Oregon Greater Sage-Grouse

Draft Resource Management Plan Amendment

and

Environmental Impact Statement

US Department of the Interior,
Bureau of Land Management
May 2018

BLM

The Bureau of Land Management's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

Cover Photo: Steve Ting

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Oregon State Office
P.O. Box 2965, Portland, Oregon 97208
http://www.blm.gov/or

APR 19 2018

Dear Reader:

The Oregon Draft Resource Management Plan Amendment (RMPA) and Draft Environmental Impact Statement (EIS) is available for your review and comment. The Bureau of Land Management (BLM) prepared this document in consultation with cooperating agencies and in accordance with the National Environmental Policy Act of 1969, as amended; the Federal Land Policy and Management Act of 1976, as amended; implementing regulations; the BLM's Land Use Planning Handbook (H-1601-1); and other applicable law and policy.

The planning area is the BLM Oregon Burns, Lakeview, and Vale District Offices. The planning area encompasses approximately 60,649 surface acres in research natural areas administered by the BLM in Harney, Lake, and Malheur Counties.

As directed by BLM Planning Regulations, Alternative B has been identified in the Draft EIS as the preferred alternative. Identification of the preferred alternative does not indicate any commitments on the part of the BLM with regard to a final decision. In developing the Proposed RMPA/Final EIS, which is the next phase of the planning process, the decision-maker may select a subset of actions from each of the alternatives analyzed in the Draft RMPA/Draft EIS for the purpose of creating a management strategy that best meets the needs of the resources and values in this area under the BLM's multiple use and sustained yield mandate.

The BLM encourages the public to review and provide comments on the Draft RMPA/Draft EIS. The Draft RMPA/Draft EIS is available on the project website at: https://goo.gl/7wdKmM. Paper copies are also available for public review at BLM offices within the planning area.

Public comments will be accepted for 90 calendar days following the Environmental Protection Agency's publication of its Notice of Availability in the *Federal Register*. The BLM can best utilize your comments and resource information submissions if received within the review period.

Written comments may be submitted as follows (submittal of electronic comments is encouraged):

1. Written comments may be submitted electronically at website: https://goo.go/PxkL5Q
2. Written comments may also be mailed directly or delivered to the BLM at:
   Bureau of Land Management Oregon State Office
   Attn: Draft EIS for Greater Sage-Grouse Conservation
   P.O. Box 2965
   Portland, OR 97208

To facilitate analysis of comments and information submitted, we encourage you to submit comments in an electronic format. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, be advised that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

Public meetings will be held at various locations around the planning area to provide the public with opportunities to submit comments and seek additional information. The locations, dates, and times of these meetings will be announced at least 15 days prior to the first meeting via a press release and on the project website: https://goo.go/PxkL5Q

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

Sincerely,

Jamie E. Connell
State Director
Oregon/Washington

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

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

Abstract: This draft resource management plan (RMP) amendment and draft environmental impact statement (EIS) has been prepared by the United States Department of the Interior (DOI), Bureau of Land Management (BLM) with input from cooperating agencies. The purpose of this RMP amendment (RMPA) is to enhance cooperation with the States by modifying the approach to Greater Sage-Grouse management in existing RMPs to better align with individual state plans and/or conservation measures. The Oregon Governor's Office responded to the BLM's 2017 Notice of Intent that there are important consistencies between the Oregon state plan and the BLM's 2015 Oregon Greater Sage-Grouse plan amendments and that a major plan amendment is not needed. However, the Oregon BLM State Director determined through discussions with the Governor's Office that an evaluation of the 2015 decision to make all or portions of 13 key Research Natural Areas unavailable to livestock grazing was needed. This document is considering amendments to eight BLM RMPs in Oregon. The EIS describes and analyzes two alternatives for managing livestock grazing in Greater Sage-Grouse habitat on approximately 22,000 acres of BLM-administered surface estate in 13 key Research Natural Areas. The No-Action Alternative is a continuation of current management; use of public lands and resources would continue to be managed under the current BLM RMPs, as amended in 2015. The Management Alignment Alternative was derived through discussion and coordination with the Governor's Office and cooperating agencies to align with the State conservation plan and to support conservation outcomes for Greater Sage-Grouse. This is the agency's preferred alternative, though this does not constitute a final decision and there is no requirement that the preferred alternative identified in the draft EIS be selected as the agency's decision in the Record of Decision. Livestock grazing is the primary planning issue addressed in this plan amendment.

Review Period: Comments on the Oregon Greater Sage-Grouse Draft Resource Management Plan Amendment and Draft Environmental Impact Statement will be accepted for 90 calendar days following publication of the United States Environmental Protection Agency's Notice of Availability in the *Federal Register*.

For further information, contact:

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ACRONYMS AND ABBREVIATIONS

	Full Phrase
ARMPA	approved resource management plan amendment
BLM	Bureau of Land Management
CEQ	Council on Environmental Quality
DOI	US Department of the Interior
EIS	environmental impact statement
FLMPA	Federal Land Management and Policy Act
GHMA	General Habitat Management Area
LUPA	Land Use Plan Amendment
NEPA	National Environmental Policy Act
ODFW	Oregon Department of Fish and Wildlife
PHMA	Priority Habitat Management Area
RMP	resource management plan
RMPA	resource management plan amendment
RNA	research natural area
ROD	record of decision
SO	Secretarial Order
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey

Executive Summary

ES.1 INTRODUCTION

Greater Sage-Grouse is a state-managed species that is dependent on sagebrush steppe ecosystems. These ecosystems are managed in partnership across the range of the Greater Sage-Grouse by federal, state, and local authorities. Efforts to conserve the species and its habitat date back to the 1950s. Over the past two decades, state wildlife agencies, federal agencies, and many others in the range of the species have been collaborating to conserve Greater Sage-Grouse and its habitats. The United States (US) Department of the Interior (DOI) and the Bureau of Land Management (BLM) have broad responsibilities to manage federal lands and resources for the public benefit. Nearly half of Greater Sage-Grouse habitat is managed by the BLM.

In September 2015, the US Fish and Wildlife Service (USFWS) determined that the Greater Sage-Grouse did not warrant listing under the Endangered Species Act of 1973. In its "not warranted" determination, the USFWS based its decision in part on regulatory certainty from the conservation commitments and management actions in the BLM and US Forest Service (Forest Service) Greater Sage-Grouse land use plan amendments (LUPAs) and revisions, as well as on other private, state, and federal conservation efforts. Since 2015 the BLM, in discussion with partners, recognized that several refinements and policy updates would help strengthen conservation efforts, while providing increased economic opportunity to local communities.

The BLM continues to build upon its commitment to on-the-ground management to promote conservation through close collaboration with State governments, local communities, private landowners, and other stakeholders. **Table ES-1** shows the acres of on-the-ground treatment activity between 2015 and 2017 and planned for 2018, based upon annual budgets allocated by Congress. BLM's accomplishments reflect contributions from programs other than Greater Sage-Grouse, including fuels, riparian, and range management.

Table ES-1
Acres of On-The-Ground Treatment Activity for Fiscal Years 2015 to 2017 and Planned for 2018

Fiscal Year	Conifer Removal	Fuelbreaks	Invasive Species Removal	Habitat Protection	Habitat Restoration	Total
2015	98,876	15,000	63,612	41,003	75,952	294,443
2016	165,963	14,614	66,621	42,305	95,748	385,251
2017	185,032	65,455	124,582	10,428	93,474	479,000
2018[1]	118,384	65,442	68,512	9,240	54,509	316,087

[1]Planned

The BLM is now engaged in a planning effort to further enhance its continued cooperation with western states by ensuring greater consistency between individual state plans and the BLM's multiple-use mission. This executive summary highlights the major components of this planning document and outlines the potential impacts from the proposed management changes. The BLM's efforts seek to improve

management alignment in ways that will increase management flexibility, maintain access to public resources, and promote conservation outcomes.

ES.2 Purpose of and Need for Action

The BLM's purpose and need for this planning action helps define the scope of proposed alternative actions and issues the agency must analyze. In the Federal Land Policy and Management Act (FLPMA), Congress provided the BLM with discretion and authority to manage public lands for multiple use and sustained yield, and declared it the policy of the United States to coordinate the land use planning process with other federal and state plans. Further, FLPMA specifically provides that it neither enlarges nor diminishes the authority of the states in managing fish and wildlife. As the sovereign with the lead role in managing game species, including Greater Sage-Grouse, states play a critical role in conserving and restoring the Greater Sage-Grouse and its habitat.

The purpose of this land use plan amendment process is to enhance cooperation with the states by modifying the approach to Greater Sage-Grouse management in existing land use plans to better align with individual state plans and/or conservation measures and DOI and BLM policy.

