the pipeline. | Lake, Oregon | | 2012-2022 | Western Great Basin |
| Oregon Community Wind Energy Project | Construction of 6 to 7 wind turbines near Big Valley and associated power line ROW paralleling Deep Creek to Adel Substation. | Lake, Oregon | | Initiating NEPA analysis (2014-2015). | Western Great Basin |

**Table 5-1**
**Reasonably Foreseeable Future Actions**

| Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions | | | | | |
|---|---|---|---|---|---|
| **Name** | **Description** | **Location** | **Developed Area** | **Status of Action** | **GRSG Population** |
| | This project is now over. Taking down testing tower. | | | | |
| Prescribed Burning—Green Mountain Hayes Butte Bridge Creek Highway 31 | Burning of individual juniper trees in sagebrush habitat to improve sagebrush/sage-grouse habitat up to 1,100 acres. | Lake, Oregon | | 2013 | Central Oregon |
| Silver Creek juniper cutting | Cutting juniper in sagebrush habitat to improve sagebrush/ sage-grouse habitat (1,000 acres). | Lake, Oregon | | 2013 | Central Oregon |
| Brown's Valley Paisley Desert fuel break mowing | Mowing fuel breaks next to roads to prevent large-scale wildfires in sagebrush habitat | Lake, Oregon | | 2014-2015 | Central Oregon |
| **Prineville District** | | | | | |
| West Butte | West Buttes includes a permanent 4.5-mile access road, a pole-mounted 115-kV electrical transmission line, a 14.4-kV electrical | 32 miles east of Bend, Oregon | | NEPA and ROD completed 2011. Implementation date unknown. | Central Oregon |

**Table 5-1**
**Reasonably Foreseeable Future Actions**

| Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions | | | | | |
|---|---|---|---|---|---|
| **Name** | **Description** | **Location** | **Developed Area** | **Status of Action** | **GRSG Population** |
| | utility line that would convey 104 MW of power generated from 52 wind turbines proposed on private land. | | | | |
| Playa EA | Cut up to 2,000 acres of juniper per year. Close about 10 miles of road in playas. Exclude livestock grazing on up to 6,500 acres in 10 playas. Effects on sage-grouse, other wildlife. | South of Hampton, Oregon | | NEPA in progress. ROD and implementation 2013. | Central Oregon |
| High Desert Shrub Steppe EA | Cut or burn up to 10,000 acres of juniper per year. Effects on GSRG. | Between Millican and Hampton, Oregon | | NEPA and ROD completed 2011. Implementation ongoing through 2031. | Central Oregon |
| District-wide herbicide EA | Treat noxious and invasive weeds. Effects on a variety of resources. | Entire Prineville District | | NEPA in progress. Expect ROD 2014 and implementation 2014 thru 2034. | Central Oregon |
| Glass Buttes communication site | Communication site upgrades on about 5 acres, and RMP amendment for | Near Hampton, Oregon | | NEPA in progress. ROD expected fall 2013. | Central Oregon |

**Table 5-1**
**Reasonably Foreseeable Future Actions**

| Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions | | | | | |
|---|---|---|---|---|---|
| **Name** | **Description** | **Location** | **Developed Area** | **Status of Action** | **GRSG Population** |
| | visual resources (VRM Class II to VRM Class IV) on about 45 acres. Effects on visual resources, public safety. | | | | |
| Multiple grazing permit renewals | Renew 37 grazing permits and leases. Effects on local economy, wildlife. | Various areas in Prineville District | | NEPA in progress. Expect ROD late 2013. | Central Oregon |
| John Day Basin RMP revision (allowable/prescriptions and management direction; RMPs are NOT implementation actions) | Protect areas for wilderness characteristics (e.g., no wind turbines) and close areas to OHVs. Effects on motorized recreation, wilderness character, and various other resources. | John Day Basin (northeast side of Prineville District) | | ROD expected winter 2013. | Historic Habitat |
| **Vale District** | | | | | |
| Baker Habitat Restoration and Fuels Treatment projects | Multiyear phased hazardous fuels and wildlife habitat restoration project on approximately 45,000 acres. | Baker County, 7 to 25 air miles southwest of Baker City | Baker County | ROD and FONSI signed; EA distributed and public comment received. | Baker population and Great Basin Core population |

**Table 5-1**
**Reasonably Foreseeable Future Actions**

| Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions | | | | | |
|---|---|---|---|---|---|
| **Name** | **Description** | **Location** | **Developed Area** | **Status of Action** | **GRSG Population** |
| District-wide noxious weed treatments | Ongoing interagency effort with Oregon Department of Agriculture and eastern Oregon counties. | Vale District counties in Oregon and Washington | Widespread across eastern Oregon | Continuing. | Baker population and Great Basin Core population |
| Mormon Basin Fuels Treatment | Largely juniper reduction. Focus is on "C" allotments in northern Malheur County, in coordination with OWEB funding and ODFW habitat management projects. | Northwest Malheur County | Widespread, central Vale District | In planning. | Great Basin Core population |
| High Bar/Upper and Lower Pine Creek Placer Mining Project | Up to 250 acres of activity would be disturbed for mineral extraction. | Baker County, near the town of Hereford, Oregon | Baker County | ROD pending, EA distributed, comments received. FONSI signed. | Great Basin PGH population |
| Malheur Queen Placer | Approximately 800 acres approved for development of placer gold extraction. | North-central Malheur County | Malheur and Baker Counties | ROD and FONSI signed; development underway. | Great Basin Core population |
| Advance Testing for Natural Gas | Proponent is developing planning to test for natural gas. | Northern Malheur County | Northern Malheur County | Only notice of testing locations provided. The BLM has met in the field with proponent. | Great Basin Core population |

**Table 5-1**
**Reasonably Foreseeable Future Actions**

| Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions | | | | | |
|---|---|---|---|---|---|
| **Name** | **Description** | **Location** | **Developed Area** | **Status of Action** | **GRSG Population** |
| | | | | Note that significant effort is underway across the state line in Idaho investigating natural gas. | |
| Grassy Mountain Gold | Expansion of gold mine on private lands. Access crosses BLM-administered lands. | Northern Malheur County | | Plans are anticipated at an unknown date. The proponent is completing baseline studies to fulfill state permits. Current activity is on private lands. Several coordination meetings have already been held. | Great Basin Core population |
| Aurora Project | Uranium extraction proposed. Project area within historic mercury mine area. | South-central Malheur County, along Nevada border. Transport of material and supplies would likely be from Oregon south into Nevada. | Mid-scale area effected at the socioeconomic level (Nevada, Idaho, and Oregon); project disturbance projected to be localized. | Initial coordination with proponent; site has been tested for development potential. | Great Basin Core population |

### 5.1.3 Greater Sage-Grouse and Sage-Grouse Habitat

The cumulative effects analysis study area extends beyond the planning area boundary and consists of WAFWA GRSG Management Zones IV and V. This RMPA/EIS contains a quantitative cumulative effects analysis for GRSG habitat within the planning area boundary. At the larger WAFWA Management Zone level, the analysis is primarily qualitative. Data and information to enable a more comprehensive quantitative analysis that become available between the draft RMPA/EIS and the final may include the following:

- Ongoing LUPAs and revisions
- State plans that may not yet be complete
- Coordination with states and agencies during consistency reviews
- Data from lands not administered by the BLM

Those data that become available will be compiled and included in the quantitative cumulative effects analysis for GRSG in the final RMPA/EIS.

The time frame for this analysis is 10 years, because land use planning documents are generally evaluated on a ten-year cycle. The assumptions and indicators follow those established for the analysis of direct and indirect effects in Chapter 4.

***WAFWA Management Zone IV***

Management Zone IV consists of GRSG populations in the Snake River Plains: east-central Idaho, southwest Montana, Snake-Salmon-Beaverhead, Belt Mountains, Weiser, northern Great Basin, Box Elder, and Sawtooth (Garton et al. 2011). The three most substantial threats to GRSG and their habitats occurring across populations in WAFWA Management Zone IV are weed spread, fire, fragmentation, isolation and small population size (USFWS 2013a).

The Baker and Northern Great Basin GRSG populations in Oregon are within this management zone. The most productive sites on the deep, moist soils of the Snake River Plains and along the Malheur River were converted to agriculture in the late 1800s and early 1900s. As a result, many populations in the region are small or isolated, with the exception of those in central Idaho (watershed of the Snake-Salmon-Beaverhead Rivers) and the northern Great Basin (USFWS 2013a). Habitat availability is a primary limiting factor in this region due to the combination of land use change, leading to fragmentation and isolation and disturbances, primarily from fire (Manier et al. 2013).

Most of the sagebrush in this management zone is federally managed (Knick 2011), but local projects, such as removing spring developments, addressing juniper encroachment, and restoring native grasses, may be more important than rangewide effects because of habitat quality and connectivity to other GRSG populations in the area.

Geothermal and wind energy development potential is high throughout Management Zone IV. (See **Table 5-1** for a list of proposed geothermal and wind energy projects in Management Zone IV.) Few oil and gas wells exist there, and less than 350,000 acres (1 percent) of GRSG habitats are leased for federal fluid mineral exploration. Coal and solar potential are also low throughout this management zone. Agricultural development influences 1 percent of Management Zone IV, and 85 percent of PPH and PGH are within 4.3 miles of cropland (Manier et al. 2012).

*Baker Population*

The Baker population of GRSG has approximately the same distribution as the area covered by the Baker administrative unit, identified in Oregon's Sage-Grouse Conservation Strategy (Hagen 2011). In 2010 the Baker spring population was estimated to be 872 to 1,650 birds. This is the smallest extant population of GRSG exclusively within Oregon (USFWS 2013a). More than 80 percent of the Baker population's historical habitat remains available today. Nevertheless the Baker population is considered more at risk and likely less resilient due to its small population size and limited connectivity to other populations. These factors, along with invasive weeds and juniper encroachment are considered to be the primary threats to this population (Hagen 2011), but other threats are renewable energy development (primarily wind), energy transmission, and OHV recreation.

*Northern Great Basin Population*

The Northern Great Basin population of GRSG is large in Oregon, Idaho, Nevada, and Utah, which contains a large amount of publicly managed land (mostly BLM). This area also includes among the least fragmented and largest sagebrush-dominated landscapes within the extant range of GRSG (Knick and Hanser 2011).

Oregon represents the western part of this large population, which is shared with southern Idaho, northeast Nevada, and northwest Utah. Within Oregon, this represents one of the largest populations. The delineation of the Northern Great Basin population does not correspond well to any existing assessment for Oregon, but it does include almost all of the Vale administrative unit, as well as portions of the Burns administrative unit. In Oregon alone, the spring population in the Northern Great Basin is likely to be several thousand birds, with spring lek counts approaching 3,000 males.

Loss of sagebrush habitat has been and continues to be the major threat to the population in Oregon. Historically this loss of sagebrush habitat occurred through deliberate mechanical and chemical treatment of sagebrush to increase livestock forage. Between 1963 and 1974 over 500,000 acres of sagebrush was deliberately seeded with crested wheatgrass or sprayed with herbicide (Garton et al. 2011). More recently wildfire has become the most significant threat to landscape-scale losses of sagebrush habitat. In conjunction with fire, invasive

annual plants are also one of the greatest risks to the over 4 million acres of sagebrush habitat for this population in Oregon. More than 580,000 acres are already dominated by invasive plant species (Hagen 2011).

Other threats in this region are mining, renewable energy development and transmission, and due to its greater abundance in higher elevations, juniper encroachment.

*Relevant Cumulative Actions*

There are two potential gold mining operations covering up to 1,050 acres that would impact GRSG habitat in Management Zone IV. The construction of the mines and associated roadways would reduce and further fragment GRSG habitat in this region. Furthermore, increased noise and air pollution could disturb GRSG during their breeding season or other sensitive periods.

The Boardman to Hemingway transmission line project will connect electrical energy transmission from Boardman, Oregon, on the Columbia River to the Hemingway substation in Melba, Idaho. This project would impact Morrow, Union, and Malheur Counties in Oregon and Owyhee and Canyon Counties in Idaho. Activities associated with the construction of the Boardman to Hemingway project could include short-term surface disturbances and increases in noise, which could affect GRSG fitness and reproductive success. In the long term, the operation of the Boardman to Hemingway project would likely increase the potential for habitat fragmentation and predation on GRSG.

A number of projects for invasive plant control, vegetation restoration, conifer removal, and fuels treatment are ongoing and would reduce GRSG habitat in the short term. Ultimately, these habitat restoration projects are expected to enhance conditions and expand habitat acreage for GRSG.

There are a number of Candidate Conservation Agreements (CCAs) and Candidate Conservation Agreements with Assurances (CCAAs) in Oregon. Though none have been implemented, assuming they are signed, these are voluntary agreements whereby landowners agree to manage their lands to remove or reduce threats to GRSG. In CCAAs, landowners receive assurances against additional regulatory requirements should GRSG ever be listed under the ESA. These agreements are expected to enhance conditions for GRSG and improve habitat connectivity.

The ODFW is implementing WAFWA's sage-grouse strategy across management zones. The WAFWA sage-grouse strategy includes monitoring, research, outreach, and funding of conservation projects for sage-grouse. A basic premise of the WAFWA sage-grouse strategy to ensure sage-grouse conservation is that additional conservation capacity must be developed at all government levels range-wide for both the short term (first three to five years) and for the long term.

The US Department of Agriculture, Natural Resources Conservation Service (NRCS)'s Sage-Grouse Initiative includes private landowners in 11 western states to improve habitat for GRSG, while improving working ranches (Natural Resources Conservation Service 2012). With approximately 31 percent of all sagebrush habitat across the range in private ownership (Stiver 2011), a unique opportunity exists for the NRCS to benefit GRSG; it can ensure the persistence of large and intact rangelands by implementing the Sage-Grouse Initiative (USFWS 2010a).

Participation in the NRCS Sage-Grouse Initiative program is voluntary, but willing participants enter into binding contracts or easements to ensure that conservation practices that enhance GRSG habitat are implemented (USFWS 2010a). Though participation is voluntary and, thus, not a traditional regulatory approach, participating landowners are bound by contract. Usually three to five years in duration, the contracts require landowners to implement conservation practices in consultation with NRCS staff in order to receive financial incentives. This generally takes the form of payments to offset costs of implementing conservation practices and easement or rental payments for long-term conservation (USFWS 2010a).

While potentially effective at conserving GRSG populations and habitat on private lands, incentive-based conservation programs that fund the Sage-Grouse Initiative generally require reauthorization from Congress under subsequent Farm Bills; therefore, these funding streams are potentially variable as they are subject to the political process.

As of 2012, the Sage-Grouse Initiative has secured conservation easements on 208,000 acres across the GRSG range (NRCS 2012), the largest percentage of which is in Wyoming (120,700 acres).

The ODFW is also implementing the state GRSG plan adopted in April 2011 (ODFW 2011); its provisions are included in this RMPA as Alternative E. Alternative E uses habitat designations of Low Density habitat instead of PGMA and Core Area habitat rather than PPMA. Management of core habitat would be similar to PPMA, but Low Density habitat covers fewer acres of BLM-administered land than PGMA. Despite this, it would still protect areas outside of PGMA. The ODFW plan would provide recommendations for lands not administered by the BLM. Implementation of Alternative E would restrict mineral leasing, ROW siting, OHV use, and other activities in GRSG habitat on BLM-administered lands. If recommendations were adopted on lands not administered by the BLM, these restrictions and protections for GRSG would cover a larger area.

*Major Threat: Fire*

Wildfire has been a primary threat to GRSG habitats and populations occurring across Management Zone IV, resulting in habitat loss and fragmentation (USFWS 2013a). From 2001 to 2011, more than 3.8 million acres (10 percent of PPH and

13 percent of PGH) of GRSG habitats have burned in this management zone. Nearly 800,000 acres of GRSG habitat burned during two fires in 2012 alone. An average of more than 237,000 acres of PPH burns annually, with more than a million acres burned in some years. The Murphy Fire in Idaho and Nevada affected over 650,000 acres of habitat in this management zone in 2007 (USFWS 2013a). Additionally, 81 percent of the region is considered at high risk for fire. Approximately 8.5 million acres (26 percent) spread throughout Management Zone IV is also considered high risk for cheatgrass invasion. Both the Baker and Northern Great Basin GRSG population areas are at high risk of fire.

Under current management (Alternative A), prescribed burning may be used to achieve habitat objectives. Alternative A lacks clear desired conditions allowing for disparate interpretations to guide use of fire and fuels management. Alternatives B, C, D, E, and F all prioritize sagebrush protection in fuels treatment programs and provide for protection and maintenance of sagebrush habitat in the event of wildfire, with Alternative D providing the most specific direction and the widest range of allowable techniques for fire control. Alternative E would also allow for treating sagebrush to create mosaics, but its approach is more limited than under Alternative D.

GRSG populations within Management Zone IV have some of the highest densities of all of the seven WAFWA management zones; however, they have undergone long-term population declines. Under Alternative A, the direct and indirect effects of wildfire described in Chapter 4 would likely continue to increase loss and fragmentation of sagebrush habitat in this management zone. This would be in conjunction with the likelihood of increasing future fires from annual weed invasions and predicted climate change. Some of the listed past, present, and reasonably foreseeable future actions that may help alleviate impacts from fire are ongoing vegetation management actions that reduce fuels, control noxious weeds, and improve wildlife habitat. Examples of these activities are the Baker Habitat Restoration and Fuels Treatment (45,000 acres) and the Mormon Basin Fuels Treatment.

An additional factor in the analysis of cumulative effects of fire on GRSG is the trend of increasing fire size, frequency, and severity, due to such factors as exotic annual grasses, human disturbances, or climate change. The management actions under Alternative B and the other action alternatives for fire seek to minimize the impacts from wildfire on GRSG habitat.

Management actions under Alternative B and the other action alternatives with regard to fire are focused on increased protection of GRSG habitat, primarily within PPMA/Core Area habitat, by limiting loss or fragmentation, with additional emphasis on protecting sagebrush habitat during suppression and prevention planning and staging. Therefore, the direct and indirect effects of fire on GRSG from the management actions under Alternative B may be reduced. The past, present, and reasonably foreseeable future actions do not substantially

increase impacts on GRSG from wildfire. Alternatives C and F have substantially the same approach as Alternative B for wildfire, though Alternative C's emphasis on grazing removal and passive restoration could result in increased spread of invasive weeds, such as cheatgrass, which promote fire risk and may alter fire regime (Balch et al. 2012).

Alternatives D and E for fire are more proactive than Alternatives B, C, and F, and allow a wider range of permitted activities to reduce fire risk. While these activities, including prescribed burns, could cause short-term reductions in GRSG habitat, over the long term these approaches would be more likely to reduce loss of habitat on public and private lands from wildfire. However, VDDT modeling of vegetation cover under the alternatives (**Tables 4-2** and **4-3**) indicates the increase in fuels treatment under Alternative D and the sagebrush treatments under Alternative E would be insufficient to halt or reverse current projected declines in sagebrush cover.

The cumulative effect of the direct and indirect effects of management actions under the action alternatives, when combined with the past, present and reasonably foreseeable future actions, are similar to the cumulative effects described in Alternative B. They are not expected to change the existing population trends or remove and fragment sagebrush habitat past a critical threshold.

*Major Threat: Spread of Weeds*

Invasive weeds alter plant community structure and composition, productivity, nutrient cycling, and hydrology. Weeds may cause declines in native plant populations, including sagebrush habitat, through competitive exclusion and niche displacement, among other mechanisms. Invasive plants reduce and, in cases where monocultures occur, eliminate vegetation that GRSG use for food and cover. Invasive plant species do not provide suitable GRSG habitat, since the species depends on a variety of native forbs and the insects associated with them for chick survival.

GRSG also depend on sagebrush, which they eat year-round and use exclusively throughout the winter for food and cover. Along with replacing vegetation essential to GRSG, invasive plant species fragment GRSG habitat or reduce habitat quality. Invasive plant species can also create long-term changes in ecosystem processes, such as fire cycles and other disturbance regimes that persist even after an invasive plant is removed (Connelly et al. 2004). All the GRSG subpopulations in Oregon are threatened to some extent by spread of invasive weeds, especially invasive annual weeds.

Under current management (Alternative A), the BLM uses integrated weed management techniques. These include mechanical, manual, chemical, and biological control to reduce the likelihood of invasive weed spread and the extent of current infestations. This issue is intimately tied to the threat from fire, and fuels management actions can also reduce weeds and create fire breaks.

Both the Baker and Northern Great Basin GRSG population areas are at high risk from the spread of weeds.

Under all alternatives, integrated vegetation management would continue to be used to control, suppress, and eradicate noxious and invasive species. Under the action alternatives, vegetation management and restoration would prioritize sagebrush reestablishment and weed control as part of habitat management.

Furthermore, the restrictions on uses that would be implemented under the action alternatives would reduce surface-disturbing activities, thereby reducing the likelihood for the introduction and spread of weeds. Alternative C would also restrict livestock grazing, which would further restrict the spread of invasive weeds via livestock. However, it could also impact weed control agreements with lessees, which would reduce the resources available to combat weed spread on BLM lands.

To the extent that the BLM reduces human disturbance from road building, ROW construction, and livestock grazing in habitat areas under the action alternatives, these actions would likely reduce the spread of weeds into new areas. Alternatives B and C are most restrictive of new roads and infrastructure projects on BLM-administered lands. State and local plans to restore habitat would also benefit GRSG populations. Overall, methods, approaches, and resources for weed control would be similar under all alternatives. As a result, the action alternatives would not substantially increase cumulative effects on GRSG from the spread of weeds.

*Major Threat: Isolation/Small Population Size*

The Northern Great Basin as a whole represents one of the larger areas of habitat connectivity and supports the largest GRSG population (Garton et al. 2011). However, the Baker population is small (estimated to be 872 to 1,650 birds in 2010), lacks nearby suitable habitat, and likely has limited connectivity to nearby populations due to habitat and topography (USFWS 2013a). However, there is recent evidence of some connectivity between the Baker population and the Weiser population in Idaho. These areas have been isolated by extirpation of neighboring populations or conversion of sagebrush habitat to agricultural fields or human developments. Isolation and small population size is a major threat to the Baker population of GRSG in Oregon.

Special designations, such as ACECs and WSAs, would protect GRSG habitats. This is because they include special management prescriptions, often restrictions on resource uses, to protect areas from habitat fragmentation, loss, and human disturbance. In ACECs where GRSG is a relevant and important value, management prescriptions would be tailored to the threats to GRSG in the specific location. These prescriptions would be more likely to protect intact GRSG habitats or populations. In ACECs designated to protect other values, where the management prescriptions would not be intended to protect GRSG, some incidental protection may also be provided to GRSG by actions designed

to protect other relevant and important values. In addition, other BLM protective actions, such as fire suppression, BLM-administrative lands retention, and ROW co-locating, would provide additional benefit to isolated populations that can least afford to lose individuals or reduce recruitment rates.

Across all alternatives, state and local efforts would continue to address the isolation and small population threat through a mix of voluntary and regulatory mechanisms. In addition, many of the proposed projects listed in **Table 5-1**, including habitat restoration projects and vegetation and wildfire treatments, would contribute to alleviating isolation and fragmentation. They would accomplish this by increasing the extent and connectivity of habitats and by preventing fires that would fragment habitats.

Overall, action Alternatives C and F would be more protective of isolated GRSG populations by designating over 4 million acres of new ACECs to protect GRSG. Existing ACECs would continue to be managed under Alternatives A, B, D, or E but would not be explicitly managed to protect GRSG. However, other management actions in all the action alternatives, such as those for fire and land tenure, would likely prevent the threat of isolation and small population size from worsening. This would be the case when the management actions are combined with the proposed restoration and vegetation management projects shown in **Table 5-1**.

***Management Zone V***

Management Zone V contains the westernmost extent of GRSG distribution. Population stability within the management zone is highly mixed. Some of the areas are undergoing range contraction as populations on the edges are becoming extirpated, and other areas have been highly stable.

This management zone consists of five populations/subpopulations in three states (Connelly et al. 2004). The Klamath, Central Oregon, and Western Great Basin populations are found partially or completely within Oregon. These three GRSG populations represent the westernmost extent of the GRSG range, and a mix of habitat issues here have had long-term effects on GRSG. Most of the sagebrush landscape (77 percent) is federally managed (Knick 2011), suggesting that federal habitat management may have a strong influence on these populations. GRSG leks in Management Zone V are relatively well connected (second to the Wyoming Basin; Knick and Hanser 2011); however, the COT Report (USFWS 2013a) identifies habitat loss and fragmentation due to wildfire, invasive weed spread, and conifer encroachment as primary threats to GRSG in this area (USFWS 2013a). However, wildfire is generally less of a threat in MZ V compared to MZ IV because the number of fires and average fire size is smaller in the Oregon portion of MZ V than MZ IV.

The range of GRSG in the sub-region has continued to shrink over the last three decades, although some populations within Management Zone V remain relatively stable. When considered in its entirety, including south-central

Oregon, population change from 1965 to 2004 was statistically undetectable (Connelly et al. 2004); depending on the estimates, it declined by 2 to 3.3 percent (Garton et al. 2011; WAFWA 2008). Of the seven management zones, Management Zone V is one of those supporting the highest densities of GRSG.

*Central Oregon*

The central Oregon population has approximately the same distribution as the area covered by the Prineville administrative unit identified in Oregon's Sage-Grouse Conservation Strategy (ODFW 2011). Approximately 700,000 acres of habitat for the central Oregon population has been identified as priority areas for conservation. This is a relatively large population, with the minimum spring population estimated at 1,775 to 2,084 birds in 2010 (Hagen 2011).