ES.2.1 Scope of the Analysis

It is important that the Oregon BLM step down this national-level purpose and need described above in terms that specifically relate to the scope of issues identified herein. In its November 30, 2017, response to the Notice of Intent, the Office of Governor Kate Brown concluded that there are important consistencies between Oregon BLM's 2015 Record of Decision (ROD)/Approved Resource Management Plan Amendment (ARMPA) and the State of Oregon's 2015 Oregon Sage-grouse Action Plan. Further, the Office of Governor Kate Brown indicated that a major plan amendment was not needed in Oregon, that implementation of the 2015 ROD/ARMPA should continue, that additional discussion and coordination was needed to refine some plan and policy interpretations, and that those discussions and refinement efforts should occur via the ongoing SageCon partnership.

Through subsequent discussion with the Governor's Office, the Oregon BLM State Director has determined that the scope of the Oregon BLM proposed action in this environmental impact statement (EIS) and resource management plan amendment (RMPA) is to evaluate whether the 2015 ROD/ARMPA decision to make portions of the key research natural areas (RNAs) unavailable to livestock grazing is a necessary component of Greater Sage-Grouse conservation. The RMPA/EIS will assess:

1. Whether and how making areas unavailable to livestock grazing addresses specific threats to Greater Sage-Grouse and Greater Sage-Grouse habitat as identified in the USFWS's Conservation Objectives Team Final Report (2013).

2. Whether the vegetation communities of interest in the key RNAs can be protected and studied with smaller areas of grazing exclusion and still meet the stated 2015 ROD/ARMPA purposes to:

    a. Serve as areas for comparison for managed areas in the rest of the Greater Sage-Grouse habitat in the 2015 ROD/ARMPA

    b. Function as areas for baseline vegetation monitoring for those specific plant communities with no management activities (i.e., succession is allowed to proceed).

3. Whether having the key RNAs available to grazing and managed under the previous district management plan provisions will preclude the BLM from achieving the research (or scientific study) purposes of the 2015 ROD/ARMPA.

ES.3 Issues and Related Resource Topics Identified Through Scoping

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

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

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

- Issues and related resource topics retained for further consideration in this RMPA/EIS—These were issues raised during scoping for which alternatives were developed to address the issues.
- Clarification of decisions in the 2015 ROD/ARMPA—These are decisions or frameworks in the 2015 ROD/ARMPA that require clarification as to their application or implementation. No new analysis is required, as the intentions behind the decisions were analyzed in the 2015 Final EIS.
- Issues and resource topics not carried forward for additional consideration or analysis are those brought up during scoping that were not carried forward in this RMPA/EIS—While some of these issues are considered, they do not require additional analysis because they were analyzed in the 2015 Final EIS, and no new information has been identified that would warrant further analysis. Others are not carried forward in this EIS because they do not further the purpose of aligning with the State's conservation plan.

ES.3.1 Issues and Related Resource Topics Retained for Further Consideration in this Draft RMPA/EIS

The issues identified in **Table ES-2**, below, were previously analyzed in the 2015 Final EIS; however, based on the proposed changes, the resource topics and potential impacts that may require additional analysis are as follows: Greater Sage-Grouse, vegetation (including invasive plants, riparian areas and wetlands, and special status plants), fish and wildlife (including other special status species), socioeconomics, and livestock grazing. Therefore, these resource topics are carried forward for detailed analysis.

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

Table ES-2
Issues and Related Resource Topics

Issues	Resource Topics Related to the Issues
Modifying Livestock Grazing Decisions within Research Natural Areas ● What opportunities would be available to study the impacts of grazing on the presence and abundance of forb species and insects important to pre-laying hens and chicks? ● What are the impacts of allowing or removing grazing within key RNAs on overall wildfire risks? ● What are the economic impacts to grazing permittees due to reductions in AUMs? Is there a threshold where no impacts would occur?	Greater Sage-Grouse, vegetation (including riparian), wildlife, livestock grazing (including permittee socioeconomics)

ES.3.2 Clarification of Planning Decisions in the 2015 ROD/ARMPA

The following issues with existing planning decisions were raised during scoping. These issues require clarification of language in the 2015 ROD/ARMPA but do not require new analysis. The clarifying language for these planning decisions is displayed in this planning document to communicate how these issues are being addressed.

A variety of national Instructional Memoranda (IMs) were issued following the 2015 ROD/ARMPA to clarify interpretations and implementation considerations. Several of these IMs were further updated in 2018, including one on how to use the Habitat Objectives table from the 2015 ROD/ARMPA. The BLM will be working to review and further refine DOI and BLM policy.

Similarly, a variety of policy, guidance, or training and education needs have been identified, including the following topics:

- Reserve common allotments (grass banks) to promote resilience and viability for livestock economies and habitat restoration priorities
- Waivers, exceptions, and modifications for development actions within priority habitat

ES.3.3 Issues and Resource Topics Not Carried Forward for Additional Analysis (Scoping Issues Outside the Scope and Scoping Issues Previously Analyzed)

The following issues were raised during scoping and are not carried forward for a variety of reasons. For example, population-based management is not carried forward for detailed analysis because the BLM does not manage species populations; that authority falls under the jurisdiction of the Oregon Department of Fish and Wildlife.

In addition, grazing to manage wildfire risks is not addressed in further detail in this RMPA/EIS. The key Research Natural Areas (RNAs) are too small in acreage to show any impact or effect on this large-scale issue. Svejcar et al. (2014) argue that grazing is necessary to manage wildfire risks in sagebrush ecosystems, and this concern was raised during scoping for this RMPA/EIS. It is well established that wildfire is a risk in sagebrush ecosystems and to Greater Sage-Grouse habitat, particularly as it pertains to dominance by annual grasses and establishment of the annual grass-fire cycle (e.g., Brooks et al. 2015; Coates et al. 2015; Coates et al. 2016).

Livestock do not evenly distribute themselves across allotments and pastures, tending to concentrate in areas near water and shade and in gentler terrain, resulting in grazing effects on fine fuel loading that are not strategically placed, but more haphazard. The establishment reports for the key RNAs mention that most of these areas are lightly grazed due to the lack of available water (see **Chapter 3**, **Section 3.11**). Without extensive fencing, herding, and provision of supplemental water at a minimum, it is unlikely that grazing would reduce wildfire risks within key RNAs. As evidenced by the recent wildfires in several key RNAs (see **Chapter 3**, **Section 3.3.1**), they are too small and isolated to affect landscape-scale wildfire size and behavior for fires originating outside key RNAs.

Other issues were analyzed in the 2015 Final EIS, and no significant new information related to these issues has emerged since that time. Therefore, the following issues do not require additional analysis in this RMPA/EIS.

- Restrictions on rights-of-way (ROWs) and infrastructure
- Wind energy development in priority habitat management areas (PHMA)
- ROW avoidance in PHMA and general habitat management areas (GHMA)
- Retention of lands as identified as PHMA or GHMA in federal ownership
- Varying stipulations applied to oil, gas, and geothermal development
- Effects of NSO stipulations on Greater Sage-Grouse habitat on non-BLM-administered land
- Mitigation for oil and gas development
- Prioritization of fluid mineral leases outside of PHMA and GHMA
- Numerical noise limitations within PHMA
- Contribution of disturbance caps toward Greater Sage-Grouse conservation objectives
- Required design features (RDFs)
- Habitat objectives and ability to achieve rangeland health standards (see Section 1.5.2)
- Vegetation treatments and wildfire response
- Adaptive management
- Habitat assessment framework
- Mitigation standard

Other issues were evaluated as part of the 2015 ROD/ARMPA. For the same reasons they were dismissed in the 2015 ROD/ARMPA, they are not carried forward for detailed analysis in this RMPA/EIS (Section 1.6.4 on pages 1-20 to 1-22 in the Final EIS):

- Hunting Greater Sage-Grouse
- Predator control

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

- Air
- Soils
- Water
- Wild horses and burros
- Geology
- Cultural resources
- Paleontological resources
- Visual resources
- Wildland fire management
- Lands with wilderness characteristics
- Forestry
- Recreation and visitor services
- Comprehensive trails and travel management
- Lands and realty
- Energy and minerals
- Special designations
- Indian Trust resources
- Noise

ES.4 ALTERNATIVES CONSIDERED

Alternatives development and analysis is the heart of an EIS. The alternatives considered in this document address all the issues brought forward by the public and considered by BLM. The comparative analysis between alternatives establishes a framework for decision makers to understand important trade-offs and identify the most effective way to meet the purpose and need and BLM's multiple use mission. The alternatives analysis can support the BLM in adapting its management when information and circumstances change.