This population is estimated to have only 53 percent of historic sagebrush habitat, having lost more than any in other GRSG administrative unit in Oregon. The area also has a high proportion of privately owned GRSG habitat (48 percent), compared with most other GRSG management zone populations in Oregon.

This population faces a wide suite of threats, including juniper encroachment, (Freese 2009). This threatens over 900,000 acres of the 1.8 million acres of sagebrush habitat in in this area. It also threatens connectivity with other Oregon populations to the south and east (Hagen 2011).

Additional threats are invasive annual weeds, fire, mining, and grazing. Projections based on historic trends suggest this population is at risk; however, in the last two years there have been a number of positive developments, including thousands of acres of habitat improvement under the NRCS's Sage-Grouse Initiative (NRCS 2012) and increasing local interest in GRSG conservation.

*Western Great Basin*

The Western Great Basin GRSG population is shared among southeastern Oregon, northeastern California, and northwestern Nevada. Range-wide for GRSG, this area contains one of four remaining large intact expanses of sagebrush habitat and connects south-central Oregon with northwest Nevada. Most of the sagebrush-dominated landscape is in Oregon (Knick and Hanser 2011). Habitat fragmentation increases to the south and west in the population. Garton et al. (2011) estimated for the Western Great Basin a minimum population estimate of 5,904 males in 2007 (includes northeast California and northwest Nevada). The Western Great Basin is the most resilient population in Management Zone V, but reducing threats is not likely to ensure long-term persistence in some areas. Resiliency needs to be improved in the California and Nevada portions of the Western Great Basin, with increased habitat suitability in terms of shrub densities and native grasses and forbs.

Oregon's portion of the population has some of the best habitat and highest GRSG densities in the state. It includes Hart Mountain National Antelope Refuge and Trout Creek Mountains, though habitat in the latter was likely compromised by 2012 fires. The delineation of the Western Great Basin population does not correspond well to any existing assessment for Oregon; however, it includes almost all of the Lakeview administrative unit, as well as portions of the Burns and Vale administrative units.

In Oregon, the spring population in the Western Great Basin likely exceeded 10,000 birds in 2010 (Hagen 2011). Over 80 percent of the Oregon historic GRSG habitat remains intact, and most of the habitat is in public ownership (Hagen 2011). In the Lakeview administration unit, which comprises most of the Western Great Basin population in Oregon, about 78 percent of the region is administered by the BLM; the USFWS manages more than 278,000 acres. Invasive weeds, fire, and juniper encroachment (particularly on the western edge) represent the greatest risks to this population. Renewable energy development (wind and geothermal) and wild horses have also been identified as threats to GRSG habitat in the Steens and Dry Valley/Jack Mountain action areas.

*Relevant Cumulative Actions*

Two ROWs for transmission line construction and expansion are proposed that would affect the central Oregon and the Western Great Basin population areas. Both of these population areas also have proposed wind energy projects, which would impact GRSG habitat. There are 37 grazing permit renewals that could affect GRSG in the Western Great Basin population area. The proposed expansion of the Tucker Hill Perlite Mine from 23 acres to 75 acres would affect the central Oregon population area.

A number of noxious weed control, vegetation restoration, conifer removal, and fuels treatment projects are ongoing and would reduce GRSG habitat in the short term. Ultimately, these habitat restoration projects are expected to enhance conditions and expand habitat acreage for GRSG.

*Major Threat: Fire*

Fire has largely negative effects on GRSG by directly affecting the distribution and condition of available sagebrush habitats (Beck et al. 2009; Baker 2011). Wildfire and prescribed fires typically kill sagebrush, thereby reducing cover and forage in the short term.

However, fire is also beneficial to many sagebrush ecosystems and does not always have net negative effects on GRSG populations and habitats. In some higher elevation habitats, where mountain big sagebrush is the dominant canopy, rapid regeneration due to site potential, seed production and layering can produce 25 percent cover within 20 years (Winward 2004).

There is little evidence that fire will enhance GRSG habitat in Wyoming big sagebrush communities (Crawford et al. 2004). In low elevations, wildfire represents an important threat to habitat conservation and population stability (USFWS 2010a). This is due to increased fuel potentials caused by annual grasses and landscape-scale decrease in intact sagebrush habitats. Within Oregon's Management Zone V, the effects and extent of habitat conversion from wildfire are variable, but the increased fire susceptibility is associated with increased invasion of nonnative annual grasses.

Current wildfire suppression and fuels management would continue under Alternative A. Alternative A lacks clear desired conditions allowing for disparate interpretations to guide use of fire and fuels management. The direct and indirect effects described in Chapter 4 may result in the increased loss and fragmentation of the existing sagebrush habitat from wildfire. This would be in conjunction with past, present, and reasonably foreseeable actions and the likelihood of increasing fires from invasive annual grasses.

Some of the ongoing activities that may help alleviate impacts from fire are ongoing vegetation management actions that control noxious weeds and post-fire rehabilitation, such as the Prineville, Burns, Lakeview, and Vale District-wide Herbicide EAs and the Brown's Valley Paisley Desert Fuel Break Mowing (770 acres).

Management actions for fire under Alternative B and the other action alternatives are focused on increased protection of GRSG habitat, primarily within PPMA/Core Area habitat, benefitting GRSG by limiting habitat loss or fragmentation. Alternatives B, C, D, E, and F all prioritize sagebrush protection in fuels treatment programs and provide for similar protection and maintenance of sagebrush habitat in implementing prescribed burning the event of wildfire, with Alternative D providing the most specific direction and the widest range of allowable techniques for fire control. Alternative E would also allow for treating sagebrush to create mosaics, but its approach is generally more limited than under Alternative D. VDDT modeling of vegetation cover under the alternatives (**Tables 4-2** and **4-3**) indicates the increase in fuels treatment under Alternative D would not halt or reverse the current projected declines in sagebrush cover.

An additional factor in the analysis of cumulative effects of fire on GRSG is the trend of increasing fire size, frequency, and severity in rangelands, from such factors as incursion of exotic annual grasses and human disturbances.

The cumulative effect of the direct and indirect effects of management actions for fire under Alternatives C, D, E, or F, when combined with the past, present, and reasonably foreseeable actions, are similar to Alternative B. When combined with the past, present, and reasonably foreseeable actions, these fire management actions do not substantially increase impacts on GRSG. They are not expected to be substantial, to change the existing population trend, or to remove and fragment sagebrush habitat past a critical threshold.

*Major Threat: Spread of Weeds*

Invasive weeds alter plant community structure and composition, productivity, nutrient cycling, and hydrology. They may cause declines in native plant populations, including sagebrush habitat, through competitive exclusion and niche displacement, among other mechanisms. Invasive plants reduce and, in cases where monocultures occur, eliminate vegetation that GRSG use for food and cover. Invasive plant species do not provide suitable habitat, since GRSG depend on a variety of native forbs and the insects associated with them for chick survival.

GRSG also depend on sagebrush, which they eat year-round and use exclusively throughout the winter for food and cover. Along with competitively excluding vegetation essential to GRSG, invasive plant species fragment GRSG habitat and reduce habitat quality. Invasive plant species can also create long-term changes in ecosystem processes, such as fire cycles and other disturbance regimes that persist even after an invasive plant is removed (Connelly et al. 2004). All the subpopulations in the Great Basin sub-region are threatened to some extent by spread of invasive weeds, especially cheatgrass.

All three populations within Management Zone V are threatened by widespread weeds and annual grasses (USFWS 2013a). About 77 percent of lands within this management zone are under federal management. Since 2000, more than 1.5 million acres have burned. Most of the management zone is considered at high risk of fire, and about 44 percent of lands are considered to be at high risk of cheatgrass. Approximately 8 percent of PPH and 4 percent of PGH do not meet BLM land health standards in this management zone (Manier et al. 2013).

Most PGH and all PPH occur on BLM-administered lands. Management Zone V has approximately the same amount of lands in PPH and PGH as Management Zone IV; however, Management Zone V has a much greater percentage of its land in PPH and PGH, potentially providing much greater opportunities for restoration and for reducing the potential for invasive species via federal actions.

Under the action alternatives, vegetation management and restoration would prioritize sagebrush reestablishment and weed control as part of habitat management.

Under all alternatives, integrated vegetation management would be used to control, suppress, and eradicate noxious and invasive species. This management would use mechanical, manual, chemical, and biological control to reduce the likelihood of invasive weed spread and the extent of current infestations. This issue is intimately tied to the threat from fire, and fuels management actions can also reduce weeds and create fire breaks. Although this increased management focus could benefit GRSG habitat, the actual change in the probability of invasive weed establishment would depend on the resources available to devote to the effort. Weed treatment and removal projects that would benefit GRSG habitat

in the long term are ongoing or planned throughout Management Zones IV and V (see **Table 5-1**).

To the extent that the BLM reduces human disturbance from road building, ROW construction, and livestock grazing in habitat areas under the action alternatives, these actions would likely reduce the spread of weeds into new areas. Alternatives B and C are most restrictive of new roads and infrastructure projects on BLM-administered lands. State and local plans to restore habitat would also benefit GRSG populations.

Alternative C would also restrict livestock grazing, which would further restrict the spread of invasive weeds via livestock. However, it could also impact weed control agreements with lessees, which would reduce the resources available to combat weed spread on BLM lands. Overall, methods, approaches, and resources for weed control would be similar under all alternatives.

*Major Threat: Conifer Encroachment*

Expansion of conifer woodlands, especially juniper (*Juniperus* spp.), presents a threat to GRSG because this vegetation does not provide suitable habitat for the species. Furthermore, mature trees displace shrubs, grasses, and forbs, which are important components of GRSG habitat, through direct competition for resources. Juniper expansion is associated with increased bare ground and potential for erosion (Petersen et al. 2009). Mature trees may offer perch sites for raptors, so woodland expansion may also represent expansion of raptor predation threat.

In Management Zones III, IV, V, and VI conifer encroachment is connected to reduced habitat quality in important seasonal ranges, where woodland development is sufficient to restrict shrub and herbaceous production (Connelly et al. 2004). While widespread, this problem affects specific sagebrush habitats and GRSG populations because of local juniper and pinyon-juniper expansions. Notably, Forest Service research indicates that more than 55 percent of Great Basin sagebrush ecosystems (Management Zones III and V) are at risk of cheatgrass invasion; approximately 40 percent of this same landscape was at risk of displacement by juniper expansion. Within Management Zone V in Oregon, all three GRSG population areas have significant juniper encroachment, increasing isolation and extirpating some populations on the western edge of the range.

Conifers would be removed under all alternatives and would continue to improve GRSG habitat. It would do this by increasing forage, cover quality, and composition and by reducing predator perches, decreasing fire spread and intensity, and potentially increasing water availability within Management Zones IV and V. Most alternatives specify areas where vegetation treatments would be prioritized and how treatments would be developed. However, treatment acres are not specified within the alternatives and therefore are not quantifiable by alternative.

Under Alternative A, management would continue to use GRSG habitat standards, defined by Connelly et al. (2000a) and Hagen et al. (2007), though there is little direct guidance to manage for conifer encroachment. Vegetation treatments for GRSG would continue to be prioritized in population areas and would follow the associated conservation strategy. Treatments would also be prioritized within proximity to active lek sites and within early-stage juniper stands. The BLM and Forest Service would continue to coordinate vegetation treatments with other federal and state agencies, private landowners, and tribes.

Some of the ongoing activities that may help alleviate impacts from conifer encroachment are ongoing vegetation management actions that cut or burn juniper and lodgepole pine, such as the High Desert Shrub Steppe EA (10,000 acres/year), the Playa EA (2,000 acres/year), and the South Warner Sagebrush Sage-Grouse Habitat Restoration (50,000 acres).

For conifer expansion, Alternatives A, B, D, and F provide very similar guidance. Management under Alternatives B, D, E, and F would prioritize vegetation treatments within PPMA/Core Area habitat and PGMA/Low Density habitat. Alternative D would have the greatest likelihood to increase acres restored, because it provides specific on-the-ground management objectives for vegetation treatments, which are categorized by GRSG seasonal habitat requirements. Alternatives B, D, and F explicitly require the establishment of designated seed harvest areas for sagebrush seed collection in fire-prone areas. In addition, post-restoration management plans would be implemented to ensure long-term persistence of vegetation treatments. Alternative E would cover less BLM-administered land than the other action alternatives because Low Density habitat encompasses a smaller area than PGH. Alternative E also places strict limits on juniper removal, potentially leading to more loss of GRSG habitat.

Management under Alternative C would focus vegetation treatments in unoccupied GRSG habitats (e.g., crested wheatgrass seeding, urban interface, and areas of significant disturbances). Because this alternative focuses on passive restoration, it does not provide for increasing the amount and quality of GRSG habitat as much as the other action alternatives. Whether these alternatives' actions would treat conifer expansion at an adequate rate to maintain existing GRSG habitat and avoid fragmentation and increased predation will depend on funding.

*Conclusion*

Some populations will be affected more than others because they are smaller or already at higher risk. Under any alternative, despite BLM, state, and local actions, overall trends toward habitat loss are likely to continue in the small and isolated Baker population due to wildfire, disease, and predation in GRSG habitat. The central Oregon, Western Great Basin, and Northern Great Basin populations are large and presently stable; however, they face threats from a

variety of human developments and infrastructure, in addition to the major threats outlined above. These populations are potentially at risk over the long term without effective vegetation management and land development restrictions.

Under Alternative A, current management would continue on BLM-administered lands. While current approaches to vegetation management and fire suppression are benefitting GRSG, there is little specific guidance toward amelioration of major threats to GRSG in Management Zones IV and V. There would be limited interim protections within GRSG PPH or PGH, no new ROW avoidance or exclusion areas would be established, and there would no new areas closed or restricted to other resource uses.

Current management does consider wildlife habitat value in decision making, which provides limited protection for GRSG. Existing ACECs (less than 500,000 acres) would be maintained that could protect some portions of GRSG habitat.

Current sagebrush protection and habitat restoration would continue in order to improve rangeland and establish or improve connectivity between habitat areas. However, planned transmission lines and ROWs across federal, state, and private land would likely increase fragmentation of GRSG habitat. Voluntary protections would continue to be implemented on private land (i.e., NRCS Sage-Grouse Initiative, CCAs, and CCAAs).

Overall, the limited number and extent of regulatory mechanisms under Alternative A would continue to degrade habitat, resulting from the major threats in Management Zone IV and V.

Guidance provided under the action alternatives would reduce major threats faced by GRSG in Management Zones IV and V to some extent. Nevertheless, VDDT forecasting shows that overall trends toward habitat loss and fragmentation are likely to continue from the spread of invasive weeds, isolation, wildfire, and conifer encroachment. The BLM has limited ability to manage these threats through implementation of regulatory mechanisms. BLM management under the alternatives can restrict resource uses and development, which also pose threats in GRSG habitat; however, the major threats (invasive weeds, wildfire, and conifer encroachment) can be limited only by vegetation management. These programs are limited to certain areas and is unlikely to approach the scope of the threats or to prevent catastrophes such as large-scale wildfire. Thus, the major threats are likely to continue in Management Zones IV and V under all alternatives.

Under Alternative B, the BLM would implement a number of protections for GRSG, including designating PPMA and PGMA and managing new ROW exclusion and avoidance areas. Habitat would be protected by various use restrictions, including closure to mineral exploration and development. Existing ACECs would be maintained, but no new ACECs would be established. Land

disposals and acquisitions would focus on maintaining sagebrush acreage and connectivity.

Habitat-restoration projects would be prioritized in areas most likely to benefit GRSG populations. Under Alternative B, the BLM would site transmission lines in locations that minimize impacts on GRSG, likely reducing the acres of habitat disturbed, compared to Alternative A. These restrictions may dissuade developers from siting projects on BLM-administered lands. They also may push development onto state or private lands with less ability to properly implement development that minimizes impacts on GRSG. Success on a cumulative scale would be achievable if voluntary programs, local working groups, and state plans are consistently implemented and enforced.

Under Alternative C, management actions would provide more protection to GRSG on BLM-administered land in Management Zone IV and V than any other alternative. Management would be similar to that described for Alternative B but would be applied to all occupied habitat. As a result, strong restrictions in Alternative C may push development onto private or state lands with less stringent protections for GRSG. For example, under Alternative C, ROW exclusion areas would be established on all PPMA administered by the BLM, and all BLM-administered lands would be closed to livestock grazing. This would dramatically reduce the amount of resource uses allowed within GRSG habitat on BLM-administered lands. These policies would provide the most protection for GRSG habitat on BLM-administered land, but the absence of grazing may also result in fine fuel buildup leading to more destructive fires. In addition, the restrictions on BLM-administered land could result in increased habitat conversion or loss on state or private lands, absent additional actions on private lands to reduce threats to GRSG. As a result, management actions under Alternative C could be ineffective in protecting GRSG habitat from loss and fragmentation.

Management under Alternative D would improve GRSG habitat protection over current management but with fewer restrictions than Alternatives B or C. For example, under Alternative D the BLM would manage more areas as ROW avoidance. It would rely on NSO stipulations, instead of more restrictive ROW exclusion areas and closure to mineral leasing. These provisions would allow for limited development on BLM-administered lands, which could reduce pressures on state and private lands that may be protected by only voluntary agreements.

On a cumulative scale, management under Alternative D provides a more balanced approach to ameliorating major threats in Management Zone IV and V across all land statuses. If allowing limited development within GRSG habitat on BLM-administered lands would alleviate development pressures on other lands with less stringent protections, management under Alternative D would have the greatest ability to reduce major threats to GRSG.

Management under Alternative E would be similar to Alternative B in many respects, though it would impose fewer restrictions on ROW development or mineral leasing. As a result, impacts from such development would continue, but cumulative impacts from other threats would be reduced, relative to Alternative A.

Cumulative impacts under Alternative F are similar to those described for Alternatives B and C. However, the BLM would reduce grazing under Alternative F and would establish some ACECs, though on fewer acres than Alternative C. As a result, cumulative impacts under Alternative F would be similar to those described for Alternatives B and C.

### 5.1.4 Vegetation

The cumulative impact analysis area used to analyze cumulative impacts on vegetation covers the planning area.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect vegetation are vegetation and habitat management and improvement projects, noxious weed control, wildland fire management, livestock grazing management, wild horse and burro use and gathers, mining, and renewable energy development.

***Alternative A***

Current management would continue on BLM-administered lands in the planning area. There would be no PPMA or PGMA designated. Most land use plans, particularly the older plans for Brothers-La Pine, Three Rivers, and Baker, would not implement use restrictions (e.g., ROW exclusion and closure to mineral leasing and development) to protect GRSG habitat. Grazing management would not specifically consider GRSG habitat needs, and vegetation management would not prioritize sagebrush. Newer plans (e.g., Southeast Oregon, Lakeview, Steens, Andrews, and Upper Deschutes) may prescribe guidance for some of these resources and uses, but with no or little consistency across the decision area.

Planned ROW construction could increase fragmentation of vegetation, and new oil and gas developments would increase loss of sagebrush vegetation. However, some use restrictions would be implemented, which would protect vegetation in these areas from degradation or removal. Vegetation management and noxious weed control projects would benefit sagebrush ecosystems by removing invasive plants and promoting healthy vegetation communities. Overall, Alternative A would lack the landscape-level management tools to reduce cumulative effects from past, present, and reasonably foreseeable future actions.

***Alternative B***

Under Alternative B, PPMA and PGMA would be designated and use restrictions would be implemented in these areas. For example, ROW exclusion and avoidance areas would be established within PPMA and PGMA, respectively, and these would cover larger areas than under Alternative A. Grazing management would be changed to reduce impacts on sagebrush vegetation. No ACECs would be established.

Most ROWs, access roads, and associated infrastructure planned according to **Table 5-1** would be sited outside PPMA under Alternative B. The exception would be locatable minerals proposed for withdrawal, planned mineral and geothermal exploration and development sited outside PPMA in unleased areas, and conservation measures applied to valid existing rights.

The vegetation management and restoration projects mentioned above would benefit the planning area in discrete locations. As a result, the cumulative effects from past, present, and reasonably foreseeable future actions under Alternative B would be reduced, compared to Alternative A.

***Alternative C***

Removing grazing would likely reduce potential impacts from grazing described in **Section 4.3**, Vegetation. Cumulative impacts associated with grazing would also be reduced. All PPMA would be managed as an ACEC. Use restrictions in these areas would retain the extent and condition of native vegetation, thereby reducing cumulative impacts from resource uses. Other cumulative impacts are similar to those described for Alternative A.

***Alternative D***

Alternative D is intended to preserve management flexibility and provide increased implementation guidance while protecting GRSG habitat. Management under Alternative D would increase vegetation protection compared to current management, but with less protection than Alternatives B or F.

Alternative D would establish ROW avoidance but not exclusion areas, thereby reducing but not eliminating impacts from ROW development. Restrictions on mineral leasing and development would be greater than under Alternative A, but less stringent than Alternatives B, C, and F. Prescribed burning and fuels management would take sagebrush vegetation into account.

As under the other alternatives, the vegetation management and weed control plans listed in **Table 5-1**, Reasonably Foreseeable Future Actions, would benefit vegetation health. Development restrictions in occupied habitat would retain existing vegetation, and rangeland improvements would improve vegetation quality on sagebrush acreage. As a result, the cumulative effects from past, present, and reasonably foreseeable future actions under Alternative D would be reduced, compared to Alternative A, but to a lesser extent than under Alternatives B and C.

***Alternative E***

Cumulative impacts from Alternative E are similar to those described for Alternative D.

***Alternative F***

Alternative F would provide more protection to GRSG habitat on BLM-administered land but would reduce management flexibility. Alternative F would establish ACECs in occupied habitat, and occupied habitat would be ROW exclusion areas and closed to mineral development and leasing. PPMA would be proposed for withdrawal from locatable mineral entry. These provisions would protect vegetation from loss, fragmentation, and disturbance associated with surface-disturbing activities.

Reduced grazing would likely reduce potential impacts from grazing described in **Section 4.3**. Reduced management flexibility could lead to inefficient or ineffective management at the site-specific scale when conditions may require alterations in management. As under the other alternatives, the vegetation management and weed prevention projects listed in **Table 5-1**, Reasonably Foreseeable Future Actions, would benefit vegetation health. Alternative F would impose the most stringent restrictions on development of GRSG habitat, potentially restricting the ROW and mineral developments in **Table 5-1**, thereby retaining the greatest extent of sagebrush vegetation. As a result, Alternative F would result in the greatest reduction in cumulative effects from past, present, and reasonably foreseeable future actions, compared to all alternatives.

### 5.1.5 Fish and Wildlife

The entire planning area was used in the analysis of cumulative impacts on special status wildlife species. Many past and present actions and conditions within the cumulative impact analysis area have affected and will likely continue to affect special status wildlife species, as described in **Section 4.4**, Fish and Wildlife.

There are many habitat improvement projects scheduled for the planning area in the form of noxious weed treatments, conifer encroachment control, wildland fire fuels treatments, and sagebrush habitat restoration. These improvement efforts would expand the extent and increase the quality of habitat for many special status wildlife species. These gains however, could be reduced by impacts from transmission line development, alternative energy projects (wind power and geothermal), livestock grazing, and mining (see **Table 5-1**).

***Alternatives Analysis***

Three indicators were identified to analyze the effects on special status species under each alternative in **Section 4.4**. These indicators include the amount and condition of available habitat, the likelihood of mortality, injury, or direct disturbance, and the likelihood of habitat disturbance.

Management under Alternative A would have the greatest cumulative impacts on special status wildlife species because it provides the fewest considerations of ecological impacts in management decisions. Alternatives B, C, D, and F would designate 4.5 million acres of PPMA and 5.6 million acres of PGMA. This would reduce cumulative impacts on special status wildlife species, compared to Alternative A.

Alternative E would designate 4.5 million acres of Core Area and 3.9 million acres of Low Density habitat. In total, this would provide less protection from cumulative impacts for special status wildlife species, compared to the other action alternatives. Under Alternative C, all occupied habitat would be closed to grazing. This would likely increase fragmentation of special status wildlife habitat as a result of increased fencing. Wildland fire and livestock grazing management under Alternative D would provide comprehensive protection for special status wildlife habitat. However, lands and realty management actions would not be as protective of cumulative impacts, compared to the other alternatives.

Under Alternative D ROW avoidance areas would be established, but no ROW avoidance areas would be included. This would allow for development to continue within PPMA.

Livestock grazing management under Alternative F would close 25 percent of PPMA and PGMA to livestock grazing. This would reduce impacts from grazing on special status wildlife, including the potential for habitat fragmentation from fencing, compared to Alternative C. Therefore, Alternative F would provide the most protection for special status wildlife species that overlap with GRSG habitat. It would result in the fewest cumulative impacts among the action alternatives.

### 5.1.6 Wild Horses and Burros

The cumulative impact analysis area used to analyze cumulative impacts on wild horses and burros management includes the planning area. This is because impacts are expected to be limited to those actions originating within the planning area.

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect wild horses and burros management are actions that change forage and water availability, access to water sources, range conditions, barriers to movement and population control (such as removing excess animals and repressing population).

Reasonably foreseeable projects in the project area include extensive vegetation treatment and fuels reduction projects. These could result in short-term impacts on horses and burros, but they are likely to improve rangeland health in the long term. Population control gathers would continue in the area to keep wild horses and burros at appropriate population levels and to support

maintenance or improvement of land health in the area overall. In addition, actions that indirectly disturb wild horses and burros are recreation and development for transmission, as well as the exploration for energy and mineral development.

Under all alternatives, no direct change would occur to areas allocated as HMAs for wild horses and burros. Under Alternative A, AML would continue to be adjusted as needed, based on rangeland conditions. Populations would be controlled to support land health within the constraints of national priorities and budgets. Under Alternatives B, C, D, and E, there could be long-term reduction of AMLs. This would come about if management for wild horses and burros conflicts with GRSG management objectives, resulting in a cumulative addition to the management needs and associated costs of wild horse and burro management in the planning area. Under Alternative F, a direct 25 percent reduction in AMLs is proposed. This would result in a cumulative addition to costs and time for management of the wild horse and burro program, due to the need for increased gathers. This could strain available resources in the region.

In addition, should management resources be concentrated in GRSG habitat due to priorities for management under the action alternatives, HMAs outside of GRSG habitat may be allotted fewer resources. In general, actions to improve land health for GRSG are also likely to improve rangelands for wild horses and burros, resulting in a cumulative improvement in the ability to meet AMLs.

### 5.1.7 Wildland Fire Management

The area used to analyze cumulative impacts on wildland fire management is the planning area.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect wildland fire management are vegetation management, restoration projects, invasive species and noxious weed control, livestock grazing, wildland fire management, lands and realty, recreation, travel management, mining, and energy development. These actions can modify vegetation condition or FRCC, the likelihood of human-caused wildfire, the size, extent, or occurrence of wildfire, or the response to wildland fire.

***Alternative A***

Under Alternative A, current management would continue on BLM-administered lands in the planning area. There would be no PPMA or PGMA designated; most land use plans would not implement use restrictions (e.g., ROW exclusion and closure to mineral leasing and development) to protect GRSG habitat. Vegetation, grazing, and wildland fire management would not prioritize sagebrush. Planned ROW construction and new minerals or energy developments could introduce invasive species and remove beneficial vegetation.

Though these projects would provide for fuel breaks, water sources, and fire response access, developments could result in continued risk of human-induced fire and the need for fire response. Planned restoration projects would focus on overall land health and could lead to improved conditions for wildland fire management; however, there is not as much restoration focus as under other alternatives. Overall, Alternative A would result in the highest risk for cumulative contribution to wildland fire from human activities, including recreation, travel, lands and realty, and minerals and energy.

***Alternative B***

Under Alternative B, the BLM would manage lands to conserve, enhance, and restore sagebrush ecosystems. Direct protection of sagebrush habitat to support GRSG would limit or modify uses. This would improve the acreage and condition of native vegetation communities, which would retain or improve conditions for wildland fire management within these areas. Use restrictions limiting activities would reduce human-caused fires and damage to native vegetation communities. It would also minimize the spread of invasive species.

Yet, restrictions could also limit wildland fire response and result in higher fuel loads and larger or more intense fires. The vegetation management and restoration projects described in **Table 5-1** would benefit wildland fire management in the planning area in discrete locations. As a result, the cumulative effects from past, present, and reasonably foreseeable actions under Alternative B would be reduced, compared to Alternative A.

***Alternative C***

Management under Alternative C would focus on removing livestock grazing and designating ACECs. Designating PPMA and PGMA and restricting mineral and land use would be similar to that described  Alternative B. However, there would be fewer acres open to fluid minerals leasing, fewer mineral materials sales, and fewer nonenergy leasables than under Alternative B. Management would focus on removing livestock grazing from GRSG habitats, with other management similar to Alternative A. Planned ROW construction and mineral and energy projects would increase the risk of human-caused fires. Cumulative impacts on wildland fire management from designating PPMA and PGMA and restricting mineral and land use would have the same impacts as described for Alternative B. Other impacts are similar to Alternative A.

***Alternative D***

Under Alternative D, the BLM would manage lands to maintain or enhance GRSG habitat to establish a mix of sagebrush classes. Management and impacts are similar to both Alternatives A and B. However, Alternative D would identify focal areas to prioritize restoration projects and coordinate with USFWS and other agencies to prioritize protection of sagebrush habitat. It also would implement a comprehensive approach, with priorities for fuels management, wildfire management, and ES&R within GRSG habitat. The management of land

uses, locatable minerals, and nonenergy leasables would be similar to Alternative A; fluid mineral leasing, mineral material sales, and travel would be the same as Alternative B.

Alternative D would have beneficial impacts on wildland fire management because it would emphasize restoration of native vegetation and fuels treatments as well as prioritize projects for the protection of sagebrush habitat. The planned vegetation management and restoration projects described in **Table 5-1** would further benefit wildland fire management in the planning area. As a result, the cumulative effects from past, present, and reasonably foreseeable actions under Alternative D would be reduced, compared to Alternative A.

***Alternative E***

Conservation guidelines under Alternative E are designed to maintain or enhance the quality of current habitats; however, the overall management and impacts are similar to Alternative B. The greatest difference is the approach to livestock grazing. As a result, the cumulative effects from past, present, and reasonably foreseeable actions under Alternative E would be reduced, compared to Alternative A, but to a lesser extent than Alternative D.

***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. More acres would be closed to grazing than under Alternative B. Impacts from Alternative F are similar to those described for Alternative B; however, Alternative F could improve conditions for wildland fire management compared to Alternative B. the cumulative effects from past, present, and reasonably foreseeable actions under Alternative F would be reduced, compared to Alternatives A and B, but to a lesser extent than Alternative D.

### 5.1.8 Livestock Grazing/Range Management

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect livestock grazing include those that reduce available grazing acreage or the level of forage production in those areas or that inhibit livestock improvements, such as water development or fences.

In the planning area, relevant past and present actions include human-caused surface disturbances, such as those associated with minerals, transmission and energy development, recreation, and current and historic grazing practices. In addition, changes in habitat due to historic fire suppression and climate change have resulted in junipers and trees encroaching into grasslands, thereby decreasing available forage.

Reasonably foreseeable future actions affecting livestock grazing are similar to present actions. They include ongoing permit and lease renewals and range improvement projects, as detailed in **Table 5-1**. These actions could cumulatively reduce permitted AUMs or restrict management options. This would be the case if allotments were found to be inconsistent with land health standards due to livestock use.

Cumulative projects that increase human disturbance in grazing areas could also indirectly impact grazing by increasing weeds and the spread of invasive species. As stated above, weed invasion can reduce preferred livestock and wildlife forage and can increase the chance of weeds being dispersed by roaming cattle. Cumulative projects that increase human disturbance in grazing areas could also directly impact grazing by displacing, injuring, or killing animals. Such projects include potential access roads, transmission line development, and some minimal geothermal exploration and mineral development.

Conversely, extensive planned vegetation improvement, weed removal, and fuels reduction and restoration in the planning area could exclude grazing from site-specific areas temporarily. However, these activities would generally improve rangeland conditions in the long term by reducing the encroachment of juniper into grasslands and improving vegetation condition. In addition to foreseeable actions, vegetation could change with continued drought or climate change. While difficult to quantify, these changes are likely to include reduced forage availability.

The contribution of the project to cumulative impacts parallels the impacts of the alternatives, as described in **Section 4.7**, Livestock Grazing/Range Management.

***Alternative A***

Under Alternative A, permitted active use would likely decline to some extent over time, following observed trends. Alternative A would allow the highest level of surface disturbance of all alternatives. The highest cumulative effect would be decreasing forage availability in the planning area.

***Alternative B***

Under Alternative B, while permitted AUMs would not be directly reduced, as compared to Alternative A, permitted active use would decline to a greater extent over time. This would be due to the implementation of grazing management changes to meet GRSG habitat objectives. These objectives include potential grazing management changes and restrictions on structural improvements and water developments. As a result, forage availably may increase in GRSG habitat, although this forage would generally not be available for livestock use. Surface-disturbing activities would be sited in lower priority habitat areas and mainly in nonhabitat areas. This would increase cumulative impacts in these areas.

***Alternative C***

The greatest impacts on livestock grazing in the planning area would be seen in Alternative C, due to the elimination of all AUMs within occupied habitat. The elimination of grazing in occupied habitat could reduce overall livestock grazing, both inside and outside the planning area. Many livestock operations that rely on BLM-administered lands also incorporate private and leased lands in their operations. Private and leased grazing lands are often limited and may not be able to absorb the grazing use that is eliminated from BLM-administered lands.

Elimination of grazing in occupied habitat would likely result in operations going out of business. In other cases, greater reliance on private lands could also put additional pressure on forage resources. It also could accelerate the conversion of private native range at a local level, potentially including GRSG habitat, to agricultural or introduced grass production.

***Alternative D***

Cumulative impacts under Alternative D are similar to those described under Alternative B. However, there would be some increased flexibility for restricting land use. As a result, increasing forage level in GRSG habitat and shifting grazing to non-GRSG habitat may be moderated, along with economic impacts on area permittees.

***Alternative E***

Under Alternative E, management direction would decrease disturbance focused in areas near seasonally important GRSG habitat and leks. As a result, forage in these areas and disturbance in other areas may increase.

***Alternative F***

Under Alternative F, permitted grazing would be reduced. Areas open to grazing would be reduced by approximately 25 percent, and permitted AUMs would be reduced approximately 62.5 percent in GRSG habitat. As discussed for Alternative C, the reduction of grazing in occupied habitat could reduce overall livestock grazing, both inside and outside the planning area. This also may have economic impacts on local permittees and lessees. In addition, prohibiting structural range improvements and new water developments under Alternative F would further decrease grazing for both BLM lands and the area overall. This would increase forage availability but could lead to closures or reductions in grazing should operators go out of business.

### 5.1.9 Recreation

The cumulative impact analysis area used to analyze cumulative impacts on recreation is the planning area and all big game herd units that intersect the planning area. Any activities that affect game populations would in turn impact wildlife viewing and hunting because of the loss or gain of the number of animals. The cumulative impact analysis area also extends along major roads, trails, and rivers, where management inside the planning area could impact use outside of it.

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area have affected and will likely continue to affect recreation surrounding BLM and Forest Service management plans and increased visitation (especially from residents in the planning area and those from the surrounding region). Actions identified in **Table 5-1** that change recreation settings through development or cause the route network to become more congested will also affect recreation. These actions are usually related to energy development or transmission. Overall, these actions are not expected to influence cumulative impacts because of the large remote character of much of the cumulative impact analysis area.

The proposed Steens Mountain Comprehensive Recreation Plan would improve recreational opportunities and experiences in the Steens Mountain Cooperative Management and Protection Area by maintaining facilities, creating new facilities and trails, closing roads, and providing interpretation. Impacts would only occur in and adjacent to the Steens Mountain Cooperative Management and Protection Area.

***Alternatives Analysis***

Under Alternatives A and C, existing recreation opportunities would be maintained. Fuels treatments and road and trail infrastructure upgrades are expected to benefit recreation by improving the recreational setting and opportunities.

Under Alternative B, limits on road construction in PPMA would reduce new opportunities for motorized recreation in the long term. This could result in localized congestion and user conflicts if motorized travel were to increase in popularity. Eliminating all cross-country motorized travel would result in a cumulative loss of cross-country recreation opportunities. Some users would go elsewhere to seek these opportunities, but there are few lands within the analysis area open to cross-country use.

Under Alternative D, adding stipulations to SRPs to protect GRSG and their habitat could force permittees to move their businesses and events onto lands not administered by the BLM in the planning area. This is not expected to result in a loss of recreation opportunities because organized recreation would be shifted to new locations or times of the year.

Cumulative impacts under Alternative E are similar to those under Alternative D. Conservation measures and relocation requirements for SRPs would result in seasonal and locational shifts in organized recreation, but they are not expected to result in large-scale loss of recreation opportunities.

Impacts under Alternative F are the same as those described under Alternative B.

### 5.1.10 Travel Management

The cumulative impact analysis area used to analyze cumulative impacts on travel management includes the planning area and extends along major roads and trails where management inside the planning area could impact use outside it.

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect travel management are increased use of the travel system and any new actions that introduce additional traffic or reduce or expand the travel system. Actions identified in **Table 5-1** that would impact travel management are travel system maintenance, energy development, and expansion of the WUI. Overall, these actions are not expected to influence cumulative impacts because of the large remote character in much of the cumulative impact analysis area. Impacts would be localized, occurring in the vicinity of these new actions and near population centers.

***Alternative A***

Under Alternative A, existing travel opportunities would be maintained, and the existing travel network would continue to meet the public's needs.

***Alternative B***

Eliminating all cross-country motorized travel would result in a cumulative loss of cross-country travel opportunities. Some users would go elsewhere for cross-country travel opportunities, but there are few lands within the analysis area open to cross-country use. Other cross-country travel systems may be less capable of accommodating extensive cross-country use; the multijurisdictional travel system encompassing the analysis area may be unable to accommodate demand.

***Alternative C***

Impacts are the same as those under Alternative A.

***Alternative D***

Impacts are the same as those under Alternative B.

***Alternative E***

Restricting motorized use near leks during breeding season (approximately March 1 through July 15) would seasonally limit access in certain parts of the decision area. It could cause travel to be shifted onto private or state lands in the planning area during breeding season.

***Alternative F***

Prohibiting new road construction and road upgrades in occupied GRSG habitat could result in localized congestion and user conflicts if motorized travel were to increase in popularity. This could cause travel to shift onto private or state

lands and the potential for increased impacts on travel management if those travel systems were ill-equipped for an increase in use.

### 5.1.11 Lands and Realty

The cumulative impact analysis area used to analyze cumulative impacts on lands and realty includes all lands within the planning area boundary.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect lands and realty are land use authorizations. Past authorizations include those for linear features, such as roads, power lines, and the Ruby Natural Gas Pipeline, and site ROW features such as communication towers and wind energy projects. There is expected to be a steady increase in demand for ROWs to accommodate new power, water, and telecommunication lines, wind projects, and communication sites. Major realty actions currently being considered in the sub-region include the Boardman to Hemingway and McNary-John Day 500-kV transmission line projects, other smaller transmission line projects, wind and geothermal energy projects with associated intertie lines, and communication sites. BLM management prescriptions that would limit the BLM's ability to accommodate ROW development would influence the level of cumulative impacts on lands and realty.

National policies to expand renewable energy production could also contribute to direct and indirect long-term cumulative impacts on the lands and realty program and be affected to various degrees by the proposed alternatives. As part of his 2013 Climate Action Plan, President Obama set a new energy goal of 10 new gigawatts of new renewable energy permitted on DOI lands by 2020 (The White House 2013). This is expected to increase the demand for renewable energy ROWs in the planning area. Wind energy potential in the planning area is moderate to high (NREL 2009a), so alternatives that would restrict renewable energy development would have the greatest effect on the number of wind energy ROWs authorized under the lands and realty program.

***Alternative A***

Impacts on lands and realty across alternatives depend largely on the number of acres where the BLM would exclude or avoid new ROW development. Under Alternative A, the BLM would continue to authorize ROW development and temporary surface disturbance on a case-by-case basis. There would continue to be 857,600 acres of ROW exclusion areas and 3,445,700 of ROW avoidance areas. As a result, cumulative impacts on lands and realty would occur only as new ROWs are proposed within avoidance areas. Alternative A would not further affect the BLM's ability to accommodate new ROW development.

***Alternative B***

BLM management would include increased levels of ROW restrictions, when compared to Alternative A. Designations of areas as avoidance or exclusion would not impact existing ROW authorizations. The restrictions would,

however, impact the BLM's ability to accommodate future ROWs. Alternative B would prohibit ROW development in PPMAs (4,547,000 acres) and avoid new ROWs in PGMAs (5,662,600 acres). A prohibition on ROW development, particularly electrical transmission lines and wind energy developments in PPMAs, would prevent the BLM from accommodating demand for new ROWs in those areas. Potential ROW applicants could seek authorizations in PGMAs, subject to special siting and design conditions, or could choose to develop on land not administered by the BLM within or outside the planning area. This could increase environmental impacts on sensitive lands, increase permitting times, and decrease the overall effectiveness of the infrastructure system (i.e., the power grid, telecommunication system, or roadway network).

Development on adjacent lands could also result in indirect effects on BLM-administered lands (e.g., via increased vehicle traffic or requests for ROW authorizations for transmission lines). ROW development could also be directed to BLM lands outside the planning area, which would increase the workload on the BLM lands and realty programs in those areas, while decreasing workload for offices with lands in the planning area.

***Alternative C***

Alternative C would result in the greatest restriction on ROW development by designating PPMAs and PGMAs (10,216,400 acres) as ROW exclusion. ROW restrictions under Alternative C would eliminate the BLM's ability to accommodate new ROWs, including large-scale transmission lines, wind energy projects, and new or expanded communication facilities. Since southeastern Oregon has the greatest wind energy potential in the state (NREL 2009a), exclusion designations would decrease the state's overall wind energy generation capacity.

ROW applicants could seek authorizations on land not administered by the BLM but inside the planning area. This could increase environmental impacts on sensitive lands, increase permitting times, and decrease the overall effectiveness of the infrastructure system (i.e., the power grid, telecommunication system, or roadway network).

Development on adjacent lands could also result in indirect effects on BLM-administered lands (e.g., via increased vehicle traffic or requests for ROW authorizations for transmission lines). ROW development could also be directed to BLM lands outside the planning area. This would increase the workload on the BLM lands and realty programs in those areas, while decreasing workload for offices with lands in the planning area.

***Alternative D***

Alternative D would increase the number of acres managed as ROW avoidance in PPMAs by 2,617,900 acres (61 percent), compared to alternative A. Potential ROW applicants could seek authorizations in PPMAs, subject to special siting and design conditions that minimize surface disturbance (e.g. underground

placement), or they could choose to develop in areas outside PPMAs. Accordingly, Alternative D would result in greater impacts on lands and realty than Alternative A, but less than Alternatives B and C.

***Alternative E***

Cumulative impacts under Alternative E are the same as Alternative B for core habitat areas and the same as Alternative A for low-density habitats.

***Alternative F***

Cumulative impacts under Alternative F are the same as Alternative B.

### 5.1.12 Fluid Minerals

The cumulative impact analysis area used to analyze cumulative impacts on fluid minerals is the planning area, which covers 31,756,500 acres.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect fluid minerals are existing and planned fluid mineral development projects on nonfederal mineral estate within the planning area. Reasonably foreseeable development scenarios and mineral potential reports were not completed for this RMPA/EIS. Therefore, all estimates of future activity are based on **Table 5-1** and on the BLM's assessment of fluid mineral trends.

The management actions proposed under this RMPA/EIS would cumulatively impact fluid mineral development through surface use restrictions (e.g., closures and NSO, CSU, and TL stipulations) that ultimately could decrease the amount of fluid mineral development in the planning area during the planning period.

Applying NSO stipulations could create cumulative closure impacts if areas surrounded by NSO buffers are beyond the reach of current drilling technologies. Closures and NSO stipulations would be the most likely management actions being considered in this RMPA/EIS to decrease fluid mineral development in the planning area. This decrease would have cumulative impacts by potentially increasing the need for foreign fuel imports due to a decrease in domestic availability of energy resources.

Additionally, the demand for mineral materials in the planning area may decrease due to reduced construction in the planning area. National policies to expand renewable energy production could also contribute to direct and indirect long-term cumulative impacts on the fluid minerals program and be affected to various degrees by the proposed alternatives.

As part of his 2013 Climate Action Plan, President Obama set a new energy goal of 10 new gigawatts of new renewable energy permitted on DOI lands by 2020 (The White House 2013). This is expected to increase the demand for renewable energy in the planning area. All of eastern Oregon has favorable geothermal resource potential (NREL 2009b). Because of this, alternatives that

would restrict geothermal development could impact the federal government's ability to achieve the renewable energy goal set by President Obama.

Because closures and NSO stipulations would have the greatest impact on fluid mineral development, the cumulative effects of these management actions are discussed below. Managing areas as ROW exclusion or avoidance could also decrease the amount of fluid mineral development in the planning area. This would be due to limitations on access to both federal mineral estate and non-federal minerals. Operators would not be able to develop new roads through ROW exclusion areas to access mineral resources, and development of new roads through ROW avoidance areas would be difficult.

Applying a three percent cumulative disturbance cap would cause land uses on private, state, and other surface lands to have a cumulative impact on mineral materials in the planning area. If activities on private, state, and other surface lands disturbed the full three percent of the GRSG habitat in the planning area, no further activities would be allowed on BLM-administered surface or on federal mineral estate. This would include mineral material development.

As described in **Section 3.11**, Fluid Leasable Minerals, Oregon is considered a pioneering area for fluid minerals. As such, oil and gas is not expected to be developed in the state unless economic conditions change. However, testing for natural gas is planned in the Vale District. Geothermal resources also exist throughout the planning area, and developers have expressed interest in extracting these resources in the foreseeable future.

***Alternative A***

Under Alternative A, 3,134,200 acres (10 percent) of the minerals in the planning area would remain closed to fluid mineral development, and another 906,000 acres (3 percent) would remain subject to NSO stipulations. Cumulative impacts of these closures and NSO stipulations would be of the type described under **Section 5.1.12**, Fluid Minerals. Additionally, 4,303,300 acres (14 percent) of the planning area would continue to be managed as ROW exclusion or avoidance areas. These avoidance or exclusion areas would make it difficult for new fluid mineral project developers to construct necessary facilities. Because of this, management of these areas could cumulatively impact fluid mineral development in the planning area, as described under **Section 5.1.12**.

***Alternative B***

The BLM would close 6,762,920 acres (21 percent) of the minerals in the planning area to fluid mineral development under Alternative B. The increase in acres closed compared to Alternative A represents 11 percent of the planning area. Approximately 796,800 acres (3 percent) of the minerals in the planning area would be subject to NSO stipulations. The decrease in acres subject to NSO stipulations, compared with Alternative A, is because acres subject to NSO stipulations under Alternative A would be closed under Alternative B.

Alternative B would also apply the three percent cap on disturbance within PPMAs. If development on private, state, or other lands were to disturb three percent of PPMAs, further development would not be allowed on BLM-administered lands or federal mineral estate. Because more of the planning area would be closed to fluid mineral development under Alternative B, the level of fluid mineral development in the planning area would likely decrease, compared with Alternative A. This decrease would reduce the supply of fluid minerals in Oregon and the United States and would impact the domestic energy mix, as described under **Section 5.1.12**.

Managing PPMAs as ROW avoidance would not have a cumulative impact on fluid minerals because these areas would be closed to fluid mineral development under Alternative B. Managing PGMAs as ROW avoidance areas (5,662,600 acres, or 18 percent of the planning area) would also reduce the level of new fluid mineral development in the planning area by restricting construction of new roads and pipelines.

***Alternative C***

The BLM would close 10,895,300 acres (34 percent) of the planning area to fluid mineral development. The increase in acres closed compared to Alternative A represents 24 percent of the minerals in the planning area. Approximately 791,800 acres (2 percent) of the minerals in the planning area would be subject to NSO stipulations. The decrease in acres subject to NSO stipulations is because acres subject to NSO stipulations under Alternative A would be closed under Alternative C. Because more of the planning area would be closed to fluid mineral development under Alternative C, the level of fluid mineral development would likely decrease, compared with Alternative A. This decrease would reduce the supply of fluid minerals in Oregon and the United States and would impact the domestic energy mix, as described under **Section 5.1.12**.

Managing occupied habitat as ROW exclusion areas would not have a cumulative impact on fluid minerals because these areas would be closed to fluid mineral development under Alternative C.

***Alternative D***

Under Alternative D, the BLM would close 3,604,400 acres (11 percent) of the minerals in the planning area to fluid mineral development. The increase in acres closed compared to Alternative A represents 1 percent of the planning area. Alternative D would also apply the three percent cap on disturbance within PPMAs. If development on private, state, or other lands were to disturb three percent of PPMAs, further development would not be allowed on BLM-administered lands or federal mineral estate.

The use of a buffer system surrounding GRSG leks would result in application of NSO stipulations to 3,787,900 acres (12 percent) of the minerals in the planning area. The increase in acres subject to NSO stipulations, compared to Alternative A, represents 9 percent of the planning area.

As discussed under **Section 5.1.12**, application of NSO stipulations could create cumulative closure effects if areas within NSO buffers were not reachable using directional drilling technology. This, in turn, could result in reduced fluid mineral development in the planning area.

Managing PPMAs as ROW avoidance areas would impact fluid mineral development within those areas by restricting access to those minerals, as described under **Section 5.1.12**. Because much of the federal mineral estate within PPMAs would be subject to NSO stipulations under Alternative D, the cumulative impacts on fluid minerals of managing PPMAs as ROW avoidance would be limited.

***Alternative E***

The cumulative impacts on fluid minerals are the same as those described under Alternative B.

***Alternative F***

The cumulative impacts on fluid minerals are the same as those described under Alternative C.

### 5.1.13 Locatable Minerals

The cumulative impact analysis area used to analyze cumulative impacts on locatable minerals is the planning area, which covers 31,756,500 acres.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect locatable minerals are existing and planned locatable mineral operations on nonfederal mineral estate within the planning area. Locatable mineral activity is occurring throughout the planning area, and there is interest in additional development of locatable mineral resources within GRSG habitat. There is also interest in uranium development in the Vale District. Reasonably foreseeable development scenarios and mineral potential reports were not completed for this RMPA/EIS. Therefore, all estimates of future activity are based on **Table 5-1** and on the BLM's assessment of locatable mineral trends.