ES.4.1 No-Action Alternative

Under the No-Action Alternative, the BLM would not amend the current Greater Sage-Grouse management plan (*Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment - ARMPA*). Greater Sage-Grouse habitat would continue to be managed under current management direction. Goals and objectives for BLM-administered lands and federal mineral estate would not change. Allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, lands and realty, and livestock grazing would also remain the same. All or portions of the 13 key RNAs would not be available for livestock grazing as described in the 2015 ROD/ARMPA. Foster Flat and Guano Creek–Sink Lakes RNAs would remain unavailable for livestock grazing.

ES.4.2 Management Alignment Alternative (Preferred Alternative)

This alternative is derived through coordination with the State and cooperating agencies to align with the State conservation plan and to support conservation outcomes for Greater Sage-Grouse. The BLM continues to build upon the 2015 planning effort as envisioned in SO 3353 by collaborating with states and stakeholders to improve alignment between federal management plans and other plans and programs at the state level, while ensuring consistency with the BLM's multiple use mission. This enhanced cooperation between the BLM and the Governor's office is intended to lead to improved management and coordination with states across the range of Greater Sage-Grouse in Oregon. It will also provide additional flexibility for the BLM to work with the State of Oregon on landscape-scale decisions, which will provide protections for Greater Sage-Grouse habitat while allowing reasonable development of other resources, in support of local communities and economies. At the request of the State, the Management Alignment Alternative in this Draft RMPA/EIS does not modify the net conservation gain standard for compensatory mitigation that the BLM incorporated into its plans in 2015. The DOI and the BLM, however, have modified their mitigation policies since the 2015 plans were finalized. The public did not have the opportunity to comment specifically on a net conservation gain

approach to compensatory mitigation during the 2015 land use planning process. In addition, the DOI and the BLM are evaluating whether the implementation of a compensatory mitigation standard on public lands is appropriate and consistent with applicable legal authorities. We request public comment about how the BLM should consider and implement mitigation with respect to the Greater Sage-Grouse, including alternative approaches to requiring compensatory mitigation in BLM land use plans.

The state action plan supports proper livestock grazing and recognizes the BLM's authority to manage grazing on public lands. Livestock grazing would be available in all or portions of the 13 key RNAs in keeping with the district RMPs' decisions that were amended by the 2015 ROD/ARMPA in order to support local communities and economies. This alternative would not change terms and conditions of existing grazing permits. Foster Flat and Guano Creek–Sink Lakes key RNAs would remain unavailable for livestock grazing in keeping with those prior district decisions and RMPs. **Table 2-2** (**Chapter 2**) further specifies the proposed changes needed to address consistency between state and federal plans.

ES.5 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

This section includes a summary comparison of environmental consequences from implementing the No-Action Alternative and the Management Alignment Alternative. A detailed description of environmental consequences is included in **Chapter 4**. In Oregon, both the No-Action Alternative and Management Alignment Alternative were previously analyzed in the 2015 Final EIS. The No-Action Alternative in this RMPA/EIS was called the Proposed Plan in the 2015 Final EIS and the Management Plan Alignment Alterative of this RMPA/EIS was called Alternative A (No Action) in the 2015 Final EIS. The BLM finds no additional impacts not previously considered in the 2015 Final EIS. Impacts described here and in **Chapter 4** are more site-specific, but were covered by the range of alternatives and within the scope of impacts previously analyzed.

No-Action Alternative	Management Alignment Alternative
Greater Sage-Grouse	
Closing all or portions of 13 key RNAs on 21,959 acres to grazing would protect and aid in the recovery of important brood-rearing habitat including riparian areas. Key RNAs would provide opportunity in the long-term to study changes in native forb species richness and cover, including species that are preferred by sage-grouse and livestock. Competition for forage would be reduced and potentially increase sage-grouse cover and nesting habitat. Sage-grouse nesting rate, nesting success and brood survival may increase.	Livestock grazing impacts on Greater Sage-grouse would vary depending on the extent of vegetation removal, type of habitat grazed, and duration and timing of the grazing period. Impacts to habitat would not change from current conditions. Impacts to sage-grouse preferred forbs and insects are uncertain, and that uncertainty would continue. Opportunities for comparison of ungrazed to grazed areas would be fewer.
Vegetation, Noxious Weeds, Riparian Areas and Wetlands	
Grazing impacts to mesic areas (riparian areas, wetlands, and playas) within the 13 key RNAs expected to decrease. Opportunities for research increased with broader range of vegetation types and plant communities available to support research efforts and broaden the potential scope of inference across eastern Oregon.	No change from current conditions and trends from livestock grazing. Opportunities for research limited to a small number of vegetation types and plant communities with a limited scope of inference.

No-Action Alternative	Management Alignment Alternative
Fish and Wildlife and Special Status Species	
Potential increase in populations of special status plants where they become protected from grazing, trampling, and changes in microclimate that may affect reproduction and establishment. Protection of riparian habitats important to wildlife would benefit riparian dependent and fish species and may increase some populations.	No change expected in populations of special status plants and wildlife where grazing has an impact. Impacts to wildlife habitat would vary depending on the extent of vegetation removal, type of habitat grazed, and duration and timing of the grazing period, but would not change from current conditions.
Livestock Grazing Management	
All or portions of the key RNAs would be unavailable to livestock grazing; however this action has not been implemented and impacts to livestock grazing have not yet been realized. When implemented, permittees would experience management changes (e.g. reduce livestock numbers, modify grazing rotations, find additional pasture, and increase the time spent on base property to provide feed and water). Approximately 39 miles of fencing would need to be constructed and maintained on a yearly basis.	The Management Alignment Alternative would represent a change in land use allocation; however, no actual management change or impact would occur on the ground since grazing has not been formally removed from the key RNAs. There would be no impacts to the terms and conditions of existing grazing permits. Approximately 39 miles of fencing needed to implement the No-Action Alternative would not be constructed. There would be no impacts to the operators and their livestock grazing management through changes to grazing practices or authorized use.
Socioeconomics	
There would be direct negative economic impacts to permittees in at least five of the 13 key RNAs where a loss of AUMs could not be absorbed into the remaining permit area. All permittees would likely experience management changes (e.g. rotation or season of use) due to new fencing and loss of acres available to grazing.	There would be no impacts to the livestock operators from continuing grazing in the 13 key RNAs. No additional fencing would need to be constructed or maintained along with the associated cost impacts.

Chapter 1. Purpose and Need for Action

1.1 Introduction

Greater Sage-Grouse is a state-managed species that depends on sagebrush steppe ecosystems. These ecosystems are managed in partnership across its range by federal, state, and local authorities. State agencies responsible for fish and wildlife management possess broad responsibility for protecting and managing fish, wildlife, and plants within their borders, except where preempted by federal law. Similarly, the DOI has broad responsibilities to manage federal lands and resources for the public's benefit. Approximately half of Greater Sage-Grouse habitat is managed by the BLM and US Forest Service (Forest Service).

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

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

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

The BLM is currently implementing the 2015 Greater Sage-Grouse plans. The plans recommended that SFAs be proposed for withdrawal; however, this proposed withdrawal was cancelled on October 11, 2017.

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

On June 7, 2017, the Secretary issued SO 3353 with a purpose of enhancing cooperation among 11 western states and the BLM in managing and conserving Greater Sage-Grouse. SO 3353 directed an Interior Review Team, consisting of the BLM, the USFWS, and US Geological Survey (USGS), to coordinate with the Sage-Grouse Task Force. They also were directed to review the 2015 Greater

Sage-Grouse plans and associated policies to identify provisions that may require modification to make the plans more consistent with the individual state plans and better balance the BLM's multiple-use mission as directed by SO 3349 "American Energy Independence."

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

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

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

1.2 PURPOSE OF AND NEED FOR ACTION

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

The purpose of this land use plan amendment process is to enhance cooperation with the states by modifying the approach to Greater Sage-Grouse management in existing land use plans to better align with individual state plans and/or conservation measures and DOI and BLM policy.

Scope of the Analysis

It is important that the Oregon BLM step down this national-level purpose and need described above in terms that specifically relate to the scope of issues identified herein. In its November 30, 2017, response to the Notice of Intent, the Office of Governor Kate Brown concluded that there are important consistencies between Oregon BLM's 2015 RODARMPA and the State of Oregon's 2015 Oregon Sage-grouse Action Plan. Further, the Office of Governor Kate Brown indicated that a major plan amendment was not needed in Oregon, that implementation of the 2015 ROD/ARMPA should continue, that additional discussion and coordination was needed to refine some plan and policy interpretations, and that those discussions and refinement efforts should occur via the ongoing SageCon partnership.

Through subsequent discussion with the Governor's Office, the Oregon BLM State Director has determined that the scope of the Oregon BLM proposed action in this EIS and RMPA is to evaluate

whether the 2015 ROD/ARMPA decision to make portions of the key research natural areas (RNAs) unavailable to livestock grazing is a necessary component of Greater Sage-Grouse conservation. The RMPA/EIS will assess:

1. Whether and how making areas unavailable to livestock grazing addresses specific threats to Greater Sage-Grouse and Greater Sage-Grouse habitat as identified in the USFWS's Conservation Objectives Team Final Report (2013).

2. Whether the vegetation communities of interest in the key RNAs can be protected and studied with smaller areas of grazing exclusion and still meet the stated 2015 ROD/ARMPA purposes to:

    a. Serve as areas for comparison for managed areas in the rest of the Greater Sage-Grouse habitat in the 2015 ROD/ARMPA

    b. Function as areas for baseline vegetation monitoring for those specific plant communities with no management activities (i.e., succession is allowed to proceed).

3. Whether having the key RNAs available to grazing and managed under the previous district management plan provisions will preclude the BLM from achieving the research (or scientific study) purposes of the 2015 ROD/ARMPA.

1.3 PLANNING AREA AND CURRENT MANAGEMENT

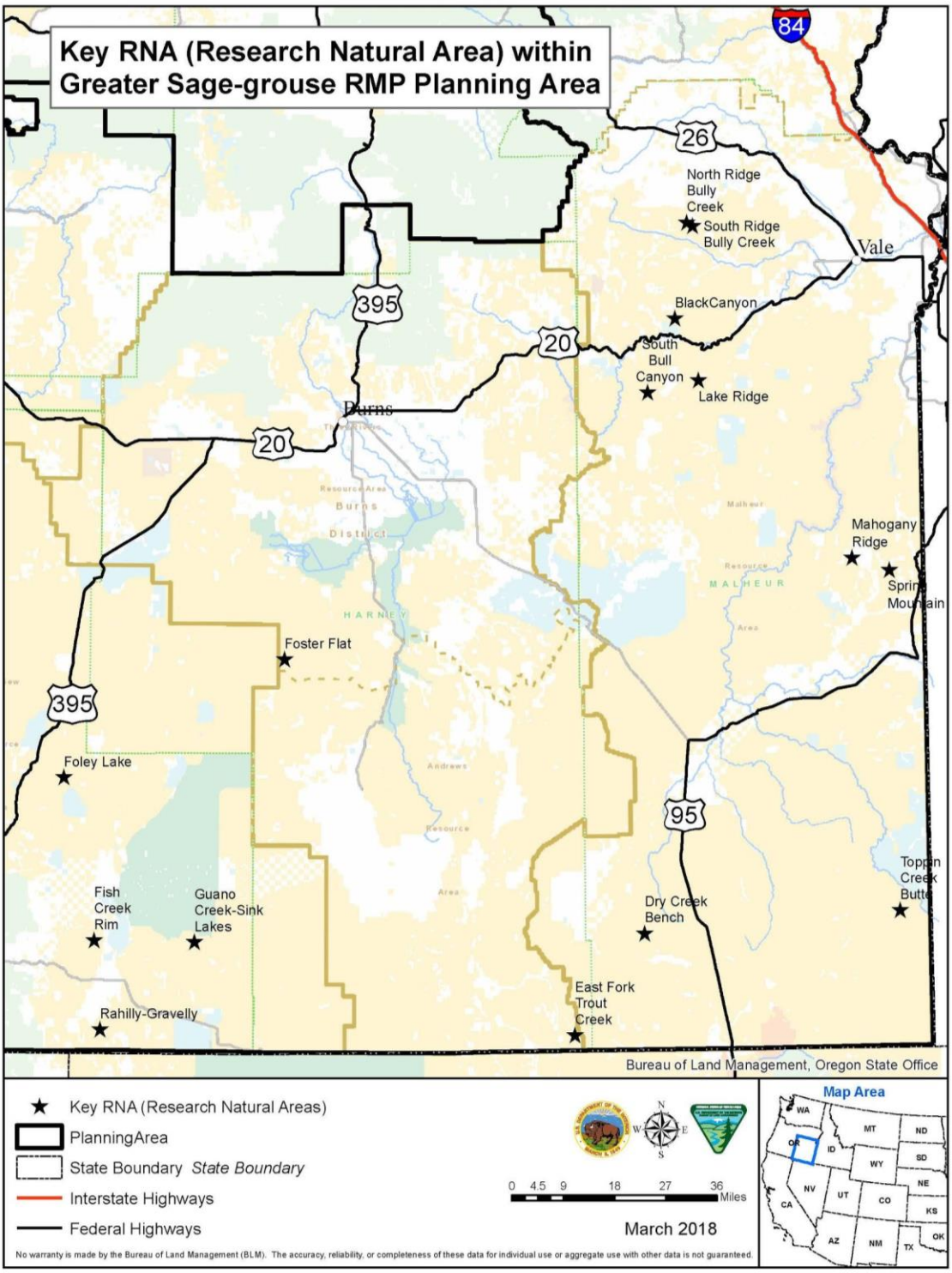
The planning area is the geographic area within which the BLM will make decisions during this planning effort. The planning area boundary includes all lands regardless of jurisdiction. For this resource management plan amendment and environmental impact statement (RMPA/EIS), the planning area consists of 15 RNAs administered by the BLM, identified as key RNAs in the 2015 ROD/ARMPA and covering approximately 60,649 acres total. Two of the RNAs discussed in this RMPA/EIS (Foster Flat and Guano Creek–Sink Lakes) were closed to livestock grazing prior to the 2015 ROD/ARMPA, which left them closed. These RNAs are discussed in this RMPA/EIS to provide context and relevance to the BLM's ability to meet the objectives identified in **Section 1.3** (e.g., 2.a and 2.b.) above.

The decision area for this plan amendment includes the 13 key RNAs that made livestock grazing unavailable on 21,959 acres through the 2015 ROD/ARMPA.

See Figure 1-1 of the 2015 ROD/ARMPA for a map of the entire Oregon Greater Sage-Grouse planning area. **Figure 1-1**, below, shows approximate locations of the 15 key RNAs in the larger 2015 ROD/ARMPA planning area. Points are used on the map to show the approximate locations of the key RNAs, as the acreage involved across the larger planning area would not be visible at the map scale. The planning area for this RMPA/EIS covers portions of three counties in Oregon: Malheur, Harney, and Lake Counties. The Burns, Lakeview, and Vale Districts manage, maintain, and implement the RMPs covering BLM-administered lands in these counties.

Under the 2015 ROD/ARMPA, management decision MD LG 1 stated that all or portions of the 13 key RNAs would be made unavailable for grazing and fences, corrals, and water storage facilities would be removed as necessary. This management direction affected approximately 21,959 acres and 1,772 animal unit months (AUMs is the amount of forage needed by a cow-calf pair for 1 month). Table 2-6 of the

Figure 1-1
Key Research Natural Areas in the Planning Area



2015 ROD/ARMPA has been updated in this analysis to reflect changes in recalculated acreage and AUMs. RNAs are a special kind of area of critical environmental concern (ACEC) where certain elements[1] or values are protected or managed for scientific purposes, and natural processes are allowed to dominate. The objectives for establishing RNAs are to maintain a wide spectrum of high-quality areas that represent the major forms of variability found in forest, shrubland, grassland, alpine, and natural situations that have scientific interest and importance that, in combination, form a national network of ecological areas on federal lands managed by the Forest Service, National Park Service, and BLM dedicated for research, education, and maintenance of biological diversity. RNAs serve to:

- Preserve and maintain genetic diversity, including threatened, endangered, and sensitive species
- Protect against human-caused environmental disruptions
- Serve as reference areas for the study of natural ecological processes, including disturbance
- Provide onsite and extension educational activities
- Serve as baseline areas for measuring long-term ecological changes
- Serve as control areas for comparing results from manipulative research
- Monitor effects of resource management techniques and practices

All key RNAs in the 2015 ROD/ARMPA were identified within priority habitat management areas (PHMA) since the intent of removing grazing was to better understand what impacts grazing may or may not be having on Greater Sage-Grouse habitat elements and successional rates and pathways following disturbance. Although there are RNAs on the Prineville District closed to grazing, none of those RNAs fall within PHMA; therefore, their utility in understanding grazing effects on Greater Sage-Grouse habitat elements was considered minimal. Leslie Gulch RNA on Vale District is closed to grazing, but Leslie Gulch does not provide Greater Sage-Grouse habitat. Steens Mountain Wilderness is closed to grazing but due to terrain, vegetation types, and elevation, it provides little to no Greater Sage-Grouse habitat.