Withdrawing an area from locatable mineral entry precludes locatable mineral resource development in that area. This would decrease the total amount of locatable mineral development in the planning area. It would in turn reduce the amount of locatable minerals available to markets within Oregon and the United States, which could impact industries that depend on these minerals. For example, high tech industries and renewable energy developers depend on certain locatable minerals as raw materials. If these minerals were to become scarcer as a result of the withdrawals recommended under this RMPA/EIS, additional imported materials could be required.

Applying a three percent cumulative disturbance cap would cause land uses on private, state, or other surface lands to have a cumulative impact on locatable

minerals in the planning area. Activities on private, state, or other surface lands could disturb the full three percent of the GRSG habitat in the planning area. In such a case, plans of operation for locatable mineral development on BLM-administered surface or on federal mineral estate would be required to incorporate mitigation measures to avoid further surface disturbance.

***Alternative A***

Under Alternative A, 996,800 acres would remain withdrawn from locatable mineral entry, and 20,500 acres would be recommended for withdrawal, for a total of 1,017,300 acres (3 percent of the planning area). Locatable mineral development would still be allowed in the remaining 97 percent of the planning area, with limited impacts on supply from withdrawals.

***Alternative B***

In addition to the 996,800 withdrawn acres, the BLM would recommend for withdrawal 4,490,500 acres, for a total of 5,487,300 acres (17 percent of the planning area). The increase in acres withdrawn or recommended for withdrawal between Alternative A and Alternative B represents 14 percent of the planning area. If all of these acres were withdrawn by Secretarial Order or Act of Congress, locatable mineral development and availability in the planning area would decrease, with the effects described under **Section 5.1.13**. Alternative B would also apply the three percent cap on disturbance within PPMAs. If development on private, state, or other lands were to disturb three percent of PPMAs, further development would not be allowed on BLM-administered lands or federal mineral estate.

***Alternative C***

In addition to the 996,800 withdrawn acres, the BLM would recommend for withdrawal 9,653,400 acres, for a total of 10,650,200 acres (34 percent of the planning area). The increase in acres withdrawn or recommended for withdrawal between Alternative A and Alternative C represents 31 percent of the planning area. If all of these acres were withdrawn by Secretarial Order or Act of Congress, locatable mineral development and availability in the planning area would decrease, with the effects described under **Section 5.1.13**. This alternative would have the greatest cumulative impacts because it recommends the most acres for withdrawal.

***Alternative D***

The cumulative impacts on locatable minerals are similar to those under Alternative A. However, Alternative D would apply the three percent cap on disturbance within PPMAs. If development on private, state, or other lands were to disturb three percent of PPMAs, further development would not be allowed on BLM-administered lands or federal mineral estate.

***Alternative E***

The cumulative impacts on locatable minerals are the same as those under Alternative B.

***Alternative F***

The cumulative impacts on locatable minerals are the same as those under Alternative B.

### 5.1.14 Mineral Materials (Salables)

The cumulative impact analysis area used to analyze cumulative impacts on mineral materials is the planning area, which covers 31,756,500 acres.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect mineral materials are existing and planned mineral material development projects on nonfederal mineral estate within the planning area. Reasonably foreseeable development scenarios and mineral potential reports were not completed for this RMPA/EIS. Therefore, all estimates of future activity are based on **Table 5-1** and on the BLM's assessment of mineral material trends.

Closing areas to mineral material disposal would decrease the level of mineral material development within the planning area. This would reduce the available supply of minerals for construction projects. Because construction typically uses mineral materials from nearby, the decrease in locally available supplies would impact the feasibility of these projects. For example, development for renewable energy, fluid minerals, locatable minerals, and nonenergy solid leasable minerals and highway construction all depend on mineral materials. These project developers would have to source mineral materials from farther away, or the projects may not be able to be completed if mineral materials are not locally available.

Applying a three percent cumulative disturbance cap would cause land uses on private, state, or other surface lands to have a cumulative impact on mineral materials in the planning area. If activities on private, state, or other surface lands were to disturb the full three percent of PPMAs in the planning area, no further activities, including mineral material development, would be allowed on BLM-administered surface or on federal mineral estate.

***Alternative A***

Under Alternative A, 2,752,500 acres (9 percent) of the planning area would continue to be closed to mineral materials disposal. Developers could not create new mineral material pits within these areas. The availability of mineral materials to supply construction projects on state, private, BLM-administered, or other lands would be reduced, as described under **Section 5.1.14**, Mineral Materials (Salables).

***Alternative B***

The number of acres closed to mineral material disposal would increase to 7,105,500 acres (22 percent of the planning area). The increase in acres closed

to mineral material disposal compared to Alternative A represents 13 percent of the planning area.

More acres would be closed to mineral material disposal under Alternative B. Because of this, the availability of mineral materials to supply construction projects in the planning area would be reduced. Additionally, 5,662,600 acres within PGMAs would be managed as ROW avoidance areas.

This management would restrict development of construction projects, such as road building, that create demand for mineral materials. As such, it would reduce mineral material development in the planning area.

Alternative B would also apply the three percent cap on disturbance within PPMAs. If development on private, state, or other lands were to disturb three percent of PPMAs, further development would not be allowed on BLM-administered lands or federal mineral estate.

***Alternative C***

The number of acres closed to mineral material disposal would increase to 10,682,100 acres (34 percent of the planning area). The increase in acres closed to mineral material disposal, compared to Alternative A, represents 25 percent of the planning area. More acres would be closed to mineral material disposal under Alternative C. Because of this, the availability of mineral materials to supply construction projects in the planning area would be reduced. This alternative would close the most acres to mineral material disposal and would therefore have the greatest cumulative impact within the planning area.

***Alternative D***

Cumulative impacts on mineral materials are the same as those under Alternative B.

***Alternative E***

Cumulative impacts on mineral materials are the same as those under Alternative B.

***Alternative F***

As with Alternative B, the BLM would close 7,105,500 acres (22 percent) of the planning area to mineral material disposal. Therefore, the availability of mineral materials in the planning area would decrease. However, demand for mineral materials in the planning area would greatly decrease on the additional 5,669,400 acres (18 percent) of the planning area that would be managed as ROW exclusion. Therefore, new mineral material development would not occur on the 12,774,900 acres (40 percent) of the planning area that would be either closed to mineral material disposal or closed to the activities that create demand for mineral materials.

### 5.1.15 Nonenergy Leasable Minerals

The cumulative impact analysis area used to analyze cumulative impacts on nonenergy leasable minerals is the planning area, which covers 31,756,500 acres.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect nonenergy leasable minerals are existing and planned nonenergy leasable development projects on nonfederal mineral estate within the planning area. Reasonably foreseeable development scenarios and mineral potential reports were not completed for this RMPA/EIS. Therefore, all estimates of future activity are based on **Table 5-1** and on the BLM's assessment of nonenergy leasable mineral trends.

As discussed in **Section 3.14**, Nonenergy Leasable Minerals, most nonenergy leasable mineral development in the planning area occurs on hardrock mineral deposits beneath acquired lands. The trends for these minerals are the same as those for locatable mineral activity, which is occurring throughout the planning area.

Closing areas to nonenergy leasable mineral development would reduce the availability of hardrock minerals from within the planning area. These minerals are necessary for raw materials in such sectors as high tech industries and renewable energy. Therefore, development in these planning area sectors could be impacted by reduced supplies of hardrock minerals from beneath acquired lands.

Applying NSO stipulations to nonenergy leasable mineral development restricts that development. This could either make such development impossible or cause developers to move to private, state, or other lands with similar resources that do not have such restrictions. Therefore, development of nonenergy leasables on federal mineral estate in the planning area could decrease as a result of NSO stipulations.

Applying a three percent cumulative disturbance cap would cause land uses on private, state, or other surface lands to have a cumulative impact on nonenergy solid leasable minerals in the planning area. If activities on private, state, or other surface lands were to disturb the full three percent of the GRSG habitat in the planning area, no further activities, including nonenergy solid leasable mineral development, would be allowed on BLM-administered surface or on federal mineral estate.

***Alternative A***

Approximately 3,134,200 acres (10 percent) of the planning area would remain closed to nonenergy solid mineral prospecting and leasing. These closures would reduce the availability of hardrock minerals in the planning area, as described under **Section 5.1.15**.

***Alternative B***

The BLM would close 7,157,800 acres (23 percent) of the planning area to nonenergy solid mineral prospecting and leasing. The increase in acres closed compared with Alternative A represents 13 percent of the planning area. Because more of the planning area would be closed to nonenergy solid leasable mineral development under Alternative B, the cumulative impacts of reduced supplies of hardrock minerals would be more severe. Alternative B would also apply the three percent cap on disturbance within PPMAs. If development on private, state, or other lands were to disturb three percent of PPMAs, further development would not be allowed on BLM-administered lands or federal mineral estate.

***Alternative C***

The BLM would close 11,085,800 acres (35 percent) of the planning area to nonenergy solid mineral prospecting and leasing. The increase in acres closed compared with Alternative A represents 25 percent of the planning area. Because more of the planning area would be closed to nonenergy solid leasable mineral development under Alternative C, the cumulative impacts in the form of reduced supplies of hardrock minerals would be more severe. Alternative C represents the most restrictive management of nonenergy solid leasable minerals. For this reason, it have the greatest cumulative impacts within the planning area.

***Alternative D***

The BLM would apply NSO stipulations to nonenergy solid mineral leases on 4,756,900 acres (15 percent) of the planning area. Like Alternative A, 3,134,200 acres (10 percent) of the planning area would remain closed to nonenergy solid mineral prospecting and leasing.

Areas would be subject to NSO stipulations under Alternative D, where they would not be subject to those stipulations under Alternative A. As such, nonenergy leasable mineral development in the planning area would be more restricted under Alternative D. Development of nonenergy leasable minerals on federal mineral estate in the planning area may decrease, with the supply impacts described under **Section 5.1.15**.

Alternative D would also apply the three percent cap on disturbance within PPMAs. If development on private, state, or other lands were to disturb three percent of PPMAs, further development would not be allowed on BLM-administered lands or federal mineral estate.

***Alternative E***

Cumulative impacts on nonenergy leasable minerals are the same as those under Alternative B.

***Alternative F***

Cumulative impacts on nonenergy leasable minerals are the same as those under Alternative B.

### 5.1.16 Special Designations

This cumulative impact analysis focuses on Areas of Critical Environmental Concerns. This is the only special designation discussed in **Section 3.15**, Special Designations, which would be affected by any of the alternatives.

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect ACECs are any that would impact the relevant and important values for which the ACECs were established (e.g., GRSG habitat health). Such actions are surface-disturbing activities, wildland fires, increased recreational demands, and climate change.

Cumulative impacts on existing ACECs under the various alternatives could result from actions and decisions not associated with the BLM on lands next to ACECs. While protections exist within the ACECs, population growth, development, and recreation throughout the planning area could, over time, encroach on these areas. The ACEC values could be degraded by such as factors as unauthorized off-route travel, trash dumping, increased noise, air pollution, and light pollution. Other impacts include species displacement, habitat fragmentation, and changes to the visual landscape that could affect resources within ACECs. Impacts would be greater where recreation areas or development are next to an ACEC.

There are a few proposed transmission lines and pending energy development projects within the planning area. If these transmission lines, facilities, or associated roads were to run through or be next to any of the ACECs, it could damage the relevant and important values for which these ACECs are designated. Future transmission line construction, energy development, and roads in the planning area could result in cumulative impacts on existing ACECs. Examples of long-term impacts on the ACEC from these activities are noise, heavy vehicle traffic, and dust.

Ongoing weed treatment, fuels management, and restoration projects in the planning area could also result in short-term cumulative impacts on ACECs; however, they would likely improve ACEC values in the long term by maintaining natural vegetation.

Climate change could also pose a long-term threat of cumulative impacts on the relevant and important values of ACECs. Cumulative impacts on GRSG habitat, and consequently on the ACEC, from climate change could include vegetation regime changes (e.g., from sagebrush to grasslands) and increased wildfire potential due to drought (Connelly et al. 2004).

***Alternatives Analysis***

All action alternatives would restrict such activities as ROW development, livestock grazing, mineral entry, and new road construction. This could indirectly protect ACECs. Additionally, ACEC management includes restrictions, such as the application of NSOs, that protect ACECs from uses and actions that would impair important and relevant values. Despite these protections, over time ACECs could experience cumulative impacts from existing and future ROWs, oil, gas, and geothermal development, and travel routes in the vicinity. Impacts are described in **Section 4.15.2**, Nature and Type of Effects, and include impacts such as soil erosion, disturbance of GRSG populations and vegetation due to construction, operation and maintenance, and habitat fragmentation.

The seven ACECs that identify GRSG as an important and relevant value could experience additional protections. They could have more restrictions on resource uses and surface-disturbing activities than ACECs that do not identify GRSG as an important and relevant value. Moreover, the 59 ACECs identified in **Appendix I**, Greater Sage-Grouse Habitat Density in Areas of Critical Environmental Concern, as having high percentages of GRSG habitat are also more likely to experience protections from GRSG management actions.

Under Alternatives C and F, new ACECs would be created for the important and relevant value of GRSG. Additionally, under Alternative D, ACECs with large proportions of GRSG habitat would be managed for GRSG conservation, and, as such, would restrict resource uses within those ACECs. The ACECs under Alternatives C, D, and F would be less likely to experience cumulative degradation to their important and relevant values due to management actions focused on GRSG conservation.

The BLM would adaptively manage to protect ACEC values and minimize impacts where applicable and feasible.

### 5.1.17 Soil Resources

The cumulative impact analysis area used to analyze cumulative impacts on soils covers the planning area. Under all alternatives, federal and state laws, regulations, standards, assessments, and BMPs would be applied to rangeland management, ROW authorizations, travel management, and mineral development. Under all alternatives, the BLM would continue to authorize ROW development and temporary surface disturbance on a case-by-case basis. Effects under the different alternatives are the result of the number of acres open or closed to surface disturbance.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect soil resources are those associated with surface-disturbing activities.

Disturbing land surface can expose soils to wind and rain, which can increase soil erosion rates and compact the soil. This may increase surface runoff and result in less vegetation due to the creation of root restrictive soil layers.

Management programs that disturb land surface are livestock grazing and wild horse and burro management, travel management designations, lands and realty management and associated transmission lines, wildland fire management, vegetation management, and energy and mineral development. Projects that initially disturb the surface but eventually improve soil health are improvement and restoration projects that are based on vegetation and habitat management objectives and wildland fire management.

Operations and developments that impact soil surface are ROW authorizations and associated transmission lines, roads granted under the lands and realty program, and mineral and energy development projects approved by the mineral program.

Planned and reasonably foreseeable projects and actions that may affect soil resources within the planning area are 5 ROW authorizations involving 4 transmission lines, and a communication site upgrade; 9 energy and mineral developments, involving a natural gas project, 3 wind energy projects, and 5 mineral developments; 24 vegetation management projects, including 7 fire-specific projects and 4 projects specifically dealing with invasive weeds; a recreation plan that involves building new facilities and trails; a district-wide wild horse gather; and 37 livestock grazing permit renewals. These projects, developments, and land management actions are detailed in **Table 5-1.**

Alternative C would be the most restrictive alternative and therefore the most protective of soil resources. Alternative F would be the second most restrictive, and Alternative B would be the third. Alternative A would be the least restrictive, while Alternatives D and E would be more restrictive than A, but less restrictive than B, F, or C. Alternative D would be more restrictive than E. From the most restrictive to the least restrictive, the alternatives are C, F, B, D, E, and A.

Under all alternatives, vegetation management would occur. Of the 24 vegetation management projects, 10 would use prescribed fire or pile burning to reduce hazardous fuels and juniper pine expansion. Four more projects would reduce hazardous fuels through mechanical removal, and three more would focus on post-fire stabilization and rehabilitation through reseeding.

Vegetation management projects would have the same effects on soil resources under any chosen alternative. Fire management disturbs and compacts soil during mechanical removal of vegetation and prescribed fire treatment; however, fuels reduction and fuel breaks allow for better management and better response to an active wild fire. They also may decrease the number of acres burned during a fire.

A fire of any size can impact soil resources through the loss of stabilizing vegetation cover. This would increase erosion rates. Depending on its severity and intensity, fire can alter the soil's physical, chemical, and biological properties and open the area burned to potential invasive weeds. After-fire stabilization and reseeding can reduce overall erosion of the exposed soil from wind and water and can reduce the potential for weed invasion.

The remaining vegetation management projects focus on reducing weeds in the planning area (four projects) and vegetation management (five projects), mainly removing juniper pine in an effort to return vegetation communities to historic compositions. Vegetation management is initially disturbing to soils when undesirable vegetation is removed and native seed is planted using heavy equipment that rips up soils. Success of vegetation management may not improve soil health for years after the initial disturbance.

***Alternative A***

Under Alternative A, current management would continue on BLM-administered lands in the planning area. There would be no PPMA or PGMA designated, and most land use plans would not implement use restrictions (e.g., ROW exclusion, travel management restrictions, livestock grazing closures, and energy and mineral development closures) to protect GRSG habitat. Planned ROW construction may increase compaction and erosion of soils. This would be the case if associated roads, transmission lines, or pipelines were cleared of vegetation and constructed. Also, new fluid mineral developments would increase loss of vegetation cover through both permanent and temporary roads, drilled wells and associated well pads, and soil excavations during mineral extraction. In addition, fluid mineral development may require associated pipelines and transmission lines, along with the construction of necessary service roads for these facilities.

Some use restrictions would be implemented, which would protect soils in these areas from degradation or removal. Overall, Alternative A would allow the highest level of surface disturbance of all alternatives; therefore, Alternative A would provide for the most possible impacts on soil resources from ROW and mineral developments, livestock grazing, and travel management.

***Alternative B***

Under Alternative B, PPMA and PGMA would be designated as ROW exclusion and avoidance areas. This would concentrate potential impacts from ROW authorizations and associated road or transmission line projects to nonhabitat areas. Alternative B would provide for more ROW exclusion acres than Alternatives A, D, and E and less ROW exclusions acres than Alternatives C and F. ROW exclusion areas are protected from surface-disturbing activities of ROW authorizations and associated roads and structures.

Alternative B would close fewer acres to livestock grazing than Alternatives D, C, and F. It would close the same number of acres to livestock grazing as

Alternatives A and E. The 37 planned livestock grazing permit renewals may be impacted, depending on their location to the livestock grazing closures.

Alternatives B, D, and F would all manage 7,996,000 acres as restricted to existing trails. This is more than Alternatives A and E and less than Alternative C. More restriction on cross-country travel may result in more predictable, localized, and manageable impacts on soil resources. Alternatives B, C, D, and F would manage 300,300 of acres as closed to cross-country travel management, which is greater than Alternatives A and E. Overall, Alternative B would provide for more travel restrictions than Alternative, A and E, the same amount as Alternatives D and F, and less than Alternative C.

Alternative B has more acres closed or withdrawn from energy and mineral development (locatables, leasables, nonenergy leasables, and mineral materials) than Alternatives A and D. It has the same number of acres closed as Alternative E and fewer acres closed to energy and mineral development than Alternatives C and F. Alternatives B and F have the same amount of closures to locatable mineral entry, mineral material disposal, and nonenergy leasable minerals. Alternatives B has fewer acres closed to fluid mineral leasing than Alternative F. Alternatives B and D have the same amount of mineral material disposal, and Alternative B has more acres closed to nonenergy leasables, fluid mineral leasing, and locatable mineral entry than Alternative D. Alternative B would provide for more protection of soil resources from mineral and energy development than Alternatives A and D and the same amount of protection as Alternative E.

Overall, Alternative B would be more protective of soil resources than Alternatives A and D and less protective than Alternatives C and F. While Alternatives B and E are similar in their amount of closures to mineral resources, Alternative B has more closures to livestock grazing, more ROW exclusion areas, and more acres restricted to existing roads and trails than Alternative E. This makes Alternative B more protective of soil resources than Alternative E.

***Alternative C***

Alternative C would remove all grazing from the project area. This would eliminate any impacts on soil resources from livestock grazing, including trampling of vegetation and compaction of soil near water resources. Alternative C would not allow for the renewal of the 37 livestock grazing permits that are reasonably foreseeable actions.

Alternative C would also close the most acreage to mineral entry, which may prevent some of the 15 planned energy and mineral development projects.

Additionally, Alternative C would have the greatest amount of ROW exclusion and avoidance areas and would limit the most amount of acreage to existing routes under travel management. Alternative C would concentrate ROW

authorization and associated transmission lines and roads outside of GRSG habitat and would concentrate impacts from travel management to existing route areas.

Due to the extent of land closures, Alternative C would provide the most protection of soil resources. Alternative C would also result in the most restrictions to the cumulative effects projects. It may prohibit new ROW authorization and developments and mineral and energy development. As a result, Alternative C would result in the greatest reduction in cumulative effects from past, present, and reasonably foreseeable actions, compared to all alternatives.

***Alternative D***

ROW exclusion areas under Alternative D would be the same as Alternative A, and ROW avoidance areas would increase by 2,519,000 acres. The overall effects of lands and realty management are very similar to Alternative A because an increase in ROW avoidance areas does not prohibit ROW authorizations.

Alternative D would be more protective of soil resources from the potential effects of livestock grazing than Alternatives A, B, or E due to more closures to livestock grazing. It would be less protective of soils than Alternatives C and F.

Alternative D would have more restrictions on cross-country travel than Alternatives A and E. It would have the same number of restrictions as Alternatives B and F and fewer than Alternative C.

Alternatives D and A would manage the same amount of closures to locatable mineral entry, fluid mineral leasing, and nonenergy leasables. It would recommended the same amount for acreage for withdrawal for locatable mineral entry. Alternative D would provide for more closures to mineral materials than Alternative A. Overall, Alternative D is more protective of soil resources from mineral development than Alternative A, due to more closures to mineral materials. However, it is less protective of energy and mineral development than Alternatives B, C, E, and F.

Alternative D would be more protective of soil resources than Alternatives A and E from potential impacts from livestock grazing and travel management due to more closures. However, it would be less protective of soil resources from ROW authorizations and associated development and from energy and mineral development than under Alternatives B, C, D, and E.

***Alternative E***

Alternative E would manage for the fewest ROW exclusion areas. It would be less protective of soil resources from the potential effects of ROW authorizations and associated development than Alternatives B, C, and F.

The effects on soil resources from ROW authorizations under Alternative E are similar to those under Alternatives A and D. Alternative E would be less protective of soil resources from the potential effects of livestock grazing than Alternatives B, C, and F. It would have the same number of closures as Alternatives A and D.

The effects on soil resources from livestock grazing under Alternative E are similar to those under Alternatives A and D. Alternative E would manage more acres as restricted to existing roads and trails for cross-country travel as Alternative A but fewer than Alternatives B, C, D, and F.

Energy and mineral development under Alternative E would be managed the same as under Alternative B. As a result, the cumulative impacts from past, present, and reasonably foreseeable actions would be reduced, compared to Alternative A, but to a lesser extent than the other action alternatives.

***Alternative F***

Alternative F would have the same amount of acreage managed as ROW avoidance and exclusion areas as Alternative C. Alternative F would manage the same amount of acreage as limited to existing roads and trails as Alternatives B and D, which are more than Alternatives A and E and less than Alternative C. Alternative F would manage more acres as closed to livestock grazing as Alternatives A, B, D and E and fewer acres than Alternative C. Alternative F would manage the largest the category of acreage as closed to fluid mineral leasing and the second largest amount of acres closed under nonenergy solid leasables, locatables, and mineral material sales.

Alternative F would be less restrictive of surface-disturbing activities than Alternative C, but it would be more restrictive than Alternatives A, B, D, and E. Alternative F could restrict the ROW and mineral developments in **Table 5-1**, which would prevent any impacts on soil resources from these projects.

### 5.1.18 Water Resources

The area used to analyze cumulative impacts on water resources is the entire planning area. Under all alternatives, federal and state laws, regulations, standards, assessments, and BMPs would be applied to rangeland management, ROW authorizations, travel management, and mineral development. Under all alternatives, the BLM would continue to authorize ROW development and temporary surface disturbance on a case-by-case basis. Effects under the different alternatives are the result of the number of acres open or closed to a surface-disturbing activity.

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect water resources are vegetation and habitat management and improvement projects, livestock grazing management, lands and realty management, recreation, travel management, and energy and mineral development.

These management actions disturb land surface; surface-disturbing activities may result in vegetation trampling or clearing and excavation of surface materials, which may increase sedimentation in waterways. In addition livestock may use riparian and wetland areas for water and shade and may congregate around water developments. This would result in compacted soil, decreased water quality due to fecal coliforms, trampled nearby vegetation, and reduced riparian community conditions and hydrologic functionality. These effects could negatively impact water resources, depending on their proximity to waterways, the timing of surface disturbance, local vegetation, and their location in the watershed. The more acreage an alternative closes to surface-disturbing activities, the more protection the alternative affords water resources by eliminating the potential for impact.