The only other public land area in Oregon with both Greater Sage-Grouse habitat and a long-term closure to grazing is Hart Mountain Antelope Refuge, which was closed in the mid-1990s; all wild horses were removed as well. The BLM contacted the management staff of Sheldon National Wildlife Refuge on the Oregon-Nevada border and Hart Mountain Antelope Refuge for copies of published research that may be of value to this planning effort (Earnst et al. 2012; Davies et al. 2014; Zeigenfuss et al. 2014; Batchelor et al. 2015; Boyd et al. 2017; Gooch et al. 2017), but none of these papers concerned the responses of forbs and insects important to Greater Sage-Grouse. The BLM has no authority over the management and research direction in USFWS national wildlife refuges.

1.4 PLANNING CRITERIA

Planning criteria establish constraints, guidelines, and standards for the planning process and help the BLM define the scope of the planning effort and estimate the extent of data collection and analysis. The following criteria are based on standards prescribed by applicable laws and regulations; agency guidance;

[1] Elements are the basic units to be represented in a natural area system. An element may be an ecosystem, community, habitat, or organism. Taken from Dyrness, C. T, J. F. Franklin, C. Maser, S. A. Cook, J. D. Hall, and G. Faxon. 1975. Research Natural Area Needs in the Pacific Northwest: A Contribution to Land-Use Planning. Gen. Tech. Rep. PNW-38. Portland, Oregon: US Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. P. 231.

results of consultation and coordination with the public and other federal, state, and local agencies; analysis pertinent to the planning area; and professional judgment.

The BLM has identified these planning criteria:

- The BLM will comply with all laws, regulations, policies, and guidance related to public lands management on BLM-administered lands.
- Greater Sage-Grouse is a state-managed species dependent on sagebrush steppe habitats managed in partnership by federal, state, and local authorities. State game and fish agencies' Greater Sage-Grouse data and expertise will be used to the fullest extent practicable in making management determinations on BLM-administered lands.
- Lands addressed in the RMPA/EIS will be BLM-administered land in Greater Sage-Grouse habitats, including surface and split-estate lands with federal subsurface mineral rights. Any decisions in the RMPA/EIS will apply only to BLM-administered lands.
- This RMPA/EIS will comply with Secretarial orders, including 3353 (Greater Sage-Grouse Conservation and Cooperation with Western States), which strives for compatibility with state conservation plans.
- This RMPA/EIS will incorporate, as appropriate, information in a USGS report that identified and annotated Greater Sage-Grouse science published since January 2015 (Carter et al. 2018) and a report that synthesized and outlined the potential management implications of this new science (Hanser et al. 2018).
- This RMPA/EIS will recognize valid existing rights.
- All activities and uses within Greater Sage-Grouse habitats will follow existing and current land health standards (Standards for Rangeland Health and Guidelines for Livestock Grazing Management, 1997).
- Where restrictive land use allocations or decisions are in effect for other resources (e.g., wilderness study areas, areas of critical environmental concern/research natural areas, cultural resources, and riparian areas) under existing RMPs, those more restrictive land use allocations or decisions will not be amended by this RMPA/EIS.

1.5 Issues and Related Resource Topics Identified Through Scoping

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

The BLM used internal, agency, and public scoping to identify issues to consider in the environmental analysis. A summary of the scoping process is presented in a report titled "Potential Amendments to Land Use Plans Regarding Greater Sage-Grouse Conservation Scoping Report" (https://goo.gl/FopNgW). When determining whether to retain an issue for more detailed analysis in this RMPA/EIS, the interdisciplinary team considered, among other things, the following:

- The environmental impacts associated with the issue; the threats to species and habitat associated with the issue are central to development of a Greater Sage-Grouse management plan or of critical importance.

- A detailed analysis of environmental impacts related to the issue is necessary to make a reasoned choice between alternatives.
- The environmental impacts associated with the issue are a substantial point of contention among the public or other agencies.
- There are potentially significant impacts on resources associated with the issue.

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

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

- Issues and related resource topics retained for further consideration in this RMPA/EIS—These were issues raised during scoping that are retained in this RMPA/EIS and for which alternatives were developed to address the issues. In some cases, the resolution in the alternatives were previously analyzed in the 2015 Final EIS. In other cases, additional analysis is needed in this RMPA/EIS. Because the issues were analyzed under resource topics in 2015, the resource topics corresponding with those retained for further analysis are also considered in this RMPA/EIS. Just like issues, they may have been analyzed in the 2015 Final EIS for those decisions being included in this RMPA/EIS.
- Clarification of decisions in the 2015 ROD/ARMPA—These are decisions or frameworks in the 2015 ROD/ARMPA that require clarification as to their application or implementation. No new analysis is required, as the intentions behind the decisions were analyzed in the 2015 Final EIS.
- Issues and resource topics not carried forward for additional consideration or analysis—These are issues brought up during scoping that are not carried forward in this RMPA/EIS. While some of these issues are considered in this RMPA/EIS, they do not require additional analysis because they were analyzed in the 2015 Final EIS. Others are not carried forward in this RMPA/EIS because they do not further the purpose of aligning with the State's conservation plan. Similar to issues, there are resource topics that are not retained for further analysis in this RMPA/EIS. This is because either they are not affected by the changes proposed in **Chapter 2** (Alternatives) or because the effect was analyzed in the 2015 Final EIS.

1.5.1 Issues and Related Resource Topics Retained for Further Consideration in this RMPA/EIS

Table 1-1 summarizes those issues identified through scoping and that have been retained for consideration and additional discussion in **Chapters 3** and **4**.

Based on these issues identified in **Table 1-1** that have not been previously analyzed, the resource topics that have the potential to be significantly affected are: Greater Sage-Grouse, vegetation (including invasive plants, riparian areas and wetlands, and special status plants), fish and wildlife (including other special status species), socioeconomics, and livestock grazing. Therefore, these resource topics are carried forward for detailed analysis.

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

Table 1-1
Issues and Related Resource Topics

Issues	Resource Topics Related to the Issues
Modifying Livestock Grazing Decisions within Research Natural Areas ● What opportunities would be available to study the impacts of grazing on the presence and abundance of forb species and insects important to pre-laying hens and chicks? ● What are the impacts of allowing or removing grazing within key RNAs on overall wildfire risks? ● What are the economic impacts to grazing permittees due to reductions in AUMs? Is there a threshold where no impacts would occur?	Greater Sage-Grouse, vegetation (including riparian), wildlife, livestock grazing (including permittee socioeconomics)

1.5.2 Clarification of Planning Decisions in the 2015 ROD/ARMPA

The following issues with existing planning decisions were raised during scoping. These issues require clarification of language in the 2015 ROD/ARMPA but do not require new analysis. The clarifying language for these planning decisions is displayed in this planning document to communicate how these issues are being addressed.

A variety of national Instructional Memoranda (IMs) have been issued since 2016 to clarify interpretations and implementation considerations and are applicable to the 2015 ROD/ARMPA. Several of the 2016 IMs were updated in 2018, including one on how to use the Habitat Objectives table. Oregon BLM is not amending the mitigation standard. Oregon BLM will be working with the SageCon partnership and the various BLM districts to communicate and clarify the contents of the revised IMs.

A variety of plan maintenance actions have been identified. Plan maintenance needs include:

- Habitat Objectives–Plan Maintenance action to clarify the use and application of the Habitat Objectives table of the 2015 ROD/ARMPA (has been completed)
- Recommendation on mineral withdrawal from sagebrush focal areas
- Clarifying discrepancy in noise restrictions
- Clarification around lek buffers
- Clarification of Appendix J and longevity of trigger responses
- Clarification around the required design feature reclamation language

Similarly, a variety of policy, guidance, or training and education needs have been identified, including the following topics:

- Reserve common allotments (grass banks) to promote resilience and viability for livestock economies and habitat restoration priorities
- Waivers, exceptions, and modifications for development actions within priority habitat.

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

Issues and Related Resource Topics Not Carried Forward for Additional Analysis

The following issues were raised during scoping and are not carried forward for a variety of reasons. For example, population-based management is not carried forward for detailed analysis because the BLM does not manage species populations; that authority falls under the jurisdiction of the Oregon Department of Fish and Wildlife.

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

- Restrictions on rights-of-way (ROWs) and infrastructure
- Wind energy development in PHMA
- ROW avoidance in PHMA and general habitat management areas (GHMA)
- Retention of lands as identified as PHMA or GHMA in federal ownership
- Varying stipulations applied to oil, gas, and geothermal development
- Effects of NSO stipulations on Greater Sage-Grouse habitat on non-BLM-administered land
- Mitigation for oil and gas development
- Prioritization of fluid mineral leases outside of PHMA and GHMA
- Numerical noise limitations within PHMA
- Contribution of disturbance caps toward Greater Sage-Grouse conservation objectives
- Required design features (RDFs)
- Habitat objectives and ability to achieve rangeland health standards (see **Section 1.5.2**)
- Vegetation treatments and wildfire response
- Adaptive management
- Habitat assessment framework
- Mitigation standard
- Soils
- Wild horses and burros

Grazing to Manage Wildfire Risks: In addition to the above issues not carried forward for additional analysis, grazing to manage wildfire risks is not addressed in further detail in this RMPA/EIS. The key RNAs are too small in acreage to show any impact or effect on this large-scale issue. Svejcar et al. (2014) argue that grazing is necessary to manage wildfire risks in sagebrush ecosystems, and this concern was raised during scoping for this RMPA/EIS. That wildfire is a risk in sagebrush ecosystems and to Greater Sage-Grouse habitat particularly as it pertains to dominance by annual grasses and establishment of the annual grass-fire cycle is well established (e.g., Brooks et al. 2015; Coates et al. 2015; Coates et al. 2016).

Recent research indicates that grazing can decrease the risk, size, and severity of wildfires (Davies et al. 2011; Strand et al. 2014; Davies et al. 2016b; Davies et al. 2017), although extreme burning conditions usually override what impacts grazing may have on fire spread rates (Strand et al. 2014). Winter and early spring grazing seem to have the greatest effect (Strand et al. 2014; Davies et al. 2016b; Davies et al. 2017), although care must be taken during spring grazing of native perennial bunchgrasses to avoid successive years of impacts on plant leaf and basal area, production potential, and reproduction (Davies et al. 2014). Grazing areas dominated by annual grasses at the right times and repeatedly serves to reduce annual grass biomass and height, affecting potential fire behavior (Diamond et al. 2009; Davies et al. 2014; Schmelzer et al. 2014; Strand et al. 2014), although supplements may be needed to maintain livestock weight (Schmelzer et al. 2014).

However, plant responses are mixed with some studies showing increases in cheatgrass following wildfire in grazed landscapes (e.g., Condon and Pyke 2018) and others indicating resistance to cheatgrass following wildfire with grazing (e.g., Davies et al. 2009; Davies et al. 2016a). Effects from long-term grazing removal are also mixed with indications that it can lead to annual grass expansion following fire (Davies et al. 2009; Davies et al. 2014; Davies et al. 2016a) or that it will not (Davis and Crawford 2015; Ellsworth et al. 2016). The interactions between grazing and fire with respect to annual grass response depend on preburn vegetation condition, site characteristics, post-fire weather, grazing practices, and the impacts of other disturbances such as insect outbreaks, pathogens, and herbivory by native ungulates, wild horses, and rodents (Davies et al. 2014; Strand et al. 2014; Svejcar et al. 2014).

Fires greater than 2,265 acres tend to reduce Greater Sage-Grouse population growth rates when they burn near lek sites (Brooks et al. 2015). Additionally, significant erosion can occur when fires exceed 10,000 acres (Brooks et al. 2015). Experience in the Great Basin shows that fire suppression efforts are usually ineffective when 20-foot wind speeds exceed 10 mph, maximum temperature exceeds 90°F, and relative humidity is less than 10 percent with nighttime humidity recovery of less than 15 percent. Under moderate burning conditions, active fire spread typically lasts only one burning period whereas under extreme conditions, active fire spread typically lasts for several days with spread occurring over all 24 hours in a day.

Experience and modeling in forest ecosystems indicate that fuels treatments on landscapes need to be strategically placed with respect to expected fire spread direction and topography in order to affect potential fire size and fire behavior, particularly since most large wildfires are larger than individual treatment areas (Finney 2001, 2007; Schmidt et al. 2008; Chung 2015). When fuels treatments are randomly placed, a larger proportion of the landscape must be treated to have the same effect on fire size and fire behavior as strategically placed treatments (Finney 2001, 2007).

Livestock do not evenly distribute themselves across allotments and pastures, tending to concentrate in areas near water and shade and in gentler terrain, resulting in grazing effects on fine fuel loading that are not strategically placed, but more haphazard. The establishment reports for the key RNAs mention that most of these areas are lightly grazed due to the lack of available water (see **Chapter 3**, **Section 3.7**). Without extensive fencing, herding, and provision of supplemental water at a minimum, it is unlikely that grazing would reduce wildfire risks within key RNAs. As evidenced by the recent wildfires in several key RNAs (see **Chapter 3**, **Section 3.3.1**), they are too small and isolated to affect landscape-scale wildfire size and behavior for fires originating outside key RNAs.

Other issues were evaluated as part of the 2015 ROD/ARMPA. For the same reasons they were dismissed in the 2015 ROD/ARMPA, they are not carried forward for detailed analysis in this RMPA/EIS (Section 1.6.4 on pages 1-20 to 1-22 in the Final EIS):

- Hunting Greater Sage-Grouse
- Predator control

Resource Topics Not Carried Forward for Additional Analysis

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

- Air
- Soils
- Water
- Wild horses and burros
- Geology
- Cultural resources
- Paleontological resources
- Visual resources
- Wildland fire management
- Lands with wilderness characteristics
- Forestry
- Recreation and visitor services
- Comprehensive trails and travel management
- Lands and realty
- Energy and minerals
- Special designations
- Indian Trust resources
- Noise

1.6 RELATIONSHIP TO OTHER POLICIES, PLANS, AND PROGRAMS

- The BLM recognizes the importance of state and local plans. The BLM will work to be consistent with or complementary to the management actions in these plans whenever possible.

1.6.1 State Plans

State plans considered during this planning effort are the following:

- Sage-Grouse Conservation Partnership. 2015. The Oregon Greater Sage-Grouse Action Plan. Oregon Governor's Natural Resources Office, Salem, Oregon, USA
- State of Oregon Natural Areas Plan 2015

1.6.2 Local Plans

One new local land use plan was completed after the 2015 ROD/ARMPA was signed. In 2016, the Harney Soil and Water Conservation District adopted a land use plan.

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Chapter 2. Alternatives

2.1 INTRODUCTION

This chapter describes the alternatives evaluated as a part of this RMPA/EIS. This RMPA/EIS analyzes in detail the No-Action Alternative and one action alternative (Management Alignment Alternative), which was developed to meet the purpose and need presented in **Chapter 1**. In addition to the alternatives considered in detail, this chapter also describes an alternative considered but eliminated from detailed analysis.

Components of Alternatives

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

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

2.2 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

2.2.1 Varying Constraints on Land Uses and Development Activities

During scoping, some commenters asked for increased or additional constraints on land uses and ground-disturbing activities to protect Greater Sage-Grouse habitat. These constraints are beyond those in the current management plan.[1] Other commenters, in contrast, asked the BLM to consider eliminating or reducing constraints on land uses, or incorporating other flexibilities into the BLM's implementation of RMPs, in addition to those issues that are already evaluated in the Management Alignment Alternative. The BLM considered every scoping comment and, where appropriate, incorporated these issues into the Management Alignment Alternative following coordination with the State. Because the purpose and need for the BLM's action, building off of the 2015 ROD/ARMPA, is to enhance cooperation with the states by seeking to better align the BLM's RMPs with individual state plans and/or conservation measures, the BLM gave great weight to the State's identification of issues that warrant consideration in this planning effort.

This planning process does not revisit every issue that the BLM evaluated in 2015. Instead, the BLM now addresses refinements to the 2015 ROD/ARMPA decisions, consistent with the BLM's purpose and need

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

for action. Accordingly, this RMPA/EIS has as its foundation in the comprehensive 2015 Final EIS and ROD/ARMPA, and incorporates those documents by reference—including the entire range of alternatives evaluated through the 2015 planning process:

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

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

Further, additional constraints on land uses or development without a documented need would not meet the purpose of SO 3353. The BLM did not discover new information that would indicate the agency should increase the level of conservation, management, and protection to achieve its land use

plan objective. As part of the consideration of whether to amend the 2015 Greater Sage-Grouse RMPs, the BLM requested the USGS to develop an annotated bibliography of Greater Sage-Grouse science published since January 2015 (Carter et al. 2018; see **Section 3.1**). In addition, SO 3353 directs the BLM to promote habitat conservation, while contributing to economic growth and energy independence. As analyzed in the 2015 Final EIS (see Sections 4.4.6, pages 4-112 and 113; Section 4.5.6, pages 4-132 and 133; Section 4.8.6, Alternative C, page 4-193; Section 4.16.6, page 4-278; Section 4.20.3, page 4-330; Section 4.20.4, pages 4-351 to 4-355) and hereby incorporated by reference, all of the previously analyzed alternatives, including one proposing constraints stricter than the current management plan, were predicted to result in a loss of development opportunities on public lands.

2.3 DESCRIPTION OF ALTERNATIVES

2.3.1 No-Action Alternative

Under the No-Action Alternative, the BLM would not amend the current Greater Sage-Grouse management plan (*Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment - ARMPA*). Greater Sage-Grouse habitat would continue to be managed under current management direction. Goals and objectives for BLM-administered lands and federal mineral estate would not change. Allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, lands and realty, and livestock grazing would also remain the same. All or portions of the 13 key RNAs would not be available for livestock grazing as described in the 2015 Oregon ROD/ARMPA. Foster Flat and Guano Creek–Sink Lakes RNAs would remain unavailable for livestock grazing.