Planned and reasonably foreseeable projects and actions that may affect water resources within the planning area are 5 ROW authorizations, involving 4 transmission lines, and a communication site upgrade; 9 energy and mineral developments, involving a natural gas project, 3 wind energy projects, and 5 mineral developments; 24 vegetation management projects, including 7 fire-specific projects and 4 projects specifically dealing with invasive weeds; a recreation plan that involves building new facilities and trails; a district-wide wild horse gather; and 37 livestock grazing permit renewals. These projects, developments, and land management actions are detailed in **Table 5-1.**

As discussed below by alternative, Alternative C would be the most restrictive and therefore the most protective of water resources. Alternative F would be the second most restrictive, and Alternative B would be the third. Alternative A would be the least restrictive, while Alternatives D and E would be more restrictive than Alternative A but less restrictive than Alternatives B, F, or C. Alternative D would be more restrictive than E. From the most restrictive to the least restrictive, the Alternatives are C, F, B, D, E, A.

Vegetation would be managed under all alternatives. Of the 24 vegetation management projects, 10 would use prescribed fire or pile burning to reduce hazardous fuels and to reduce juniper pine expansion. Four projects would reduce hazardous fuels through mechanical removal, and three would focus on post-fire stabilization and rehabilitation through reseeding. Vegetation management projects would have the same effects on water resources under any chosen alternative.

The effects of fire on water resources are determined largely by the severity of the fire, the decisions made relative to any suppression activities, and the immediate post-fire precipitation. Effects of fire on water resources can occur under all alternatives and can include a short-term decrease in water quality. This would be due to increased particulate loads and stream flow and average storm flow discharge as a result of lower vegetation density and reduction in

litter cover. After-fire stabilization and reseeding can reduce overall erosion of the exposed soil from wind and water.

The remaining vegetation management projects focus on reducing weeds in the planning area (four projects) and vegetation management (five projects), mainly removing juniper pine to return vegetation communities to historic compositions. Direct effects of vegetation management may temporarily decrease water quality through increased sedimentation of waterways from undesirable vegetation clearing or burning. The long-term effects of vegetation management would protect water quality by reducing runoff and sedimentation into surface waters through stabilizing soils with vegetation.

***Alternative A***

Under Alternative A, current management would continue on BLM-administered lands in the planning area. There would be no PPMA or PGMA designated. Most land use plans would not implement use restrictions (e.g., ROW exclusion, travel management restrictions, livestock grazing closures, and closure to energy and mineral development) to protect GRSG habitat. Planned ROW construction would be permitted with conditions of approval. These include 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.

Potential impacts from locatable mineral, mineral material, nonenergy leasable, and fluid leasable mineral activity often result from violation of mineral regulations. These 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. Impacts from mineral activity are regulated and mitigated through federal and state laws, as well as handbooks, stipulations, and conditions of approval. These measures have effectively reduced the potential of surface or groundwater contamination.

Some use restrictions would be implemented, which would protect soils in these areas from degradation or removal. Overall, Alternative A would allow the highest level of surface disturbance of all alternatives; therefore, it would provide for the most possible impacts on water resources from ROW and mineral developments, livestock grazing, and travel management.

***Alternative B***

Under Alternative B, PPMA and PGMA would be designated as ROW exclusion and avoidance areas. This would concentrate potential impacts from ROW authorizations and associated road or transmission line projects in nonhabitat areas. Alternative B would provide for more ROW exclusion acres than Alternatives A, D, and E and fewer ROW exclusions acres than Alternatives C and F. ROW exclusion areas are protected from the surface-disturbing activities of ROW authorizations and associated roads and structures.

Alternative B would have fewer acres closed to livestock grazing than Alternatives D, C, and F. It would have the same amount of closure to livestock grazing as Alternatives A and E. The 37 planned livestock grazing permit renewals may be impacted, depending on their location to the closures to livestock grazing.

Alternatives B, D, and F would all manage 7,996,000 acres as restricted to existing trails. This is more than Alternatives A and E and less than Alternative C. More restrictions on cross-country travel may result in more predictable, localized, and manageable impacts of soil erosion into water resources. Alternatives B, C, D, and F would manage 300,300 of acres as closed to cross-country travel management, which is greater than Alternatives A and E. Overall, Alternative B would provide for more travel restrictions than Alternatives A and E, the same amount as Alternatives D and F, and fewer than Alternative C.

Alternative B has more acreage closed or withdrawn from energy and mineral development (locatables, leasables, nonenergy leasables, and mineral materials) than Alternative A and D. It has the same number of closed acres as Alternative E and fewer acres closed to energy and mineral development than Alternatives C and F. Alternative B and F have the same number of closures to locatable mineral entry, mineral material disposal, and nonenergy leasable minerals. Alternatives B has fewer acres closed to fluid mineral leasing than Alternative F. Alternatives B and D have the same amount of mineral material disposal, and Alternative B has more acres closed to nonenergy leasables, fluid mineral leasing, and locatable mineral entry than Alternative D. Alternative B would provide for more protection of water resources from mineral and energy development than Alternatives A and D and the same amount of protection as Alternative E.

Overall, Alternative B would be more protective of water resources than Alternatives A and D and less protective than Alternatives C and F. While Alternatives B and E are similar in their number of closures to mineral resources, Alternative B has more closures to livestock grazing, more ROW exclusion areas, and more acres restricted to existing roads and trails than Alternative E. This makes Alternative B more protective of water resources than Alternative E.

***Alternative C***

Alternative C would remove all grazing from the project area, which would eliminate any impacts on water resources from livestock grazing, including vegetation trampling and soil compaction near water resources. Alternative C would not allow for the renewal of the 37 livestock grazing permits that are reasonably foreseeable actions.

Alternative C would also close the most acres of all alternatives to mineral entry, which may prevent some of the 15 planned energy and mineral development projects.

Additionally, Alternative C would have the most ROW exclusion and avoidance areas and would limit the most acres to existing routes under travel management. Alternative C would concentrate ROW authorization and associated transmission lines and roads outside of GRSG habitat and would concentrate impacts from travel management to existing routes.

Due to the extent of land closures, Alternative C would be most protective of water resources of all the alternatives. Alternative C would also most restrict the cumulative effects projects. It may prohibit new ROW authorization and developments and mineral and energy development. As a result, Alternative C would result in the greatest reduction in cumulative effects from past, present, and reasonably foreseeable actions.

***Alternative D***

ROW exclusion areas under Alternative D would be the same as Alternative A, and ROW avoidance areas would increase by 2,519,000 acres. The overall effects of lands and realty management are very similar to Alternative A. This is because an increase in ROW avoidance areas does not prohibit ROW authorizations.

Alternative D would be more protective of water resources from the potential effects of livestock grazing than Alternatives A, B, and E, due to more closures to livestock grazing, and less protective than Alternatives C and F.

Alternative D would have more restrictions to cross-country travel than Alternatives A and E. It would have the same level of restrictions as Alternatives B and F and fewer restrictions than Alternative C.

Alternatives D and A would manage the same number of closures to locatable mineral entry, fluid mineral leasing, and nonenergy leasables. It would recommended the same number for acres for withdrawal from locatable mineral entry. Alternative D would provide for more closures to mineral materials than Alternative A. Overall, Alternative D is more protective of water resources from mineral development than Alternative A. This is because it calls for more closures to mineral materials but is less protective of energy and mineral development than Alternatives B, C, E, and F.

Because it calls for more closures, Alternative D would be more protective of water resources than Alternatives A and E from potential impacts of livestock grazing and travel management. However, it would be less protective of water resources from ROW authorizations and associated development and energy and mineral development than under Alternatives B, C, D, and E.

***Alternative E***

Alternative E would manage of the fewest ROW exclusion areas. It would be less protective of water resources from the potential effects of ROW authorizations and associated development than Alternatives B, C, and F. The

effects on water resources from ROW authorizations under Alternative E are similar to those under Alternatives A and D.

Alternative E would be less protective of water resources from the potential effects of livestock grazing than Alternatives B, C, and F. It calls for the same number of closures as Alternatives A and D. The effects on water resources from livestock grazing under Alternative E are similar to those under Alternatives A and D. Alternative E would restrict more acres to existing roads and trails for cross-country travel as Alternative A but fewer acres than Alternatives B, C, D, and F. Energy and mineral development under Alternative E would be managed the same as under Alternative B. As a result, the cumulative impacts from past, present, and reasonably foreseeable actions would be reduced, compared to Alternative A, but to a lesser extent than under the other action alternatives.

***Alternative F***

Alternative F would have the same number of acres managed as ROW avoidance and exclusion areas as Alternative C. Alternative F would manage the same number of acres as limited to existing roads and trails as Alternatives B and D. This is more than Alternatives A and E and less than Alternative C. Alternative F would manage more acres as closed to livestock grazing as Alternatives A, B, D and E and fewer acres than Alternative C. Alternative F would manage the largest category of acreage as closed to fluid mineral leasing and the second largest number of acres closed under nonenergy solid leasables, locatables, and mineral material sales.

Alternative F would be less restrictive of surface-disturbing activities than Alternative C, but it would be more restrictive than Alternatives A, B, D, and E. Alternative F could restrict the ROW and mineral developments in **Table 5-1**.

### 5.1.19 Lands with Wilderness Characteristics

Past, present, and reasonably foreseeable actions and conditions in the cumulative impact analysis area that have affected and will likely continue to affect lands with wilderness characteristics are wildland fires, wildland fire management, energy development, mining, noxious weed invasion, increased recreation demand, livestock grazing, ROWs, and road construction. Continued travel management and recreation development in the planning area could increase visitor use on BLM-administered lands. This includes lands with wilderness characteristics and could affect wilderness characteristics if it were to reduce the opportunities for solitude.

Development of energy and minerals resources could introduce sights, noises, and infrastructure in or next to lands with wilderness characteristics, which could impair the feeling of solitude and degrade naturalness.

In addition, vegetation management on public and private lands could alter landscape appearance and setting in the short and long term, protecting or degrading wilderness characteristics, depending on the activity.

Cumulative impacts on lands with wilderness characteristics would be mitigated where management actions governing other resources threaten wilderness characteristics.

***Alternatives Analysis***

Cumulative impacts would be most likely to damage lands with wilderness characteristics under Alternative A. This is because the fewest restrictions on present and future resource uses are in place under this alternative. Management under the action alternatives would protect wilderness characteristics to some degree, and GRSG, by placing restrictions on development and land uses. Such restrictions would indirectly limit cumulative impacts on wilderness characteristics. Alternatives C and F place broader and more stringent restrictions on allowable uses of resources in GRSG habitat; consequently, they would provide more indirect protections to lands with wilderness characteristics and would be less likely to have cumulative impacts that would degrade those characteristics.

### 5.1.20 Social and Economic Conditions (Including Environmental Justice)

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect social and economic conditions are chiefly mining and mineral exploration and development, lands, realty, transportation, ROWs, renewable energy development, recreation, and livestock grazing.

The cumulative impact analysis area used to analyze potential impacts on social and economic conditions consists of the counties identified as the socioeconomic study area.

Changes to social and economic conditions result when individuals, businesses, governments, and other organizations initiate actions. Over the next several decades, millions of decisions will be made by thousands of residents of the counties in the socioeconomic study area and others. These decisions will affect trends in employment, income, housing, and property. Projections published by the Oregon Employment Department and the Oregon Office of Economic Analysis account for these individual decisions in the aggregate and provide a baseline for comparing effects of alternatives in the future.

The projections represent a regional forecast and take a range of actions into account: management actions by the BLM as well as many other government entities, private citizens, and businesses. As a result, they incorporate the past, present, and reasonably foreseeable projects that will form the basis of future economic and social trends in the cumulative impact analysis area.

Current and future trends in the cumulative impact analysis area are as follows:

- Population growth
- Demographic change
- Changes in supply, demand, and policy related to livestock grazing and other forms of agriculture
- Changes in recreation demands
- Renewable energy development
- Potential mining activity, including for gold, uranium, and salable minerals
- Other activities noted in **Section 4.19**, Social and Economic Impacts (Including Environmental Justice)

Some of the predicted employment and income effects of the actions considered in this EIS could be quantified. For the agriculture sector, the BLM used IMPLAN, a regional economic model, to calculate indirect and induced impacts of these actions. **Table 5-2**, Projected Employment by Alternative for Primary Socioeconomic Study Area, shows projected employment for 2020 in the seven counties of the primary study area, as forecast by the State of Oregon.

Because Alternative A represents current management plans, employment would correspond most closely to the existing forecasts. Employment under Alternatives C and F, especially, would change from the projections, with the best estimate for those changes being the quantities shown in Chapter 4, Environmental Consequences. Thus, **Table 5-2** shows the estimated change in employment for these alternatives, based on modifying the projected future employment by the estimated changes for the socioeconomic study area (from IMPLAN).

**Table 5-2**
**Projected Employment by Alternative for Primary Socioeconomic Study Area**

| Item | Alter-native A | Alter-native B | Alter-native C | Alter-native D | Alter-native E | Alter-native F |
|---|---|---|---|---|---|---|
| Employment (2010)[1] | 42,147 | 42,147 | 42,147 | 42,147 | 42,147 | 42,147 |
| Average annual change in future employment related to grazing[2] | N/A | 0 | -746 | -4 | 0 | -419 |
| Average annual change in future employment related to wind energy development[3] | N/A | -61 | -61 | 0 | 0 | -61 |
| Average annual change in future employment related to geothermal development[3] | N/A | -41 | -89 | 0 | -41 | -89 |

**Table 5-2**
**Projected Employment by Alternative for Primary Socioeconomic Study Area**

| Item | Alter-native A | Alter-native B | Alter-native C | Alter-native D | Alter-native E | Alter-native F |
|---|---|---|---|---|---|---|
| Projected 2020 employment[4] | 46,877 | 46,775 | 45,981 | 46,873 | 46,836 | 46,308 |
| Percent change, 2010 to 2020 | 11.2% | 11.0% | 9.1% | 11.2% | 11.1% | 9.9% |

Source: Oregon Employment Department (2012) (current and projected employment data), modified by estimates from IMPLAN reported in Section 4.19. Annual changes shown include direct, indirect, and induced effects from IMPLAN; see Appendix R, Economic Impact Analysis Methodology, for a detailed description of this model.
[1]The source of 2010 employment data used in this table differs from that used in Section 3.20, Social and Economic Conditions (Including Environmental Justice), so there may be differences between the estimates shown.
[2]The values for livestock grazing represent the midpoint of the low and high scenarios described in Section 4.7, Livestock Grazing/Range Management.
[3]The values for wind energy and geothermal development include operation and construction jobs, with the latter assumed to be spread out over a 10-year construction period (e.g., 600 construction jobs in an alternative would mean about 60 construction jobs per year on average). Because construction is assumed to be distributed over ten years, the average annual operations jobs would be half of the estimated operations jobs when full capacity is installed.
[4]Where the underlying data sources do not provide county-level employment projections, they were imputed based on the county shares of current employment.

Changes in employment, especially under Alternatives C and F, would have a measurable effect on future employment, according to this analysis. Employment changes related to livestock grazing (including sectors that support and are supported by grazing), wind and geothermal development represent the only sectors that could be quantified for this analysis.

Under Alternatives A, B, D, and E, employment would increase by about 11 percent, with small reductions projected under Alternatives B, D, and E. Under these alternatives, the reduction would not likely be noticeable, given the size of the study area and the uncertainty associated with a long-term forecast. Under Alternatives C and F, employment would be projected to increase by somewhat less: 9.1 percent and 9.9 percent respectively. These reductions would be noticeable, but they would also be relatively small, given the size of the study area and the uncertainty inherent in long-term forecasting.

**Table 5-3**, Projected Earnings by Alternative for Primary Socioeconomic Study Area, shows projected changes in earnings, which parallel the projected changes in employment. Note that changes in geothermal earnings were not included in this table, due to lack of data. **Table 5-3** shows that Alternatives C and D would have a measurable although relatively small effect on future regional earnings.

Changes related to livestock grazing (including sectors that support and are supported by grazing) and wind energy development are the only sectors that could be quantified for the earnings analysis. The analysis indicates that under

**Table 5-3**
**Projected Earnings by Alternative for Primary Socioeconomic Study Area**

| Item | Alter-native A | Alter-native B | Alter-native C | Alter-native D | Alter-native E | Alter-native F |
|---|---|---|---|---|---|---|
| Earnings in 2010[1] | $3,294 | $3,294 | $3,294 | $3,294 | $3,294 | $3,294 |
| Average annual change in future earnings related to grazing[2] | N/A | $0 | -$23.5 | -$0.1 | $0 | -$13.2 |
| Average annual change in future earnings related to wind energy development[3] | N/A | -$2.8 | -$2.8 | $0 | $0 | -$2.8 |
| Projected 2020 earnings[4] | $5,249 | $5,246 | $5,223 | $5,249 | $5,249 | $5,233 |
| Percent change, 2010 to 2020 | 59.4% | 59.3% | 58.6% | 59.3% | 59.4% | 58.9% |

Note: All dollar figures are in millions of year 2010 dollars.
Source: Oregon Office of Economic Analysis (2013; current and projected earnings data), modified by estimates from IMPLAN reported in Section 4.19. Annual changes shown include direct, indirect, and induced effects from IMPLAN; see Appendix R, Economic Impact Analysis Methodology, for a detailed description of this model.
[1]The source of 2010 earnings data used in this table differs from that used in Section 3.18, Social and Economic Conditions (Including Environmental Justice), so there may be differences between the estimates shown.
[2]The values for livestock grazing represent the midpoint of the low and high scenarios described in Section 4.19.
[3]The values for wind energy development include operation and construction earnings, with the latter assumed to be spread out over a ten-year construction period. Because construction is assumed to be distributed over ten years, the average annual operations earnings would be half of the estimated operations earnings when full capacity is installed.
[4]Where the underlying data sources do not provide county-level projections, they were imputed based on the county shares of current earnings.

Alternatives A, B, D, and E, earnings would increase by a little over 59 percent, with a small reduction projected under Alternatives B and D. A somewhat larger reduction would be projected under Alternatives C and F. Even here, the reduction would be barely noticeable, given the size of the study area and the uncertainty associated with a long-term forecast.

Of the effects documented in **Section 4.19**, the impact that most exacerbates current economic challenges is the potential for several of the management alternatives—especially Alternatives C and F—to increase costs for livestock grazing operators. Long-term trends, including changing market conditions, consolidation supported by economies of scale, demographic change, and environmental concerns, have increasingly challenged economic conditions for ranch operators, especially smaller operators.

Increased costs due to restrictions on vegetation treatments, infrastructure improvements, and other management elements could exacerbate existing trends. Increased costs also can create additional cumulative impacts for the livestock grazing and ranching sector. This in turn could have economic impacts over and above those identified in the employment and earnings projections shown. It could also result in social impacts since the grazing and ranching

industry has been quite influential in terms of establishing community character, identity, and social values across the region.

In this way, all of the alternatives would have some degree of cumulative social and economic impact related to grazing. Although AUMs would be reduced only under Alternatives C, D, and F, Alternatives B and E would also entail changes to management that could increase costs or decrease the flexibility of ranchers to manage their animals.

In terms of geographic regions, the cumulative effects on livestock grazing operators would occur throughout the socioeconomic study area, but would be most important in Harney, Lake, and Malheur Counties. **Section 4.19** provides additional information to characterize geographic differences as well as the potential for disproportionate impacts on low-income and minority populations.

Impacts on wind energy development would also have economic consequences for the study area, especially under Alternatives B, C, and F. However, under all alternatives, exclusion and avoidance areas could have some impact on wind energy development, although economic consequences are less likely under Alternatives A and E. Alternatives B, C, D, and F could all impose increased costs to future wind energy developers. This would result from routing transmission lines and access roads to avoid GRSG-occupied habitat and through mitigation measures. These increased costs could have a deterring effect on some future investments.

The other effect identified in **Section 4.19** that could lead to a cumulatively considerable contribution to impacts is potential fiscal effects. This would be especially the case in the smaller counties that are also more dependent on economic activities on BLM-administered lands. Because specific impacts on local government tax revenues could not be quantified, the nature of the potential cumulative effect is not possible to characterize beyond the analysis in **Section 4.19**. That analysis notes specific counties in which local tax revenues could be most affected by the management alternatives.

Impacts on geothermal development, although not quantified for the earnings analysis, could also have economic consequences for the study area as shown in the employment estimates. Although impacts would not be noticeable at the national level, management alternatives restricting geothermal development would have effects that would be cumulative and counter to national trends of growth of domestic renewable energy sources.

Other effects, including potential changes in economic activity related to mining, are expected to contribute to cumulative effects. There are no expected economic and social impacts of management changes on these sectors, as documented in **Section 4.19**.

# CHAPTER 6
# CONSULTATION AND COORDINATION

## 6.1 INTRODUCTION

This chapter describes the public outreach and participation opportunities made available through the development of this RMPA/EIS and consultation and coordination efforts with tribes, government agencies, and other stakeholders. This chapter also lists the interdisciplinary team of staff who prepared the RMPA/EIS.

The BLM land use planning activities are conducted in accordance with requirements of the NEPA, CEQ regulations, and BLM policies and procedures implementing NEPA. The NEPA and associated laws, regulations, and policies require the BLM to seek public involvement early in and throughout the planning process to develop a reasonable range of alternatives to proposed actions and to prepare environmental documents that disclose the potential impacts of proposed actions and alternatives. Public involvement and agency consultation and coordination, which have been at the heart of the planning process leading to this draft RMPA/EIS, were achieved through *Federal Register* notices, public and informal meetings, individual contacts, media releases, and the Greater Sage-Grouse Planning Strategy project website (http://www.blm.gov/wo/st/en/prog/more/sagegrouse/western.html).

## 6.2 COLLABORATION

Federal laws require the lead agency to consult with certain federal and state agencies and entities and Native American tribes (40 CFR Part 1502.25) during the NEPA decision-making process. Federal agencies are also directed to integrate NEPA requirements with other environmental review and consultation requirements to reduce paperwork and delays (40 CFR Part 1500.4-5).

In addition to formal scoping (**Section 6.4.1**, Scoping Process), the BLM implemented an extensive collaborative outreach and public involvement process that has included coordinating with cooperating agencies, holding public

scoping meetings, and holding a socioeconomic workshop. The BLM will continue to meet with interested agencies and organizations throughout the planning process, as appropriate, and will continue coordinating closely with cooperating partners.

### 6.2.1 Native American Tribal Consultation

The BLM began tribal consultation by requesting a consultation meeting with area tribes to discuss the details of the GRSG planning efforts. Each of the tribes was also invited to participate in the planning effort as cooperating agencies. The list of tribes contacted is detailed in **Table 6-1**, Cooperating Agencies.

The draft RMPA/EIS will be provided to the tribes concurrently with its release to the public.

### 6.2.2 Oregon State Historic Preservation Officer Consultation

The draft RMPA/EIS will be provided to the Oregon State Historic Preservation Offices concurrently with its release to the public.

### 6.2.3 US Fish and Wildlife Service Consultation

To comply with Section 7(c) of the ESA, the BLM consulted USFWS early in the planning process. USFWS provided input on planning issues, data collection and review, and alternatives development in their role as a cooperating agency.

## 6.3 COOPERATING AGENCIES

A cooperating agency is any federal, state, or local government agency or Native American tribe that enters into a formal agreement with a lead federal agency to help develop an environmental analysis. More specifically, cooperating agencies "work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks" (BLM 2005d).

On December 7, 2011, the BLM wrote to 35 local, state, federal, and tribal representatives, inviting them to participate as cooperating agencies for the Oregon Greater Sage-Grouse Sub-region RMPA/EIS. There were 7 more follow-up letters to Native American tribes. Twelve agencies agreed to participate on the EIS as designated cooperating agencies, all of which have signed MOUs with the BLM (**Table 6-1**). Some agencies are participating as cooperating agencies under the larger umbrella of the national-level MOUs described below.

The Forest Service and USFWS are participating in the EIS process as cooperating agencies at a national level, and both agencies have signed MOUs at a national level.

**Table 6-1**
**Cooperating Agencies**

| Agencies and Tribes Invited to be Cooperators | Agencies that Accepted | Agencies that Signed MOUs |
|---|---|---|
| **Counties** | | |
| Baker County | | |
| Crook County | X | X |
| Deschutes County | X | X |
| Gillam County | | |
| Grant County | | |
| Harney County | X | X |
| Jefferson County | | |
| Klamath County | | |
| Lake County | X | X |
| Malheur County | X | X |
| Morrow County | | |
| Sherman County | | |
| Umatilla County | | |
| Union County | | |
| Wallowa County | | |
| Wasco County | | |
| **State Agencies** | | |
| Governor's Natural Resources Office | | |
| Oregon Department of Agriculture | | |
| Oregon Department of Economic Development | | |
| Oregon Department of Energy | | |
| Oregon Department of Environmental Quality | | |
| Oregon Department of Fish and Wildlife | X | X |
| Oregon Department of Forestry | | |
| Oregon Department of Geology and Mineral Industries | | |
| Oregon Department of Land Conservation/Development | | |
| Oregon Department of Transportation | | |
| Oregon Division of State Lands | | |
| Oregon Water Science Center | | |
| Oregon State Parks and Recreation Department | | |
| Oregon State University | X | X |
| **Federal Agencies** | | |
| Bureau of Reclamation | | |
| Federal Energy Regulatory Commission | X | X |
| Federal Highway Administration | | |
| Natural Resources Conservation Service | X | X |
| US Army Corps of Engineers | | |
| US Attorney's Office | | |
| USDA Animal and Plant Health Inspection Service | | |
| USDA Rural Development | | |
| US Environmental Protection Agency | | |
| US Fish and Wildlife Service | X | X |

**Table 6-1**
**Cooperating Agencies**

| Agencies and Tribes Invited to be Cooperators | Agencies that Accepted | Agencies that Signed MOUs |
|---|---|---|
| US Forest Service | X | X |
| **Tribes** | | |
| Burns Paiute Tribe | | |
| Confederated Tribes of the Warm Springs | | |
| Modoc Tribe of Oklahoma | | |
| Confederated Tribes of the Colville Reservation | | |
| Shoshone-Bannock Tribes of Fort Hall | | |
| Fort McDermitt Paiute Tribe | | |
| Nez Perce Tribe | | |
| Shoshone-Paiute Tribes of Duck Valley | | |
| Confederated Tribes of the Umatilla Indian Reservation | | |
| Fort Bidwell Indian Community | | |
| Klamath Tribes | | |
| **Other** | | |
| Harney Soil and Water Conservation District | X | X |

Since starting on May 18, 2012, the BLM has conducted 9 meetings to date with cooperating agencies. Cooperating agencies were also encouraged to attend the scoping open houses and provide comments during the scoping period (**Section 6.4.1**). These agencies have been engaged throughout the planning process, including during alternatives development.