2.3.2 Management Alignment Alternative

This alternative is derived through coordination with the State and cooperating agencies to align with the State conservation plan and to support conservation outcomes for Greater Sage-Grouse. The BLM continues to build upon the 2015 planning effort as envisioned in SO 3353 by collaborating with states and stakeholders to improve alignment between federal management plans and other plans and programs at the state level, while ensuring consistency with the BLM's multiple use mission. This enhanced cooperation between the BLM and the Governor's office is intended to lead to improved management and coordination with states across the range of Greater Sage-Grouse in Oregon. It will also provide additional flexibility for the BLM to work with the State of Oregon on landscape-scale decisions, which will provide protections for Greater Sage-Grouse habitat while allowing reasonable development of other resources, in support of local communities and economies. At the request of the State, the Management Alignment Alternative in this Draft RMPA/EIS does not modify the net conservation gain standard for compensatory mitigation that the BLM incorporated into its plans in 2015. The DOI and the BLM, however, have modified their mitigation policies since the 2015 plans were finalized. The public did not have the opportunity to comment specifically on a net conservation gain approach to compensatory mitigation during the 2015 land use planning process. In addition, the DOI and the BLM are evaluating whether the implementation of a compensatory mitigation standard on public lands is appropriate and consistent with applicable legal authorities. We request public comment about how the BLM should consider and implement mitigation with respect to the Greater Sage-Grouse, including alternative approaches to requiring compensatory mitigation in BLM land use plans.

The state action plan supports proper livestock grazing and recognizes the BLM's authority to manage grazing on public lands. Livestock grazing would be available in all or portions of the 13 key RNAs in keeping with the district RMPs' decisions that were amended by the 2015 ROD/ARMPA in order to support local communities and economies. This alternative would not change terms and conditions of

existing grazing permits. Foster Flat and Guano Creek–Sink Lakes key RNAs would remain unavailable for livestock grazing in keeping with those prior district decisions and RMPs.

2.4 COMPARISON OF ALTERNATIVES

Table 2-1
Detailed Comparison of Alternatives

Topic	2015 ARMPA Decision Number	No-Action Alternative	Management Alignment Alternative
Modifying Livestock Grazing Decisions within Research Natural Areas			
	Objective LG 2	On BLM-managed lands, 12,083,622 acres will continue to be available for livestock grazing in Greater Sage-Grouse habitat. In 13 key RNAs, 21,959 acres will be unavailable for livestock grazing. Foster Flat and Guano Creek–Sink Lakes RNAs will remain closed to livestock grazing per district RMP decisions made prior to the 2015 ARMPA.	On BLM-administered lands, an additional 21,959 acres will be available for livestock grazing; livestock grazing would be permitted in the 13 key RNAs. Foster Flat and Guano Creek–Sink Lakes RNAs will remain closed to livestock grazing per district RMP decisions made prior to the 2015 ARMPA.
	Objective SD 4	Manage key RNAs, or large areas within the RNAs, as undisturbed baseline reference areas for the sagebrush plant communities they represent that are important for Greater Sage-Grouse. Manage key RNAs for minimum human disturbance, allowing natural succession to proceed.	Manage the Foster Flat and Guano Creek–Sink Lakes RNAs as undisturbed baseline reference areas for the sagebrush plant communities they represent that are important for Greater Sage-Grouse. Minimize human disturbance in 15 key RNAs, allowing natural ecological processes to proceed.
	Management Direction LG 1	All or portions of 13 key RNAs will be unavailable for grazing (Table 2-6). Determine whether to remove fences, corrals, or water storage facilities (e.g., reservoirs, catchments, and ponds) from these 13 key RNAs. Foster Flat and Guano Creek–Sink Lakes RNAs will remain closed to livestock grazing per district RMP decisions made prior to the 2015 ARMPA.	This management direction would be deleted. Management would be governed by pre-2015 ARMPA district decisions and RMPs and other appropriate 2015 ARMPA goals, objectives, and management decisions. Foster Flat and Guano Creek–Sink Lakes RNAs will remain closed to livestock grazing per district RMP decisions made prior to the 2015 ARMPA.

Table 2-2
Key Research Natural Areas (RNAs) - Summary of Acres and AUMs by Alternative

RNA Name	District	Total Acres of the RNA**	No-Action Alternative		Management Alignment Alternative	
			Acres Available for Livestock Grazing	Acres / AUMs Unavailable for Livestock Grazing	Acres / AUMs Available for Livestock Grazing	Acres Unavailable for Livestock Grazing
Black Canyon	Vale	2,639	0	2,639/260	2,639/260	0
Dry Creek Bench	Vale	1,637	1,015	622/52	1,637/52	0
East Fork Trout Creek	Burns	361	57	304/47	361/47	0
Fish Creek Rim	Lakeview	8,716	5,966	2,750/110	8,716/110	0
Foley Lake	Lakeview	2,228	959	1,269/51	2,228/51	0
Foster Flat	Burns	2,687	0	2,687	0	2,687
Guano Creek–Sink Lakes	Lakeview	11,185	0	11,185	0	11,185
Lake Ridge	Vale	3,860	3,091	769/74	3,860/74	0
Mahogany Ridge	Vale	682	527	155/27	682/27	0
North Ridge Bully Creek	Vale	1,569	1,405	164/19	1,569/19	0
Rahilly-Gravelly	Lakeview	18,678	10,396	8,282/586	18,678/586	0
South Bull Canyon	Vale	790	43	747/116	790/116	0
South Ridge Bully Creek	Vale	621	224	397/61	621/61	0
Spring Mountain	Vale	996	0	996/153	996/153	0
Toppin Creek Butte	Vale	3,998	1,313	2,685/216	3,998/216	0

** The table has been updated from the 2015 ARMPA ROD to more accurately reflect acreage and AUM changes

2.5 PREFERRED ALTERNATIVE

BLM regulations require the agency to identify a preferred alternative in the Draft RMPA/EIS (43 CFR 1610.4-7). The preferred alternative represents those goals, objectives, and actions determined to be most effective at resolving planning issues and balancing resource use at this stage of the process. While collaboration is critical in developing and evaluating alternatives, the final designation of a preferred alternative remains the responsibility of the lead agency, which is the BLM for this project. The agency has identified the Management Alignment Alternative, in collaboration with the Governor's office, as the preferred alternative.

It is important to note that the identification of a preferred alternative does not constitute a final decision, and there is no requirement that the preferred alternative identified in the Draft RMPA/EIS be selected as the agencies' decision in the ROD. Various parts of separate alternatives that are analyzed in this Draft RMPA/EIS can be "mixed and matched" to develop a proposed plan. With respect to the compensatory mitigation in particular, at the request of the State, the Management Alignment Alternative in this Draft RMPA/EIS does modify the net conservation gain standard for compensatory mitigation that the BLM incorporated into its plans in 2015. The DOI and the BLM, however, have

modified their mitigation policies since the 2015 plans were finalized. The public did not have the opportunity to comment specifically on a net conservation gain approach to compensatory mitigation during the 2015 land use planning process. In addition, the DOI and the BLM are evaluating whether the implementation of a compensatory mitigation standard on public lands is appropriate and consistent with applicable legal authorities. We request public comment about how the BLM should consider and implement mitigation with respect to the Greater Sage-Grouse, including alternative approaches to requiring compensatory mitigation in BLM land use plans.

2.6 PLAN EVALUATION, MONITORING, AND ADAPTIVE MANAGEMENT - COMMON TO ALL ALTERNATIVES

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

Monitoring data gathered over time is examined and used to draw conclusions on whether management actions are meeting stated objectives, and if not, why not. Conclusions are then used to make recommendations on whether to continue current management or to identify what changes need to be made in management practices to meet objectives. The BLM will use land use plan evaluations to determine if the decisions in the 2015 ARMPA, supported by the accompanying NEPA analysis, are still valid in light of new information and monitoring data. Evaluations will follow the protocols established by the BLM Land Use Planning Handbook (H-1601-1) or other appropriate guidance in effect at the time the evaluation is initiated.

The 2015 ARMPA also includes an adaptive management strategy that includes soft and hard triggers and responses for Oregon Priority Areas for Conservation (hereafter called PACs). These triggers are not specific to any particular project but identify habitat and population thresholds. Triggers are based on the two key metrics that are being monitored during the life of the ARMPA: habitat loss and population declines. Soft triggers represent an intermediate threshold indicating that management changes are needed at the implementation level to address habitat or population losses. If a soft trigger were tripped during the life of the plans, the BLM's response would be to apply more conservative or restrictive conservation measures to mitigate for the specific cause in the decline of populations or habitats, with consideration of local knowledge and conditions. These adjustments will be made to preclude tripping a "hard" trigger (which signals more severe habitat loss or population declines).