## 6.4 PUBLIC INVOLVEMENT

Public involvement is a vital and legal component of both the RMPA and EIS processes. Public involvement vests the public in the decision-making process and allows for full environmental disclosure. Guidance for implementing public involvement under NEPA is codified in 40 CFR Part 1506.6, thereby ensuring that federal agencies make a diligent effort to involve the public in the NEPA process. Section 202 of the FLPMA directs the Secretary of the Interior to establish procedures for public involvement during land use planning actions on BLM-administered lands. These procedures can be found in the BLM's Land Use Planning Handbook H-1601-1 (BLM 2005d). Public involvement for the Oregon Greater Sage-Grouse Sub-region RMPA/EIS includes the following:

- Public scoping before beginning NEPA analysis to determine the scope of issues and alternatives to be addressed in the RMPA/EIS
- Public outreach via newsletters and press releases throughout the RMPA/EIS process
- Collaboration with federal, state, local, and tribal governments, and cooperating agencies throughout the RMPA/EIS process

- Public review and comment on the draft RMPA/EIS
- Public review and comment on the final RMPA/EIS

### 6.4.1 Scoping Process

The formal public scoping process for the Oregon Greater Sage-Grouse Sub-region RMPA/EIS began on December 9, 2011, with the publication of the notice of intent in the Federal Register (76 *Federal Register* 77008-77011). The notice of intent notified the public of the BLM's intent to prepare EISs and supplemental EISs to incorporate Greater Sage-Grouse conservation measures into LUPs; it also initiated the public scoping period. A notice of correction to the notice of intent was released on February 10, 2012 (77 *Federal Register* 7178-7179). The notice of correction extended the scoping period until March 23, 2012.

***Project Website***

The BLM launched a national Greater Sage-Grouse conservation website as part of its efforts to maintain and restore Greater Sage-Grouse habitat on public lands. The national website is available on the Internet at http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html. The BLM has also launched a Great Basin regional website: http://www.blm.gov/wo/st/en/prog/more/sagegrouse/western.html. These sites are regularly updated to provide the public with the latest information about the planning process. The Great Basin website provides background information about the project, a public involvement timeline, maps of the planning areas, and copies of public information documents and notice of intent. The dates and locations of scoping open houses were also announced on the Great Basin website.

***Press Release***

A press release was made available on the national and Great Basin region websites on December 8, 2011, announcing the scoping period for the EIS process. The Oregon BLM State Offices also distributed a press release on January 10, 2012, announcing the scoping period for the EIS process. The press release provided information on the scoping open houses being held and described the various methods for submitting comments. A second press release was posted on the national and Great Basin websites on February 7, 2012, announcing the extension of the public scoping period to March 23, 2012. A third press release was issued on the national and Great Basin websites on February 9, 2012, announcing the addition of National Forests to the GRSG planning efforts (not applicable to Oregon).

***Public Scoping Open House***

The BLM hosted five open houses to provide the public with an opportunity to become involved, learn about the project and the planning process, meet the planning team members, and offer comments. The scoping meetings were held in an open house format to encourage participants to discuss concerns and questions with the BLM and other agency staff representatives. The location and date of the open houses were as follows:

- Lakeview, Oregon – January 17, 2012
- Ontario, Oregon – January 23, 2012
- Baker City, Oregon – January 24, 2012
- Burns, Oregon – January 25, 2012
- Prineville, Oregon – January 26, 2012

***Scoping Comments Received***

Detailed information about the comments received can be found in the *National Greater Sage-Grouse Planning Strategy Scoping Summary Report*, finalized in May 2012 (BLM 2012b). A total of 585 unique written submissions were received for the Great Basin region. Of these, 169 were specific to Oregon. The issues that were identified during public scoping and outreach are described in **Section 1.5.2**, Issues Identified for Consideration in the Oregon Sub-Region Greater Sage-Grouse RMP Amendments, of this RMPA/EIS. These issues guided the development of alternative management strategies outlined in **Chapter 2** of this RMPA/EIS.

### 6.4.2 Future Public Involvement

Public participation efforts will be ongoing throughout the remainder of the RMPA/EIS process. One substantial part of this effort is the opportunity for members of the public to comment on this draft RMPA/EIS during the comment period. The proposed RMPA/Final EIS will respond to all substantive comments received during the 90-day comment period. A Record of Decision will then be issued by the BLM after the release of the proposed RMPA/Final EIS, the Governor's Consistency Review, and any resolution of protests received on the proposed RMPA/Final EIS.

## 6.5 LIST OF PREPARERS

This RMPA/EIS was prepared by an interdisciplinary team of staff from the BLM and Environmental Management and Planning Solutions, Inc. (EMPSi; see **Table 6-2**, List of Preparers). In addition, staff from numerous federal, state, and local agencies, and nonprofit organizations contributed to developing the RMPA/EIS.

The following is a list of people that prepared or contributed to the development of the RMPA/EIS.

**Table 6-2**
**List of Preparers**

| Name | Role/Responsibility |
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| **BLM-Oregon State Office** | |
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| Joan Suther | Project Manager |
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**Table 6-2**
**List of Preparers**

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| Glenn Frederick | Core IDT Lead-Special Status Species, Big Game Species |
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| Chris Knauf | Core IDT Lead-Recreation and Travel Management |
| Maggie Langlas Ward | Core IDT Lead-Special Designations, including Lands with Wilderness Characteristics; NEPA review |
| Stan McDonald | Core IDT Lead-Cultural Resources and Tribal Interests |
| Mark Mousseaux | Core IDT Lead-Special Status Plants, ACECs |
| Josh Sidon | Core IDT Lead-Social and Economic Conditions (Including Environmental Justice |
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**Table 6-2**
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# CHAPTER 7
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# CHAPTER 8
# ACRONYMS AND GLOSSARY

## 8.1 ACRONYMS

| Acronyms and Abbreviations | Full Phrase |
|---|---|
| ACEC | Area of Critical Environmental Concern |
| AML | Appropriate Management Level |
| AMP | allotment management plan |
| AMS | Analysis of the Management Situation |
| AUM | animal unit month |
| | |
| BER | Baseline Environmental Report |
| BLM | United States Department of the Interior, Bureau of Land Management |
| BMP | best management practice |
| | |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| COT | Conservation Objectives Team |
| CSU | controlled surface use |
| | |
| EIS | Environmental Impact Statement |
| EPA | United States Environmental Protective Agency |
| ES&R | emergency stabilization and rehabilitation |
| ESA | Endangered Species Act of 1973 |
| | |
| FFR | Fenced Federal Range |
| FLPMA | Federal Land Policy and Management Act of 1976 |
| Forest Service | United States Department of Agriculture, Forest Service |
| FPA | Fire Program Analysis |
| FRCC | fire regime condition class |
| FWFMP | Federal Wildland Fire Management Policy |
| | |
| GH | general habitat |
| GRSG | Greater Sage-Grouse |

| Acronyms and Abbreviations | Full Phrase |
|---|---|
| HA | Herd Area |
| HAF | habitat assessment framework |
| HMA | Herd Management Area |
| HMAP | Herd Management Area Plan |
| HMP | Habitat Management Plan |
| IM | Instruction Memorandum |
| LUBA | Land Use Board of Appeals |
| LUP | Land Use Plan |
| MOU | Memorandum of Understanding |
| MZ | Management Zone |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act of 1969, as amended |
| NL | no lease |
| NRCS | Natural Resources Conservation Service |
| NSO | no surface occupancy |
| NTT | National Technical Team |
| OAR | Oregon Administrative Rule |
| ODEQ | Oregon Department of Environmental Quality |
| ODFW | Oregon Department of Fish and Wildlife |
| OHV | off-highway vehicle |
| PFC | proper functioning condition |
| PGH | preliminary general habitat |
| PGMA | preliminary general management area |
| PH | priority habitat |
| PILT | Payments in Lieu of Taxes |
| PPH | preliminary priority habitat |
| PPMA | preliminary priority management area |
| RDF | required design feature |
| REA | Rapid Ecoregional Assessment |
| RFD | reasonable foreseeable development |
| RMP | Resource Management Plan |
| RMPA | Resource Management Plan Amendment |
| RNA | Research Natural Area |
| ROD | Record of Decision |
| ROW | right-of-way |
| SRMA | special recreation management area |
| SRP | special recreation permit |
| SSS | special status species |
| TL | timing limitation |

| Acronyms and Abbreviations | Full Phrase |
|---|---|
| US | United States |
| USC | United States Code |
| USDA | United States Department of Agriculture |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| VDDT | Vegetation Dynamics Development Tool |
| WAFWA | Western Association of Fish and Wildlife Agencies |
| WHB | wild horse and burro |
| WSA | Wilderness Study Area |

## 8.2 GLOSSARY

**2008 WAFWA Sage-grouse Memorandum of Understanding (MOU):** A memorandum of understanding (MOU) among Western Association of Fish and Wildlife Agencies (WAFWA); United States (US) Department of Agriculture (USDA), Forest Service (Forest Service); US Department of the Interior (DOI), Bureau of Land Management (BLM); DOI, Fish and Wildlife Service (USFWS); DOI, Geological Survey (USGS); USDA, Natural Resources Conservation Service (NRCS); and the USDA, Farm Service Agency. The purpose of the MOU is to provide for cooperation among the participating state and federal land, wildlife management and science agencies in the conservation and management of Greater Sage-Grouse (*Centrocercus urophasianus*) sagebrush (*Artemisia* spp.) habitats and other sagebrush-dependent wildlife throughout the western US and Canada and serve as a commitment of all agencies to implement the 2006 WAFWA Conservation Strategy.

**2011 Partnership Memorandum of Understanding (MOU):** A partnership agreement among the NRCS, Forest Service, BLM, and USFWS. 2011. This range management MOU is an agreement to implement NRCS practices on adjacent federal properties.

**Acquisition:** Acquisition of lands can be pursued to facilitate various resource management objectives. Acquisitions, including easements, can be completed through exchange, Land and Water Conservation Fund purchases, donations, or receipts from the Federal Land Transaction Facilitation Act sales or exchanges.

**Activity plan:** A type of implementation plan (see *Implementation plan*). An activity plan usually describes multiple projects and applies best management practices (BMPs) to meet Land Use Plan (LUP) objectives. Examples of activity plans include interdisciplinary management plans, habitat management plans (HMPs), recreation area management plans, and grazing plans.

**Actual use:** The amount of animal unit months (AUMs) consumed by livestock based on the numbers of livestock and grazing dates submitted by the livestock operator and confirmed by periodic field checks by the BLM.

**Adaptive management:** A type of natural resource management in which decisions are made as part of an ongoing science-based process. Adaptive management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices.

**Administrative Access:** A term used to describe access for resource management and administrative purposes (such as fire suppression, cadastral surveys, permit compliance, law enforcement and military) in the performance of their official duty, or other access needed to administer BLM-administered lands or uses.

**Allotment:** An area of land in which one or more livestock operators graze their livestock. Allotments generally consist of BLM-administered lands but may include other federally managed, state-owned, and private lands. An allotment may include or more separate pastures. Livestock numbers and periods of use are specified for each allotment.

**Allotment management plan (AMP):** A concisely written program of livestock grazing management, including supportive measures if required, designed to attain specific, multiple-use management goals in a grazing allotment. An AMP is prepared in consultation with the permittees, lessees, and other affected interests. Livestock grazing is considered in relation to other uses of the range (such as watershed, vegetation, and wildlife) and to renewable resources. An AMP establishes seasons of use, the number of livestock to be permitted, the range improvements needed, and the grazing system.

**Alluvial soil:** A soil developing from recently deposited alluvium and exhibiting essentially no horizon development or modification of the recently deposited materials.

**Alluvium:** Clay, silt, sand, gravel, or other rock materials transported by moving water, deposited in comparatively recent geologic time as sorted or semi-sorted sediment in rivers, floodplains, lakes, and shores, and in fans at the base of mountain slopes.

**Ambient air quality:** The state of the atmosphere at ground level as defined by the range of measured and/or predicted ambient concentrations of all significant pollutants for all averaging periods of interest.

**Amendment:** The process for considering or making changes in the terms, conditions, and decisions of approved Resource Management Plans (RMPs) or management framework plans. Usually, only one or two issues are considered that involve only a portion of the planning area.

**Animal unit month (AUM):** The amount of forage necessary for the sustenance of one cow or its equivalent for a period of one month.

**Anthropogenic disturbances:** Features include but are not limited to paved highways, graded gravel roads, transmission lines, substations, wind turbines, oil and gas wells, geothermal wells and associated facilities, pipelines, landfills, agricultural conversion, homes, and mines.

**Aquatic:** Living or growing in or on the water.

**Air basin:** A land area with generally similar meteorological and geographic conditions throughout. To the extent possible, air basin boundaries are defined along political boundary lines and include both the source and receptor areas.

**Air pollution:** Degradation of air quality resulting from unwanted chemicals or other materials occurring in the air.

**Area of Critical Environmental Concern (ACEC):** Special Area designation established through the BLM's land use planning process (43 CFR 1610.7-2) where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards. The level of allowable use within an ACEC is established through the collaborative planning process. Designation of an ACEC allows for resource use limitations in order to protect identified resources or values.

**Atmospheric deposition:** Air pollution produced when acid chemicals are incorporated into rain, snow, fog, or mist and fall to the earth. Sometimes referred to as "acid rain" and comes from sulfur oxides and nitrogen oxides, products of burning coal and other fuels and from certain industrial processes. If the acid chemicals in the air are blown into the area where the weather is wet, the acids can fall to earth in the rain, snow, fog, or mist. In areas where the weather is dry, the acid chemicals may become incorporated into dust or smoke.

**Attainment area:** A geographic area in which levels of a criteria air pollutant meet the health-based National Ambient Air Quality Standard (NAAQS) for that specific pollutant.

**Authorized/authorized use:** This is an activity (i.e., resource use) occurring on the BLM-administered lands that is explicitly or implicitly recognized and legalized by law or regulation. This term may refer to those activities occurring on the public lands for which the BLM, Forest Service, or other appropriate authority (e.g., Congress for Revised Statutes 2477 rights-of-way [ROWs], Federal Energy Regulatory Commission [FERC] for major interstate ROWs) has issued a formal authorization document (e.g., livestock grazing lease/permit, ROW grant, coal lease, or oil and gas permit to drill). Formally authorized uses typically involve some type of commercial activity, facility placement, or event. These formally authorized uses are often spatially or temporally limited. Unless constrained or bounded by statute, regulation, or an approved LUP decision, legal activities involving public enjoyment and use of the public lands (e.g., hiking, camping, hunting, etc.) require no formal BLM or Forest Service authorization.

**Avoidance/avoidance area:** These terms usually address mitigation of some activity (i.e., resource use). Paraphrasing the Council on Environmental Quality (CEQ) Regulations (40 Code of Federal Regulations [CFR] 1508.20), avoidance means to circumvent, or bypass, an impact altogether by not taking a certain action, or parts of an action. Therefore, the term "avoidance" does not necessarily prohibit a proposed activity, but it may require the relocation of an

action, or the total redesign of an action to eliminate any potential impacts resulting from it. Also see *"right-of-way avoidance area"* definition.

**Best Management Practices (BMPs):** A suite of techniques that guide or may be applied to management actions to aide in achieving desired outcomes. BMPs are often developed in conjunction with LUPs, but they are not considered a planning decision unless the plans specify that they are mandatory.

**Big game:** Indigenous, ungulate (hoofed) wildlife species that are hunted, such as elk, deer, bison, bighorn sheep, and pronghorn antelope.

**Biodiversity (biological diversity):** The variety of life and its processes, and the interrelationships within and among various levels of ecological organization. Conservation, protection, and restoration of biological species and genetic diversity are needed to sustain the health of existing biological systems. Federal resource management agencies must examine the implications of management actions and development decisions on regional and local biodiversity.

**Biological soil crust:** A complex association between soil particles and cyanobacteria, algae, microfungi, lichens, and bryophytes that live within or atop the uppermost millimeters of soil.

**Breeding Habitat:** Leks and the sagebrush habitat surrounding leks that are collectively used for pre-laying, breeding, nesting, and early brood-rearing, from approximately March through June (Connelly et al. 2004).

**BLM Sensitive Species:** Those species that are not federally listed as endangered, threatened, or proposed under the Endangered Species Act, but that are designated by the BLM State Director under 16 United States Code (USC) 1536(a)(2) for special management consideration. By national policy, federally listed candidate species are automatically included as sensitive species. Sensitive species are managed so they will not need to be listed as proposed, threatened, or endangered under the Endangered Species Act.

**Candidate species:** Taxa for which the USFWS has sufficient information on their status and threats to propose the species for listing as endangered or threatened under the Endangered Species Act, but for which issuance of a proposed rule is currently precluded by higher priority listing actions. Separate lists for plants, vertebrate animals, and invertebrate animals are published periodically in the Federal Register (BLM Manual 6840, Special Status Species Manual).

**Casual Use:** Casual use means activities ordinarily resulting in no or negligible disturbance of the BLM-administered lands, resources, or improvements. For examples for ROWs, see 43 CFR 2801.5. For examples for locatable minerals, see 43 CFR 3809.5.

**Categorical exclusion:** A category of actions (identified in agency guidance) that do not individually or cumulatively have a significant effect on the human environment, and for which neither an environmental assessment nor an environmental impact statement is required (40 CFR 1508.4), but a limited form of NEPA analysis is performed.

**Chemical vegetation treatment**: Application of herbicides to control invasive species, noxious weeds, and/or unwanted vegetation. To meet resource objectives, the preponderance of chemical treatments would be used in areas where cheatgrass or noxious weeds have invaded sagebrush steppe.

**Clean Air Act of 1963 (as amended):** Federal legislation governing air pollution control.

**Clean Water Act of 1972 (as amended):** Federal legislation governing water pollution control.

**Climate change:** Any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from:

- natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun
- natural processes within the climate system (e.g., changes in ocean circulation)
- human activities that change the atmosphere's composition (e.g., driving automobiles) and the land surface (e.g., deforestation, reforestation, urbanization, or desertification)

**Closed area:** An area where one or more uses are prohibited temporarily or over the long term. Areas may be closed to uses such as off-road vehicles, mineral leasing, mineral or vegetative material collection, or target shooting. In off-road vehicle use closed areas, motorized and mechanized off-road vehicle use is prohibited. Use of motorized and mechanized off-road vehicles in closed areas may be allowed for certain reasons; however, such use shall be made only with the approval of the authorized officer (43 CFR 8340.0-5).

**Collaboration:** A cooperative process in which interested parties, often with widely varied interests, work together to seek solutions with broad support for managing public and other lands. Collaboration may take place with any interested parties, whether or not they are a cooperating agency.

**Communication site:** Sites that include broadcast types of uses (e.g., television, AM/FM radio, cable television, and broadcast translator) and non-broadcast uses (e.g., commercial or private mobile radio service, cellular telephone, microwave, local exchange network, and passive reflector).

**Comprehensive trails and travel management:** The proactive interdisciplinary planning, on-the-ground management, and administration of travel networks (both motorized and non-motorized) to ensure public access, natural resources, and regulatory needs are considered. It consists of inventory, planning, designation, implementation, education, enforcement, monitoring, easement acquisition, mapping and signing, and other measures necessary to provide access to BLM-administered lands for a wide variety of uses (including uses for recreational, traditional, casual, agricultural, commercial, educational, landing strips, and other purposes).

**Condition class (fire regimes):** Fire regime condition classes are a measure describing the degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components, such as species composition, structural stage, stand age, canopy closure, and fuel loadings. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plant species, introduced insects or disease, or other management activities.

**Condition of Approval:** Condition or provision (requirement) under which an application for a permit to drill or sundry notice is approved.

**Conformance:** A proposed action shall be specifically provided for in the LUP or, if not specifically mentioned, shall be clearly consistent with the goals, objectives, or standards of the approved land use plan.

**Conservation Measures:** Measures to conserve, enhance, and/or restore Greater Sage-Grouse (sage-grouse or GRSG) habitat by reducing, eliminating, or minimizing threats to that habitat. Conservation measures considered during land use plan revisions or amendments in sage-grouse habitat were developed by the Sage-Grouse National Technical Team (NTT), a group of resource specialists, land use planners, and scientists from the BLM, state fish and wildlife agencies, USFWS, NRCS, and USGS. The report drafted by the NTT, titled "A Report on National Greater Sage-Grouse Conservation Measures," provides the latest science and best biological judgment to assist in making management decisions relating to the GRSG.

**Conservation Plan:** The recorded decisions of a landowner or operator, cooperating with a conservation district, on how the landowner or operator plans, within practical limits, to use his/her land according to its capability and to treat it according to its needs for maintenance or improvement of the soil, water, animal, plant, and air resources.

**Conservation strategy:** A strategy outlining current activities or threats that are contributing to the decline of a species, along with the actions or strategies needed to reverse or eliminate such a decline or threats. Conservation strategies are generally developed for species of plants and animals that are

designated as BLM sensitive species or that have been determined by the USFWS or National Oceanographic and Atmospheric Administration-Fisheries to be federal candidates under the Endangered Species Act.

**Conserve:** To cause no degradation or loss of sage-grouse habitat. "Conserve" can also refer to maintaining intact sagebrush steppe by fine tuning livestock use, watching for and treating new invasive species, and maintaining existing range improvements that benefit sage-grouse.

**Controlled surface use (CSU):** Controlled surface use (CSU) is a category of moderate constraint stipulations that allows some use and occupancy of BLM-administered land while protecting identified resources or values and is applicable to fluid mineral leasing and all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, and construction of wells and pads). CSU areas are open to fluid mineral leasing but the stipulation allows the BLM to require special operational constraints, or the activity can be shifted more than 200 meters (656 feet) to protect the specified resource or value.

**Cooperating agency:** Assists the lead federal agency in developing an environmental assessment (EA) or environmental impact statement (EIS). These can be any agency with jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6). Any tribe or Federal, State, or local government jurisdiction with such qualifications may become a cooperating agency by agreement with the lead agency.

**Core Area Habitat:** The Oregon Department of Fish and Wildlife's (ODFW's) Sage-Grouse Conservation Assessment and Strategy for Oregon (2011) identified "Core Areas" necessary to conserve 90 percent of Oregon's GRSG population with emphasis on areas with the highest density and most important for breeding and wintering and may serve as connectivity corridors. Core Area habitat encompasses areas a) of very high, high and moderate lek density strata; b) where low lek density strata overlap local connectivity corridors; or c) where winter habitat-use overlap with either low lek density strata, connectivity corridors, or occupied habitat. Core Area habitats encompass approximately 90 percent of the known breeding populations of GRSG on 38 percent of the species' range. However, not all lek locations are known and some likely occur outside of the Core Areas.

**Council on Environmental Quality (CEQ):** An advisory council to the President of the US established by the National Environmental Policy Act of 1969 (NEPA). The CEQ reviews federal programs to analyze and interpret environmental trends and information.

**Criteria pollutant:** The US Environmental Protection Agency (EPA) uses six "criteria pollutants" as indicators of air quality and has established a maximum concentration for each of them above which adverse effects on human health

may occur. These threshold concentrations are called NAAQS. The criteria pollutants are ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead.

**Crucial wildlife habitat:** The environment essential to plant or animal biodiversity and conservation at the landscape level. Crucial habitats include, but are not limited to, biological core areas, severe winter range, winter concentration areas, reproduction areas, and movement corridors.

**Cultural resources**: Locations of human activity, occupation, or use. Cultural resources include archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and locations of traditional cultural or religious importance to specified social or cultural groups.

**Cumulative effects:** The direct and indirect effects of a proposed project alternative's incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action.

**Currently Occupied Habitat:** Occupied habitat areas were defined as areas of suitable habitat known to be used by GRSG within the last 10 years. Areas of suitable habitat contiguous with areas of known use were mapped as occupied habitat unless specific information existed that documented the lack of GRSG use.

**Ecological Site:** A distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation.

**Exploration:** Active drilling and geophysical operations to:

a. Determine the presence of the mineral resource
b. Determine the extent of the reservoir.

**Decision area:** The area for which management directions and actions outlined in this RMPA/EIS will apply. This includes only BLM-administered surface lands in the planning area and BLM-administered federal mineral estate that may lie beneath other surface ownership, often referred to as split-estate lands.

**Deferred/deferred use:** To set-aside or postpone a particular resource use or activity on the BLM-administered lands to a later time. When this term is used, the period of the deferral is specified. Deferments sometimes follow the sequence timeframe of associated serial actions (e.g., action B will be deferred until action A is completed).

**Degraded vegetation:** Areas where the plant community is not complete or is under threat. Examples include missing components such as perennial forbs or

cool season grasses, weed infestations, or lack of regeneration of key species such as sagebrush or cottonwoods trees.

**Designated roads and trails:** Specific roads and trails identified by the BLM (or another agency) where some type of motorized/nonmotorized use is appropriate and allowed, either seasonally or year-long (H-1601-1, BLM Land Use Planning Handbook).

**Desired future condition:** For rangeland vegetation, the condition of rangeland resources on a landscape scale that meet management objectives. It is based on ecological, social, and economic considerations during the land planning process. It is usually expressed as ecological status or management status of vegetation (species composition, habitat diversity, and age and size class of species) and desired soil qualities (soil cover, erosion, and compaction). In a general context, desired future condition is a portrayal of the land or resource conditions that are expected to result if goals and objectives are fully achieved.

**Desired outcomes:** A type of LUP decision expressed as a goal or objective.

**Development:** Active drilling and production of wells.

**Development Area:** Areas primarily leased with active drilling and wells capable of production in payable quantities.

**Direct impacts:** Direct impacts are caused by an action or implementation of an alternative and occur at the same time and place.

**Directional drilling:** A drilling technique whereby a well is deliberately deviated from the vertical in order to reach a particular part of the oil- or gas-bearing reservoir. Directional drilling technology enables the driller to steer the drill stem and bit to a desired bottom hole location. Directional wells initially are drilled straight down to a predetermined depth and then gradually curved at one or more different points to penetrate one or more given target reservoirs. This specialized drilling usually is accomplished with the use of a fluid-driven downhole motor, which turns the drill bit. Directional drilling also allows multiple production and injection wells to be drilled from a single surface location such as a gravel pad, thus minimizing cost and the surface impact of oil and gas drilling, production, and transportation facilities. It can be used to reach a target located beneath an environmentally sensitive area (Alaska Department of Natural Resources, Division of Oil and Gas 2009).

**Disposal lands:** Transfer of BLM-administered land out of federal ownership to another party through sale, exchange, Recreation and Public Purposes Act of 1926, Desert Land Entry or other land law statutes.

**Disruptive activities:** Those BLM-administered land resource uses/activities that are likely to alter the behavior, displace, or cause excessive stress to existing animal or human populations occurring at a specific location and/or time. In this context, disruptive activity refers to an action that alters behavior or causes the displacement of individuals such that reproductive success is negatively affected, or an individual's physiological ability to cope with environmental stress is compromised. This term does not apply to the physical disturbance of the land surface, vegetation, or features. When administered as a land use restriction (e.g., *No Disruptive Activities*), this term may prohibit or limit the physical presence of sound above ambient levels, light beyond background levels, and/or the nearness of people and their activities. The term is commonly used in conjunction with protecting wildlife during crucial life stages (e.g., breeding, nesting, birthing, etc.), although it could apply to any resource value on the BLM-administered lands. The use of this land use restriction is not intended to prohibit all activity or authorized uses.

**Diversity:** The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

**Easement:** A right afforded a person or agency to make limited use of another's real property for access or other purposes.

**Ecological Site:** A distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation.

**Emergency stabilization:** Planned actions to stabilize and prevent unacceptable degradation to natural and cultural resources, to minimize threats to life or property resulting from the effects of a fire, or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources. Emergency stabilization actions must be taken within one year following containment of a wildfire.

**Endangered species:** Any species that is in danger of extinction throughout all or a significant portion of its range (BLM Manual 6840, Special Status Species Manual). Under the Endangered Species Act, "endangered" is the more-protected of the two categories. Designation as endangered or threatened is determined by USFWS as directed by the Endangered Species Act.

**Endangered Species Act of 1973 (as amended):** Designed to protect critically imperiled species from extinction as a consequence of economic growth and development untempered by adequate concern and conservation. The Act is administered by two federal agencies, USFWS and the National Oceanic and Atmospheric Administration. The purpose of the Act is to protect species and also the ecosystems upon which they depend (16 USC 1531-1544).

**Enhance:** The improvement of habitat by increasing missing or modifying unsatisfactory components and/or attributes of the plant community to meet sage-grouse objectives. Examples include modifying livestock grazing systems to improve the quantity and vigor of desirable forbs, improving water flow in riparian areas by modifying existing spring developments to return more water to the riparian area below the development, or marking fences to minimize sage-grouse hits and mortality.

**Environmental assessment (EA):** A concise public document prepared to provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact. It includes a brief discussion of the need for the proposal, alternatives considered, environmental impact of the proposed action and alternatives, and a list of agencies and individuals consulted.

**Environmental impact statement (EIS):** A detailed statement prepared by the responsible official in which a major federal action that significantly affects the quality of the human environment is described, alternatives to the proposed action are provided, and effects are analyzed (BLM National Management Strategy for Off-highway Vehicle [OHV] Use on Public Lands).

**Evaluation (plan evaluation):** The process of reviewing the land use plan and the periodic plan monitoring reports to determine whether the land use plan decisions and NEPA analysis are still valid and whether the plan is being implemented.

**Exchange:** A transaction whereby the federal government receives land or interests in land in exchange for other land or interests in land.

**Exclusion Areas:** An area on the BLM-administered lands where a certain activity is prohibited to insure protection of other resource values present on the site. The term is frequently used in reference to lands/realty actions and proposals (e.g., ROWs), but is not unique to lands and realty program activities. This restriction is functionally analogous to the phrase "no surface occupancy" used by the oil and gas program and is applied as an absolute condition to those affected activities. The less restrictive analogous term is avoidance area. Also see *"right-of-way exclusion area"* definition.

**Existing routes:** The roads, trails, or ways that are used by motorized vehicles (e.g., jeeps, all-terrain vehicles, and motorized dirt bikes), mechanized uses (e.g., mountain bikes, wheelbarrows, and game carts), pedestrians (e.g., hikers), and/or equestrians (e.g., horseback riders) and are, to the best of BLM's knowledge, in existence at the time of RMP/EIS publication.

**Exploration:** Active drilling and geophysical operations to:

a. Determine the presence of the mineral resource

b. Determine the extent of the reservoir or mineral deposit.

**Extensive recreation management area (ERMA):** Administrative units that require specific management consideration in order to address recreation use, demand, or Recreation and Visitor Services program investments. ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. ERMA management is commensurate and considered in context with the management of other resources and resource uses.

**Federal Land Policy and Management Act of 1976 (FLPMA):** Public Law 94-579, October 21, 1976, often referred to as the BLM's "Organic Act," which provides most of the BLM's legislated authority, direction policy, and basic management guidance.

**Federal mineral estate:** Subsurface public mineral estate administered by the BLM. Federal mineral estate under BLM jurisdiction is composed of mineral estate underlying BLM-administered lands, privately owned lands, and state-owned lands

**Fire frequency:** A general term referring to the recurrence of fire in a given area over time.

**Fire management plan (FMP):** A plan that identifies and integrates all wildland fire management and related activities within the context of approved land/resource management plans. It defines a program to manage wildland fires (wildfire, prescribed fire, and wildland fire use). The plan is supplemented by operational plans including, but not limited to, preparedness plans, preplanned dispatch plans, and prevention plans. FMPs assure that wildland fire management goals and components are coordinated.

**Fire Regime Condition Classification System (FRCCS):** Measures the extent to which vegetation departs from reference conditions, or how the current vegetation differs from a particular reference condition.

**Fire suppression:** All work and activities connected with control and fire-extinguishing operations, beginning with discovery and continuing until the fire is completely extinguished.

**Fluid minerals:** Oil, gas, coal bed natural gas, and geothermal resources.

**Focal Areas:** a network is comprised of three types of focal areas: Climate Change Refugia, High Density Breeding Areas, and Restoration Opportunity Zones. The BLM has identified these areas in order to help focus and prioritize habitat restoration, off-site mitigation, conservation partnering, sage-grouse habitat and population monitoring and assessments, and post-fire emergency

stabilization and rehabilitation efforts, and to provide special consideration during fire suppression to help sustain productive sage-grouse habitat.

**Climate Change Adaptation Areas:** Generally high altitude areas (typically above 5,000 feet) with limited habitat disturbance that the BLM has identified as likely to provide the best habitat for the sage-grouse over the long term according to current climate change scenarios.

**High Density Breeding Areas:** Areas of high quality habitat with a high density of active sage-grouse leks. The Restoration Opportunity Zones are areas within existing sage-grouse habitat that if restored can provide better quality habitat and greater habitat connectivity for the sage-grouse.

**Restoration Opportunity Areas:** Areas within existing sage-grouse habitat that, if restored, can provide better quality habitat and greater habitat connectivity for the sage-grouse.

**Forage:** All browse and herbaceous foods that are available to grazing animals.

**Forage base:** The amount of vegetation available for wildlife and livestock use.

**Fragile soils:** Soils having a shallow depth to bedrock, minimal surface layer of organic material, textures that are more easily detached and eroded, or are on slopes over 35 percent.

**Fugitive dust:** Significant atmospheric dust arises from the mechanical disturbance of granular material exposed to the air. Dust generated from these open sources is termed "fugitive" because it is not discharged to the atmosphere in a confined flow stream. Common sources of fugitive dust include unpaved roads, agricultural tilling operations, aggregate storage piles, and heavy construction operations.

**General Sage-Grouse habitat:** Occupied (seasonal or year-round) habitat outside of priority habitat. These areas have been identified by state fish and wildlife agencies in coordination with respective BLM offices.

**Geographic Information System (GIS):** A system of computer hardware, software, data, people, and applications that capture, store, edit, analyze, and display a potentially wide array of geospatial information.

**Geophysical exploration:** Efforts to locate deposits of oil and gas resources and to better define the subsurface.

**Geothermal energy:** Natural heat from within the Earth captured for production of electric power, space heating, or industrial steam.

**Goal:** A broad statement of a desired outcome that is usually not quantifiable and may not have established timeframes for achievement.

**Grandfathered right:** The right to use in a non-conforming manner due to existence prior to the establishment of conforming terms and conditions.

**Grazing preference:** A superior or priority position for the purpose of receiving a grazing permit or lease. This priority is attached to base property owned or controlled by a permittee or lessee.

**Grazing system:** Scheduled grazing use and non-use of an allotment to reach identified goals or objectives by improving the quality and quantity of vegetation. Include, but are not limited to, developing pastures, utilization levels, grazing rotations, timing and duration of use periods, and necessary range improvements.

**Groundwater:** Water held underground in soil or permeable rock, often feeding springs and wells.

**Guidelines:** Actions or management practices that may be used to achieve desired outcomes, sometimes expressed as BMPs. Guidelines may be identified during the land use planning process, but they are not considered a land use plan decision unless the plan specifies that they are mandatory. Guidelines for grazing administration must conform to 43 CFR 4180.2.

**Habitat:** An environment that meets a specific set of physical, biological, temporal, or spatial characteristics that satisfy the requirements of a plant or animal species or group of species for part or all of their life cycle.

**Habitat Suitability:** The relative appropriateness of a certain ecological area for meeting the life requirements of an organism (i.e., food, shelter, water, space)

**Suitable Habitat:** Area provides environmental conditions necessary for successful survival and reproduction to sustain stable populations.

**Potential Habitat:** Area is currently unoccupied but has the potential for occupancy in the foreseeable future (less than 100 years), through succession or restoration.

**Hazardous material:** A substance, pollutant, or contaminant that, due to its quantity, concentration, or physical or chemical characteristics, poses a potential hazard to human health and safety or to the environment if released into the workplace or the environment.

**Impact:** The effect, influence, alteration, or imprint caused by an action.

**Impairment:** The degree to which a distance of clear visibility is degraded by human-made pollutants.

**Implementation decisions:** Decisions that take action to implement land use planning; generally appealable to Interior Board of Land Appeals under 43 CFR 4.410.

**Implementation plan:** An area or site-specific plan written to implement decisions made in a LUP. Implementation plans include both activity plans and project plans.

**Indicators:** Factors that describe resource condition and change and can help the BLM determine trends over time.

**Indirect impacts:** Indirect impacts result from implementing an action or alternative but usually occur later in time or are removed in distance and are reasonably certain to occur.

**Intermittent stream:** A stream that flows only at certain times of the year when it receives water from springs or from some surface sources such as melting snow in mountainous areas. During the dry season and throughout minor drought periods, these streams will not exhibit flow. Geomorphological characteristics are not well defined and are often inconspicuous. In the absence of external limiting factors, such as pollution and thermal modifications, species are scarce and adapted to the wet and dry conditions of the fluctuating water level.

**Invertebrate:** An animal lacking a backbone or spinal column, such as insects, snails, and worms. The group includes 97 percent of all animal species.

**Key wildlife ecosystems:** Specific areas within the geographic area occupied by a species in which are found those physical and biological features 1) essential to the conservation of the species, and 2) which may require special management considerations or protection.

**Land health condition:** A classification for land health which includes these categories: "Meeting Land Health Standard(s)" and "Not Meeting Land Health Standard(s)".

Meeting Land Health Standard(s): Lands for which health indicators are currently in acceptable condition such that basic levels of ecological processes and functions are in place. This rating includes the following subcategories:

- Fully Meeting Standard(s): Lands for which there are no substantive concerns with health indicators
- Exceeding Standard(s): Lands for which health indicators are in substantially better conditions than acceptable levels.

- Meeting Standard(s) with Problems: Lands which have one or more concerns with health indicators to the degree that they are categorized as meeting the Land Health Standards, but have some issues which make them at risk of becoming "not meeting."

Not Meeting Land Health Standard(s): Lands for which one or more health indicators are in unacceptable conditions such that basic levels of ecological processes and functions are no longer in place. Land health trend is used to describe these classes further. It includes these categories: upward, static, and downward.

- Upward Trend: lands which have shown improving indicator conditions over time.
- Static Trend: lands which have shown no clear improvement or decline in indicator conditions over time.
- Downward Trend: lands which have shown declining indicator conditions over time.

**Land tenure adjustments:** Land ownership or jurisdictional changes. To improve the manageability of the BLM-administered lands and their usefulness to the public, the BLM has numerous authorities for repositioning lands into a more consolidated pattern, disposing of lands, and entering into cooperative management agreements. These land pattern improvements are completed primarily through the use of land exchanges but also through land sales, through jurisdictional transfers to other agencies, and through the use of cooperative management agreements and leases.

**Land treatment:** All methods of artificial range improvement arid soil stabilization such as reseeding, brush control (chemical and mechanical), pitting, furrowing, and water spreading.

**Land use allocation:** The identification in a LUP of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the planning area, based on desired future conditions (H-1601-1, BLM Land Use Planning Handbook).

**Land use plan (LUP):** A set of decisions that establish management direction for land within an administrative area, as prescribed under the planning provisions of FLPMA; an assimilation of LUP-level decisions developed through the planning process outlined in 43 CFR 1600, regardless of the scale at which the decisions were developed. The term includes both RMPs and management framework plans (from H-1601-1, BLM Land Use Planning Handbook).

**Land use plan decision:** Establishes desired outcomes and actions needed to achieve them. Decisions are reached using the planning process in 43 CFR 1600. When they are presented to the public as proposed decisions, they can be

protested to the BLM Director. They are not appealable to Interior Board of Land Appeals.

**Integrated ranch planning:** A method for ranch planning that takes a holistic look at all elements of the ranching operations, including strategic and tactical planning, rather than approaching planning as several separate enterprises.

**Large-scale anthropogenic disturbances:** Features include but are not limited to paved highways, graded gravel roads, transmission lines, substations, wind turbines, oil and gas wells, geothermal wells and associated facilities, pipelines, landfills, agricultural conversion, homes, and mines.

**Late brood-rearing habitat:** Variety of habitats used by sage-grouse from July through September. Habitat includes mesic sagebrush and mixed shrub communities, wet meadows, and riparian areas as well as some agricultural lands (e.g. alfalfa fields).

**Leasable minerals:** Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. These include energy-related mineral resources such as oil, natural gas, coal, and geothermal, and some non-energy minerals, such as phosphate, sodium, potassium, and sulfur. Geothermal resources are also leasable under the Geothermal Steam Act of 1970.

**Lease:** Section 302 of the FLPMA provides the BLM's authority to issue leases for the use, occupancy, and development of BLM-administered lands. Leases are issued for purposes such as a commercial filming, advertising displays, commercial or noncommercial croplands, apiaries, livestock holding or feeding areas not related to grazing permits and leases, native or introduced species harvesting, temporary or permanent facilities for commercial purposes (does not include mining claims), residential occupancy, ski resorts, construction equipment storage sites, assembly yards, oil rig stacking sites, mining claim occupancy if the residential structures are not incidental to the mining operation, and water pipelines and well pumps related to irrigation and nonirrigation facilities. The regulations establishing procedures for processing these leases and permits are found in 43 CFR 2920.

**Lease stipulation:** A modification of the terms and conditions on a standard lease form at the time of the lease sale.

**Lek:** An area where male sage-grouse display during the breeding season to attract females (also referred to as strutting-ground). Each state may have a slightly different definition of lek, active lek, inactive lek, occupied lek, and unoccupied leks.

**Lek Complex:** A collection of lek sites typically with small numbers of males which are associated with a larger lek site in the vicinity (less than or equal to 1

mile). A count of a lek complex generally includes censusing all displaying males in a series of leks where no 2 lek sites are more than 1 mile apart.

**Lek Status Definitions**

- **Annual status:** Lek status based on the following definitions of annual activity (Hagen 2011):
  - **Active Lek:** A lek attended by 1 male sage-grouse or more during the breeding season. Acceptable documentation of sage-grouse presence includes observation of birds using the site or recent signs of lek attendance (e.g. fresh droppings, feathers). New leks found during ground counts or surveys are given an annual status of active.
  - **Inactive Lek**: A lek with sufficient survey data to suggest that there was no male attendance throughout a breeding season. Absence of male grouse during a single visit is insufficient documentation to establish that a lek is inactive. This designation requires documentation of either: 1) an absence of birds on the lek during at least two ground surveys separated by at least seven days. These surveys must be conducted under acceptable weather conditions (clear to partly cloudy and winds less than 15 kilometers per hour [less than 10 miles per hour]) and in the absence of obvious disturbance or, 2) a ground check of the exact known lek site late in the strutting season that fails to find any sign (fresh droppings/feathers) of attendance. Data collected by aerial surveys alone may not be used to designate inactive status.
  - **Unknown lek:** Lek status has not been documented during the course of a breeding season. New leks found during aerial surveys in the current year are given an annual status of unknown unless they are confirmed on the ground or observed more than once by air.
- **Conservation status:** Based on its annual status, a lek is assigned to one of the following categories for conservation or mitigation actions (Hagen 2011):
  - **Occupied Lek:** A regularly visited lek that has had 1 male or more counted in one or more of the last 7 years. Designate and protect surrounding area as Category 1 habitat.
  - **Occupied-pending:** A lek not counted regularly in the last 7 years, but birds were present at last visit. Designate and protect surrounding area as Category 1 habitat. These leks

should be resurveyed at a minimum of two additional years to confirm activity.

- **Unoccupied Lek:** A lek that has been counted annually and has had no birds for 8 or more consecutive years. Mitigation category based on habitat type and condition.
- **Unoccupied-pending**: A lek not counted regularly in a 7-year period, but birds were NOT present at last visit. Designate and protect surrounding area as Category 1 habitat. These leks should be resurveyed at a minimum of 2 additional years to confirm activity
- **Historic lek:** A lek that has been unoccupied prior to 1980 and remains so. Mitigation category based on habitat type and condition (1980 serves as the baseline for evaluating population objectives under ODFW's Sage-grouse Conservation Strategy, thus leks unoccupied prior to 1980 are not included in the baseline for population abundance and distribution.)

**Lentic:** Pertaining to standing water, such as lakes and ponds.

**Local Implementation Team:** Implementation of conservation guidelines outlined in *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitats* will be guided by Local Implementation Teams comprised of ODFW, land managers, and land owners. Because these groups are not mutually exclusive and include a mix of public and private entities, the BLM is the primary land manager; local groups are based on BLM district boundaries (and in some cases Resource Areas).

**Locatable minerals:** Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

**Long-term effect:** The effect could occur for an extended period after implementation of the alternative. The effect could last several years or more.

**Lotic:** Pertaining to moving water, such as streams or rivers.

**Low Density Habitat:** The ODFW's Sage-Grouse Conservation Assessment and Strategy for Oregon (2011) defines low density habitat as breeding, summer, and migratory habitats that are encompassed by areas where: a) low lek density overlapped with seasonal connectivity corridors; b) local corridors outside of all lek density strata; c) low lek density strata outside of connectivity corridors; or d) seasonal connectivity corridors outside of all lek density strata.

**Master Development Plans:** A set of information common to multiple planned wells, including drilling plans, Surface Use Plans of Operations, and plans for future production.

**Mechanized transport**: Any vehicle, device, or contrivance for moving people or material in or over land, water, snow, or air that has moving parts.

**Mineral:** Any naturally formed inorganic material, solid or fluid inorganic substance that can be extracted from the earth, any of various naturally occurring homogeneous substances (such as stone, coal, salt, sulfur, sand, petroleum, water, or natural gas) obtained usually from the ground. Under federal laws, considered as locatable (subject to the general mining laws), leasable (subject to the Mineral Leasing Act of 1920), and salable (subject to the Materials Act of 1947).

**Mineral entry:** The filing of a claim on BLM-administered land to obtain the right to any locatable minerals it may contain.

**Mineral estate:** The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

**Mineralize:** The process where a substance is converted from an organic substance to an inorganic substance.

**Mineral materials:** Common varieties of mineral materials such as soil, sand and gravel, stone, pumice, pumicite, and clay that are not obtainable under the mining or leasing laws but that can be acquired under the Materials Act of 1947, as amended.

**Mining claim:** A parcel of land that a miner takes and holds for mining purposes, having acquired the right of possession by complying with the Mining Law and local laws and rules. A mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, millsite, and tunnel site.

**Mining Law of 1872:** Provides for claiming and gaining title to locatable minerals on BLM-administered lands. Also referred to as the "General Mining Laws" or "Mining Laws."

**Mitigation:** Includes specific means, measures, or practices that could reduce, avoid, or eliminate adverse impacts. Mitigation can include avoiding the impact altogether by not taking a certain action or parts of an action, minimizing the impact by limiting the degree of magnitude of the action and its implementation, rectifying the impact by repairing, rehabilitation, or restoring the affected environment, reducing or eliminating the impact over time by preservation and

maintenance operations during the life of the action, and compensating for the impact by replacing or providing substitute resources or environments.

**Modification:** A change to the provisions of a lease stipulation, either temporarily or for the term of the lease. Depending on the specific modification, the stipulation may or may not apply to all sites within the leasehold to which the restrictive criteria are applied.

**Monitoring (plan monitoring):** The process of tracking the implementation of LUP decisions and collecting and assessing data necessary to evaluate the effectiveness of land use planning decisions.

**Motorized vehicles or uses:** Vehicles that are motorized, including jeeps, all-terrain vehicles (such as four-wheelers and three-wheelers), trail motorcycles or dirt bikes, and aircrafts.

**Multiple-use:** The management of the BLM-administered lands and their various resource values so that they are used in the combination that will best meet the present and future needs of the American people. Multiple-use is implemented by making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific, and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment and giving consideration to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output (FLPMA).

**Municipal watershed:** A watershed area that provides water for use by a municipality as defined by the community and accepted by the state.

**National Environmental Policy Act of 1969 (NEPA):** Public Law 91-190. Establishes environmental policy for the nation. Among other items, NEPA requires federal agencies to consider environmental values in decision-making processes.

**National Register of Historic Places (NRHP):** A listing of architectural, historical, archaeological, and cultural sites of local, state, or national significance established by the National Historic Preservation Act of, 1966 and maintained by the National Park Service.

**Native seed mix:** Any seed mix with any amount of non-native seeds cannot be called a "native" seed mix.

**Native vegetation:** Plant species which were found in a location prior to European contact, and consequently are in balance with these ecosystems because they have well developed parasites, predators, and pollinators.

**Natural processes:** Fire, drought, insect and disease outbreaks, flooding, and other events that existed prior to European contact and shaped vegetation composition and structure.

**Nonenergy leasable minerals:** Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. Nonenergy minerals include resources such as phosphate, sodium, potassium, and sulfur.

**Nonfunctional condition:** Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or woody debris to dissipate energies associated with flow events, and thus are not reducing erosion, improving water quality, etc.

**No surface occupancy (NSO):** A major constraint where use or occupancy of the land surface for fluid mineral exploration or development and all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, and construction of wells and pads) are prohibited to protect identified resource values. Areas identified as NSO are open to fluid mineral leasing, but surface occupancy or surface-disturbing activities associated with fluid mineral leasing cannot be conducted on the surface of the land. Access to fluid mineral deposits would require horizontal drilling from outside the boundaries of the NSO area.

**Notice-level mining activities:** To qualify for a Notice the mining activity must: 1) constitute exploration, 2) not involve bulk sampling of more than 1,000 tons of presumed ore, 3) must not exceed 5 acres of surface disturbance, and 4) must not occur in one of the special category lands listed in 43 CFR 3809.11(c). The Notice is to be filed in the BLM field office with jurisdiction over the land involved. The Notice does not need to be on a particular form but must contain the information required by 43 CFR 3809.301(b).

**Noxious weeds:** A plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or nonnative, new, or not common to the US.

**Objective:** A description of a desired outcome for a resource. Objectives can be quantified and measured and, where possible, have established timeframes for achievement.

**Off-highway vehicle (OHV or off-road vehicle):** Any motorized vehicle capable of, or designated for travel on or immediately over land, water or other natural terrain, excluding: (1) any non-amphibious registered motorboat; (2) any

military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; (3) any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) vehicles in official use; and (5) any combat or combat support vehicle when used for national defense emergencies (43 CFR 8340.0-5).

**Offsite Mitigation:** Compensating for resource impacts by replacing or providing substitute resources or habitat at a different location than the project area.

**Open:** Denotes that an area is available for a particular use or uses. Refer to specific program definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 CFR 8340.0-5 defines the specific meaning of "open" as it relates to OHV use.

**Ozone:** A faint blue gas produced in the atmosphere from chemical reactions of burning coal, gasoline, and other fuels and chemicals found in products such as solvents, paints, and hairsprays.

**Paleontological resources:** The physical remains or other physical evidence of plants and animals preserved in soils and sedimentary rock formations. Paleontological resources are important for correlating and dating rock strata and for understanding past environments, environmental change, and the evolution of life.

**Particulate matter (PM):** One of the six "criteria" pollutants for which the Environmental Protection Agency established NAAQS. Particulate matter is defined as two categories, fine particulates, with an aerodynamic diameter of 10 micrometers ($PM_{10}$) or less, and fine particulates with an aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$).

**Perennial stream:** A stream that flows continuously. Perennial streams are generally associated with a water table in the localities through which they flow.

**Permitted use:** The forage allocated by, or under the guidance of, an applicable LUP for livestock grazing in an allotment under a permit or lease and expressed in AUMs (43 CFR 4100.0-5).

**Permittee:** A person or company permitted to graze livestock on BLM-administered land.

**Physiography:** The study and classification of the surface features of the earth.

**Plan of Operations:** A Plan of Operations is required for all mining activity exploration greater than 5 acres or surface disturbance greater than casual use on certain special category lands. Special category lands are described under 43 CFR 3809.11(c) and include such lands as designated ACECs, lands within the

National Wilderness Preservation System, and areas closed to off-road vehicles, among others. In addition, a plan of operations is required for activity greater than casual use on lands patented under the Stock Raising Homestead Act with Federal minerals where the operator does not have the written consent of the surface owner (43 CFR 3814). The Plan of operations needs to be filed in the BLM field office with jurisdiction over the land involved. The Plan of Operations does not need to be on a particular form but must address the information required by 43 CFR 3809.401(b).

**Planning area:** The planning area is the geographic area for which resource management plans are developed and maintained. The planning area boundary includes all lands regardless of jurisdiction which contain mapped PPH and PGH. For this RMPA/EIS, the planning area is the entire Oregon Sub-region and covers all or a portions of 17 counties in Oregon and 1 county in Washington; however, PPH and PGH are only found in Baker, Crook, Deschutes, Grant, Harney, Lake, Malheur, and Union counties in Oregon. Lands within the planning area include a mix of private, federal, and state lands.

**Planning criteria:** The standards, rules, and other factors developed by managers and interdisciplinary teams for their use in forming judgments about decision making, analysis, and data collection during planning. Planning criteria streamlines and simplifies the resource management planning actions.

**Planning issues:** Concerns, conflicts, and problems with the existing management of BLM-administered lands. Frequently, issues are based on how land uses affect resources. Some issues are concerned with how land uses can affect other land uses, or how the protection of resources affects land uses.

**Policy:** This is a statement of guiding principles, or procedures, designed and intended to influence planning decisions, operating actions, or other affairs of the BLM or Forest Service. Policies are established interpretations of legislation, executive orders, regulations, or other presidential, secretarial, or management directives.

**Preliminary General Habitat (PGH):** Areas of occupied seasonal or year-round habitat outside of preliminary priority habitat.

**Preliminary General Management Area (PGMA)**: BLM-administered lands identified requiring special management to sustain sage-grouse populations, but that are not as important as PPMAs. The PGMAs are derived from and generally follow the PGH boundaries but may be modified in extent based on the objectives of each alternative. Likewise, management strategies applied to the PPMAs may vary by alternative.

**Preliminary Priority Habitat (PPH):** Areas that have been identified as having the highest conservation value to maintaining sustainable Greater Sage-

Grouse populations. These areas include breeding, late brood-rearing, and known winter concentration areas.

**Preliminary Priority Management Area (PPMA)**: BLM-administered lands identified to be managed as having the highest value to maintaining sustainable sage-grouse populations. The PPMAs are derived from and generally follow the PPH boundaries but may be modified in extent based on the objectives of each alternative. Likewise, management strategies applied to the PPMAs may vary by alternative.

**Priority sage-grouse habitat:** Areas that have been identified as having the highest conservation value to maintaining sustainable sage-grouse populations. These areas would include breeding, late brood-rearing, and winter concentration areas. These areas have been identified by state fish and wildlife agencies in coordination with respective BLM offices.

**Priority Areas for Conservation:** Term introduced by the USFWS to encompass the most important areas needed for maintaining sage-grouse representation, redundancy, and resilience across the landscape (USFWS 2013a).

**Prescribed fire:** A wildland fire originating from a planned ignition to meet specific objectives identified in a written, approved, prescribed fire plan for which NEPA requirements (where applicable) have been met prior to ignition.

**Primitive route:** Any transportation linear feature located within areas that have been identified as having wilderness characteristics and not meeting the wilderness inventory road definition (BLM Manual 6310 – Conducting Wilderness Characteristics Inventory on BLM Lands).

**Priority sage-grouse habitat:** Areas that have been identified as having the highest conservation value to maintaining sustainable sage-grouse populations. These areas would include breeding, late brood-rearing, and winter concentration areas. These areas have been identified by the BLM in coordination with respective state wildlife agencies.

**Proper functioning condition:** A term describing stream health that is based on the presence of adequate vegetation, landform and debris to dissipate energy, reduce erosion and improve water quality.

**Public domain:** The term applied to any or all of those areas of land ceded to the federal government by the original states and to lands acquired by treaty, purchase, or cession, and are disposed of only under the authority of Congress.

**BLM-administered land:** Land or interest in land owned by the US and administered by the Secretary of the Interior through the BLM without regard to how the US acquired ownership, except lands located on the outer

continental shelf and land held for the benefit of Native Americans, Aleuts, and Eskimos (H-1601-1, BLM Land Use Planning Handbook).

**Range Improvement:** Any activity, structure or program on or relating to rangelands which is designed to improve production of forage; change vegetative composition; control patterns of use; provide water; stabilize soil and water conditions; and provide habitat for livestock and wildlife. The term includes structures, treatment projects, and use of mechanical means to accomplish the desired results.

**Range improvement project:** An authorized physical modification or treatment which is designed to improve production of forage; change vegetation composition; control patterns of use; provide water; stabilize soil and water conditions; restore, protect and improve the condition of rangeland ecosystems to benefit livestock, wild horses and burros, and fish and wildlife. This definition includes, but is not limited to: structures, treatment projects and use of mechanical devices, or modifications achieved through mechanical means.

**Raptor:** Bird of prey with sharp talons and strongly curved beaks, such as hawks, owls, falcons, and eagles.

**Reasonable foreseeable development scenario:** The prediction of the type and amount of oil and gas activity that would occur in a given area. The prediction is based on geologic factors, past history of drilling, projected demand for oil and gas, and industry interest.

**Recreation management area:** Includes special recreation management areas (SRMAs) and extensive recreation management areas (ERMAs); see SRMA and ERMA definitions.

**Recreation experiences:** Psychological outcomes realized either by recreation-tourism participants as a direct result of their on-site leisure engagements and recreation-tourism activity participation or by nonparticipating community residents as a result of their interaction with visitors and guests within their community or interaction with the BLM and other public and private recreation-tourism providers and their actions.

**Recreation opportunities:** Favorable circumstances enabling visitors' engagement in a leisure activity to realize immediate psychological experiences and attain more lasting, value-added beneficial outcomes.

**Recreation settings:** The collective distinguishing attributes of landscapes that influence and sometimes actually determine what kinds of recreation opportunities are produced.

**Reclamation:** Rehabilitation of a disturbed area to make it acceptable for designated uses. This normally involves re-contouring, replacement of topsoil,

re-vegetation, and other work necessary to ensure eventual restoration of the site. The suite of actions taken within an area affected by human disturbance, the outcome of which is intended to change the condition of the disturbed area to meet pre-determined objectives and/or make it acceptable for certain defined resources (e.g., wildlife habitat, grazing, and ecosystem function).

**Reference state:** The state where the functional capacities represented by soil/site stability, hydrologic function, and biotic integrity are performing at an optimum level under the natural disturbance regime. This state usually includes, but is not limited to, what is often referred to as the potential natural plant community.

**Rehabilitate:** Returning disturbed lands as near to its predisturbed condition as is reasonably practical or as specified in approved permits.

**Renewable energy:** Energy resources that constantly renew themselves or that are regarded as practically inexhaustible. These include solar, wind, geothermal, hydro, and biomass. Although particular geothermal formations can be depleted, the natural heat in the Earth is a virtually inexhaustible reserve of potential energy

**Required Design Features (RDFs):** Means, measures, or practices intended to reduce or avoid adverse environmental impacts. A suite of features that would establish the minimum specifications for certain activities (i.e., water developments, mineral development, and fire and fuels management) and mitigate adverse impacts. These design features would be required to provide a greater level of regulatory certainty than through implementation of BMPs. In general, the design features are accepted practices that are known to be effective when implemented properly at the project level. However, their applicability and overall effectiveness cannot be fully assessed except at the project-specific level when the project location and design are known. Because of site-specific circumstances, some features may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations from what is described in the RMPA/EIS (e.g., a larger or smaller protective area). All variations in design features would require appropriate analysis and disclosure as part of future project authorizations. Additional mitigation measures may be identified and required during individual project development and environmental review.

**Resource Management Plan (RMP):** An LUP, as prescribed by the FLPMA, that establishes, land-use allocations, coordination guidelines for multiple-use, objectives, and actions to be achieved for a given area of land.

**Restoration:** Implementation of a set of actions that promotes plant community diversity and structure that allows plant communities to be more resilient to disturbance and invasive species over the long term. The long-term goal is to create functional, high quality habitat that is occupied by sage-grouse.

Short-term goal may be to restore the landform, soils and hydrology and increase the percentage of preferred vegetation, seeding of desired species, or treatment of undesired species.

**Restriction/restricted use:** A limitation or constraint on BLM-administered land uses and operations. Restrictions can be of any kind, but most commonly apply to certain types of vehicle use, temporal and/or spatial constraints, or certain authorizations.

**Revegetate/revegetation:** The process of putting vegetation back in an area where vegetation previously existed, which may or may not simulate natural conditions.

**Revision:** The process of completely rewriting the land use plan due to changes in the planning area affecting major portions of the plan or the entire plan.

**Right-of-way (ROW):** A right-of-way (ROW) grant is an authorization to use a specific piece of BLM-administered land for a certain project, such as roads, pipelines, transmission lines, and communication sites. A ROW grant authorizes rights and privileges for a specific use of the land for a specific period of time. Generally, a BLM ROW is granted for a term appropriate for the life of the project. Minor ROWs are typically less than about 15 miles in length and are not to exceed about 52 acres of disturbance.

**Right-of-way (ROW) avoidance area:** An area identified through resource management planning to be avoided but may be available for ROW location with special stipulations.

**Right-of-way (ROW) exclusion area:** An area identified through resource management planning that is not available for ROW location under any conditions.

**Riparian area:** A form of wetland transition between permanently saturated wetlands and upland areas. Riparian areas exhibit vegetation or physical characteristics that reflect the influence of permanent surface or subsurface water. Typical riparian areas include lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels. Excluded are ephemeral streams or washes that lack vegetation and depend on free water in the soil.

**Riparian zone:** An area 0.25-mile wide encompassing riparian and adjacent vegetation.

**Road:** A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use.

**Rotation.** Grazing rotation between pastures in the allotment for the permitted time.

**Routes:** Multiple roads, trails and primitive roads; a group or set of roads, trails, and primitive roads that represents less than 100 percent of the BLM transportation system. Generically, components of the transportation system are described as "routes."

**Sale (BLM-administered land):** A method of land disposal pursuant to Section 203 of FLPMA, whereby the US receives a fair-market payment for the transfer of land from federal ownership. BLM-administered lands determined suitable for sale are offered on the initiative of the BLM. Lands suitable for sale must be identified in the RMP. Any lands to be disposed of by sale that are not identified in the current RMP, or that meet the disposal criteria identified in the RMP, require a plan amendment before a sale can occur.

**Saturated soils:** Occur when the infiltration capacity of the soil is exceeded from above due to rainfall or snowmelt runoff. Soils can also become saturated from groundwater inputs.

**Scenic byways:** Highway routes that have roadsides or corridors of special aesthetic, cultural, or historical value. An essential part of the highway is its scenic corridor. The corridor may contain outstanding scenic vistas, unusual geologic features, or other natural elements.

**Scoping process:** An early and open public participation process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.

**Season of use:** The time during which livestock grazing is permitted on a given range area, as specified in the grazing lease.

**Seeding:** Seeding is a vegetation treatment that includes the application of grass, forb, or shrub seed, either aerially or from the ground. In areas of gentle terrain, ground applications of seed are often accomplished with a rangeland drill. Seeding allows the establishment of native species or placeholder species and restoration of disturbed areas to a perennial-dominated cover type, thereby decreasing the risk of subsequent invasion by exotic plant species. Seeding would be used primarily as a follow-up treatment in areas where disturbance or the previously described treatments have removed exotic plant species and their residue.

**Short-term effect:** The effect occurs only during or immediately after implementation of the alternative.

**Special recreation management area (SRMA):** An administrative BLM-administered lands unit identified in land use plans where the existing or

proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness, especially as compared to other areas used for recreation.

**Special recreation permit (SRP):** Authorization that allows for recreational uses of BLM-administered lands and related waters. Issued as a means to control visitor use, protect recreational and natural resources, and provide for the health and safety of visitors. Commercial SRPs are also issued as a mechanism to provide a fair return for the commercial use of BLM-administered lands.

**Special status species:** BLM special status species are: (1) species listed, candidate, or proposed for listing under the Endangered Species Act; and (2) species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the Endangered Species Act that are designated as BLM sensitive by the BLM State Director(s). All federally listed candidate species, proposed species, and delisted species in the five years following delisting are conserved as BLM sensitive species.

**Split-estate:** This is the circumstance where the surface of a particular parcel of land is owned by a different party than the minerals underlying the surface. Split estates may have any combination of surface/subsurface owners: federal/state; federal/private; state/private; or percentage ownerships. When referring to the split estate ownership on a particular parcel of land, it is generally necessary to describe the surface/subsurface ownership pattern of the parcel.

**Stabilize:** The process of stopping further damage from occurring.

**Standard:** A description of the physical and biological conditions or degree of function required for healthy, sustainable lands (e.g., land health standards). To be expressed as a desired outcome (goal).

**Standard lease terms and conditions:** Areas may be open to leasing with no specific management decisions defined in a RMP; however, these areas are subject to lease terms and conditions as defined on the lease form (Form 3100-11, Offer to Lease and Lease for Oil and Gas; and Form 3200-24, Offer to Lease and Lease for Geothermal Resources).

**State:** A state is comprised of an integrated soil and vegetation unit having one or more biological communities that occur on a particular ecological site and that are functionally similar with respect to the three attributes (soil/site stability, hydrologic function, and biotic integrity) under natural disturbance regimes.

**Stochastic:** Randomly determined event, chance event, a condition determined by predictable processes and a random element.

**Strongholds:** Large areas of intact habitat where habitats and populations appear stable (Wisdom et al. 2011).

**Stipulation (general):** A term or condition in an agreement or contract.

**Stipulation (oil and gas):** A provision that modifies standard oil and gas lease terms and conditions in order to protect other resource values or land uses and is attached to and made a part of the lease. Typical lease stipulations include No Surface Occupancy (NSO), Timing Limitations (TL), and Controlled Surface Use (CSU). Lease stipulations are developed through the land use planning (RMP) process.

**Surface disturbance:** Suitable habitat is considered disturbed when it is removed and unavailable for immediate sage-grouse use.

a. Long-term removal occurs when habitat is physically removed through activities that replace suitable habitat with long term occupancy of unsuitable habitat such as a road, powerline, well pad or active mine. Long-term removal may also result from any activities that cause soil mixing, soil removal, and exposure of the soil to erosive processes.

b. Short–term removal occurs when vegetation is removed in small areas, but restored to suitable habitat within a fewer than 5 years of disturbance, such as a successfully reclaimed pipeline or successfully reclaimed drill hole or pit.

c. Suitable habitat rendered unusable due to numerous anthropogenic disturbances

d. Anthropogenic surface disturbance are surface disturbances meeting the above definitions which result from human activities.

**Surface disruption:** Resource uses and activities that are likely to alter the behavior of, displace, or cause stress to sage-grouse occurring at a specific location and/or time. Surface disruption includes those actions that alter behavior or cause the displacement of sage-grouse such that reproductive success is negatively affected, or the physiological ability to cope with environmental stress is compromised. Examples of disruptive activities may include noise, vehicle traffic, or other human presence regardless of the associated activity.

**Surface use(s):** These are all the various activities that may be present on the surface or near-surface (e.g., pipelines), of the BLM-administered lands. It does not refer to those subterranean activities (e.g., underground mining, etc.) occurring on the BLM-administered lands or federal mineral estate. When

administered as a use restriction (e.g., *No Surface Use [NSU]*), this phrase prohibits all but specified resource uses and activities in a certain area to protect particular sensitive resource values and property. This designation typically applies to small acreage sensitive resource sites (e.g., plant community study exclosure, etc.), and/or administrative sites (e.g., government ware-yard, etc.) where only authorized, agency personnel are admitted.

**Sustained yield:** The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the BLM-administered lands consistent with multiple uses.

**Temporary/temporary use:** This term is used as the opposite of the term permanent/ permanent use. It is a relative term and has to be considered in the context of the resource values affected and the nature of the resource use/activity taking place. Generally, a temporary activity is considered to be one that is not fixed in place and is of short duration.

**Terrestrial:** Living or growing in or on the land.

**Threatened species:** Any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range (BLM Manual 6840, Special Status Species Management). Under the Endangered Species Act in the US, "threatened" is the lesser-protected of the two categories. Designation as threatened (or endangered) is determined by USFWS as directed by the Endangered Species Act.

**Timber:** Standing trees, downed trees, or logs which are capable of being measured in board feet.

**Timing limitation (TL):** The timing limitation (TL) stipulation, a moderate constraint, is applicable to fluid mineral leasing, all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, construction of wells and/or pads), and other surface-disturbing activities (i.e., those not related to fluid mineral leasing). Areas identified for TL are closed to fluid mineral exploration and development, surface-disturbing activities, and intensive human activity during identified time frames. This stipulation does not apply to operation and basic maintenance activities, including associated vehicle travel, unless otherwise specified. Construction, drilling, completions, and other operations considered to be intensive in nature are not allowed. Intensive maintenance, such as workovers on wells, is not permitted. TLs can overlap spatially with NSO and CSU, as well as with areas that have no other restrictions. Administrative activities are allowed at the discretion of the Authorized Officer.

**Total dissolved solids:** Salt, or an aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, manganese, sodium, potassium, and other cations that form salts.

**Total maximum daily load:** An estimate of the total quantity of pollutants (from all sources: point, nonpoint, and natural) that may be allowed into waters without exceeding applicable water quality criteria.

**Trail:** A linear route managed for human-power (e.g., hiking or bicycling), stock (e.g., equestrian), or OHV forms of transportation or for historical or heritage values. Trails are not generally managed for use by four-wheel drive or high-clearance vehicles.

**Transition:** A shift between two states. Transitions are not reversible by simply altering the intensity or direction of factors that produced the change. Instead, they require new inputs such as revegetation or shrub removal. Practices, such as these, that accelerate succession are often expensive to apply.

**Transportation system:** The sum of the BLM's recognized inventory of linear features (roads, primitive roads, and trails) formally recognized, designated, and approved as part of the BLM's transportation system.

**Travel management areas:** Polygons or delineated areas where a rational approach has been taken to classify areas open, closed or limited, and have identified and/or designated a network of roads, trails, ways, landing strips, and other routes that provide for public access and travel across the planning area. All designated travel routes within travel management areas should have a clearly identified need and purpose as well as clearly defined activity types, modes of travel, and seasons or timeframes for allowable access or other limitations (BLM Handbook H-1601-1, Land Use Planning Handbook).

**Trespass:** Any unauthorized use of BLM-administered land.

**Tribal interests:** Native American or Native Alaskan economic rights such as Indian trust assets, resource uses and access guaranteed by treaty rights, and subsistence uses.

**Understory:** That portion of a plant community growing underneath the taller plants on the site.

**Unitization**: Operation of multiple leases as a single lease under a single operator.

**Utility corridor:** A designated parcel of land that is either linear or areal in character. Utility corridors are not usually wider than five miles; are limited by technological, environmental, and topographical factors; and are set in width as identified by the special use permit or ROW issued. Designation criteria are set forth in Section 503 of F FLPMA for special use permits and ROWs; and 43 CFR 2802.11 for ROWs.

**Valid existing rights:** Documented, legal rights or interests in the land that allow a person or entity to use said land for a specific purpose and that are still in effect. Such rights include but are not limited to fee title ownership, mineral rights, ROWs, easements, permits, and licenses. Such rights may have been reserved, acquired, leased, granted, permitted, or otherwise authorized over time.

**Vegetation Dynamics Development Tool:** A model used to evaluate habitat trends into the future and compare effects of each alternative on vegetation.

**Vegetation manipulation:** Planned alteration of vegetation communities through use of mechanical, chemical, seeding, and/or prescribed fire or managed fire to achieve desired resource objectives.

**Vegetation treatments:** Management practices which change the vegetation structure to a different stage of development. Vegetation treatment methods include managed fire, prescribed fire, chemical, mechanical, and seeding.

**Vegetation type:** A plant community with immediately distinguishable characteristics based upon and named after the apparent dominant plant species.

**Visibility (air quality):** A measure of the ability to see and identify objects at different distances.

**Visitor day:** Twelve visitor hours that may be aggregated by one or more persons in single or multiple visits.

**Visual resources:** The visible physical features on a landscape, (topography, water, vegetation, animals, structures, and other features) that comprise die scenery of the area.

**Warranted but precluded**: When the public files a petition with USFWS to have a species listed under the Endangered Species Act, the USFWS can make one of three findings: listing is warranted; listing is not warranted; or listing is warranted but precluded. The warranted by precluded listing indicates that a species should be listed based on the available science, but listing other species takes priority because they are more in need of protection.

**Watershed:** Topographical region or area delineated by water draining to a particular watercourse or body of water.

**West Nile virus:** A virus that is found in temperate and tropical regions of the world and most commonly transmitted by mosquitos. West Nile virus can cause flu-like symptoms in humans and can be lethal to birds, including sage-grouse.

**Western Association of Fish and Wildlife Agencies (WAFWA) Management Zones:** Greater Sage-Grouse management zones established based on populations across the entire range of the Greater Sage-grouse. Oregon falls into WAFWA Management Zones IV and V. WAFWA management zones are used in the cumulative effects analysis.

**Wildcat well:** An exploratory oil well drilled in land not known to be an oil field.

**Wildland fire:** Any non-structure fire that occurs in the vegetation and/or natural fuels. Includes both prescribed fire and wildfire (NWCG Memo #024-2010 April 30, 2010. www.nwcg.gov).

**Wilderness:** A congressionally designated area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, that is protected and managed to preserve its natural conditions and that (1) generally appears to have been affected mainly by the forces of nature, with human imprints substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres or is large enough to make practical its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historic value. The definition is contained in Section 2(c) of the Wilderness Act of 1964 (78 Stat. 891).

**Wilderness characteristics:** Wilderness characteristics attributes include the area's size, its apparent naturalness, and outstanding opportunities for solitude or a primitive and unconfined type of recreation. They may also include supplemental values. Lands with wilderness characteristics are those lands that have been inventoried and determined by the BLM to contain wilderness characteristics as defined in section 2(c) of the Wilderness Act.

**Wilderness Study Area (WSA):** A designation made through the land use planning process of a roadless area found to have wilderness characteristics, as described in Section 2(c) of the Wilderness Act of 1964.

**Wildland fire use:** *A term no longer used; the new terminology is "managed fire" (see "managed fire" definition).* A vegetation treatment that involves taking advantage of a naturally-ignited wildland fire in an area where fire would benefit resources. Wildland fire use would be conducted in specific areas needing treatment after a site-specific plan and NEPA analysis are completed and only if predetermined prescriptive parameters (e.g., weather/fire behavior) can be met. Until this planning and NEPA analysis are accomplished, wildland fires would be suppressed using an appropriate management response.

**Wildland-urban interface (WUI):** The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

**Withdrawal.** An action that restricts the use of BLM-administered land and segregates the land from the operation of some or all of the BLM-administered land and mineral laws. Withdrawals are also used to transfer jurisdiction of management of BLM-administered lands to other federal agencies

**Winter Concentration Areas:** Sage-grouse winter habitats which are occupied annually by sage-grouse and provide sufficient sagebrush cover and food to support birds throughout the entire winter (especially periods with above average snow cover). Many of these areas support several different breeding populations of sage-grouse. Sage-grouse typically show high fidelity for these areas, and loss or fragmentation can result in significant population impacts.

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