Hard triggers represent a threshold indicating that immediate action within the affected Oregon PAC or PACs is necessary to stop a severe deviation from Greater Sage-Grouse conservation objectives set forth in the 2015 ARMPA. In the event that new scientific information becomes available demonstrating that the response to the hard trigger would be insufficient to stop a severe deviation from Greater Sage-Grouse conservation objectives set forth in the 2015 ARMPA, the BLM would implement interim management direction to ensure that conservation options are not foreclosed. The BLM would also undertake any appropriate plan amendments or revision if necessary. More information regarding the 2015 ARMPA's adaptive management strategy can be found in Appendix J of the 2015 ARMPA. Neither alternative in this RMPA/EIS proposes any changes to the Oregon 2015 ARMPA monitoring and adaptive management strategy.

Chapter 3. Affected Environment

3.1 Introduction

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

The geographic extent of this environmental analysis is approximately 60,649 acres in 15 key RNAs identified in the 2015 Oregon Greater Sage-Grouse Final EIS. The two key RNAs closed to grazing prior to the 2015 ARMPA will remain closed, but they are discussed here to provide context to the vegetation communities analysis in **Chapter 4**. All Oregon priority areas for conservation (Oregon PACs) are PHMA for Greater Sage-Grouse, and all key RNAs are located within Oregon PACs.

While the BLM acknowledges that there have been changes to the landscape since 2015, due to the scale of this RMPA/EIS analysis covering 60,649 acres of BLM-administered lands, data collected consistently across the range indicate that the extent of these changes to the rangewide landscape are relatively minimal. For example, BLM monitoring data collected and analyzed annually at the Biologically Significant Unit Oregon PAC scale, as outlined in the Greater Sage-Grouse Monitoring Framework (Appendix D of the 2015 ROD/ARMPA), indicates that there has been a minimal overall increase in estimated disturbance (less than 1 percent rangewide from 2015 through 2017) and an overall decrease in sagebrush availability (less than 1 percent range-wide from 2012 through 2015) within PHMA.

Rangewide estimates of habitat management areas burned for 2016 and 2017 indicate a sharp increase in the loss of potential habitat availability during 2017, compared with previous fire seasons. In Oregon, the 2017 fire season was quite mild and below the 10-year average in terms of acres burned; however, the acres lost do not necessarily impact monitored PHMA within the range-wide BSUs (including Oregon PACs) at the rangewide scale. Wildfires in Oregon PACs are discussed in more detail later in this chapter.

Based on available information, including the USGS reports described below, the BLM has concluded that the existing condition is not substantially different from that in 2015; therefore, for those resource topics discussed in detail in this RMPA/EIS, the data and information presented in the 2015 Final EIS regarding the affected environment is incorporated by reference into this RMPA/EIS. Specific section and page number references for this incorporation by reference are provided in **Section 3.2**, Resources Affected, below. Where notable changes to the baseline condition have occurred since 2015, a discussion is included in this RMPA/EIS.

Each resource topic listed below includes the following:

- A reference to the location of the affected environment discussion of that resource topic in the 2015 Final EIS, incorporating by reference the cited information

- A brief description of new data or information, if that data or information would substantially alter the description of the existing condition of that resource topic from the description that was presented in the 2015 Final EIS
- A description of changes to the existing condition of the resource topic that have occurred since the 2015 Final EIS (e.g., a large wildfire), if applicable to the resource topic

Actions that have been authorized since the 2015 ARMPA were authorized consistent with the 2015 Final EIS. The BLM will continue to implement the decisions in the 2015 ARMPA, unless and until those decisions are amended.

Acreage figures and other numbers are approximated using geographic information systems (GIS) technology and do not reflect exact measurements or precise calculations. These GIS-derived acreages are reasonable approximations for planning purposes.

3.1.1 USGS Reports

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

Following the 2015 plans, the scientific community has continued to improve the knowledge available to inform management actions and an overall understanding of Greater Sage-Grouse populations, habitat requirements, and their response to human activity.

The review discussed the science on six major topics identified by USGS and BLM, as follows:

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

Multiscale Habitat Suitability and Mapping Tools

The science developed since 2015 corroborates previous knowledge about Greater Sage-Grouse habitat selection. Advances in modeling and mapping techniques at the landscape scale can help inform allocations and targeting of land management resources to benefit Greater Sage-Grouse conservation. Similar improvements at the site scale facilitate a better understanding of the importance of grass height to nest success, which indicates the potential need for a reevaluation of the existing habitat objectives (Hanser et al. 2018, p. 2).

[1] Internet website https://doi.org/10.3133/ofr20181008
[2] Internet website https://doi.org/10.3133/ofr20181017

The BLM has completed a plan maintenance action, whereby the agency has clarified its ability to modify the habitat objective for seasonal habitat indicator values, based upon local data and best available science for Greater Sage-Grouse site selection.

Discrete Human Activities

The science developed since 2015 corroborates prior knowledge about the impact of discrete human activities on Greater Sage-Grouse. New science suggests that strategies to limit surface disturbance may be successful at limiting range-wide population declines; however, it is not expected to reverse the declines, particularly in areas of active oil and gas operations (Hanser et al. 2018, p. 2). This information may have relevance when considering the impact of changes to management actions designed to limit discrete disturbances.

Diffuse Activities

The science developed since 2015 does not appreciably change prior knowledge about diffuse activities, such as livestock grazing, predation, hunting, wild horses and burros, fences, recreation, and noise; however, some study authors questioned current assumptions, provided refinements, or corroborated existing understanding.

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

Refinements to the current hunting seasons used by state wildlife agencies may minimize potential impacts on Greater Sage-Grouse populations; however, none of the studies singled out current application of hunting seasons and timings as a plausible cause for Greater Sage-Grouse declines.

Finally, no new insights into the impacts of wild horses and burros, fence collision, recreation, or noise on Greater Sage-Grouse have been developed (Hanser et al. 2018, p. 2).

This information was considered when determining the scoping issues addressed in **Chapter 1**, **Section 1.5**.

Fire and Invasive Species

Science since 2015 indicates that wildfire will continue to threaten Greater Sage-Grouse through loss of available habitat, reductions in multiple vital rates, and declining population trends, especially in the western part of its range. The concepts of resilience after wildfire and resistance to invasion by nonnative annual grasses have been mapped across the sagebrush ecosystem. These concepts inform restoration and management strategies and help prioritize application of Greater Sage-Grouse management resources (Hanser et al. 2018, p. 2).

Restoration Effectiveness

Since 2015, tools have been developed to help managers strategically place and design restoration treatments where they will have the greatest benefit for Greater Sage-Grouse. Studies (Hanser et al.

2018, p. 3) indicate that Greater Sage-Grouse populations did not benefit from, or were negatively affected by, prescribed fire and mechanical sagebrush removal.

Restoration activities occur mainly at the implementation level, and the BLM maintains the flexibility to incorporate new tools into its project planning for restoration actions.

Population Estimation and Genetics

The accuracy of estimating Greater Sage-Grouse populations has increased. This is because of improved sampling procedures used to complete count surveys at leks and the development of correction factors for potential bias in lek count data. In addition, techniques have been improved to map Greater Sage-Grouse genetic structure at multiple spatial scales. These genetic data are used in statistical models to increase understanding of how landscape features and configuration affect gene flow. This understanding emphasizes the importance of maintaining connectivity between populations to ensure genetic diversity and distribution (Hanser et al. 2018, p. 3).

New information continues to reaffirm the BLM's understanding that Greater Sage-Grouse is a species that selects for large, intact landscapes and habitat patches.

3.2 RESOURCES AFFECTED

In accordance with **Chapter 1**, **Section 1.5**, the following resources could have potentially significant impacts based on the actions considered in **Chapter 2**.

Table 3-1, below, provides the location of baseline information in the 2015 Final EIS and hereby incorporates it by reference.

Table 3-1
Affected Environment Incorporated by Reference

Resource Topic	Location of Baseline Information
Greater Sage-Grouse	Chapter 3, Section 3.3 (Greater Sage-Grouse and Greater Sage-Grouse Habitat), pgs. 3-3 to 3-26 (BLM 2015) Additional information regarding population trends, including the status of adaptive management triggers since 2015, is provided in Section 3.3 of this chapter.
Vegetation, including noxious weeds, riparian areas, and wetlands	Chapter 3, Section 3.4 (Vegetation), pgs. 3-26 to 3-52 (BLM 2015) Additional information regarding specific RNA vegetation communities is provided in Section 3.4 of this chapter.
Fish and Wildlife	Chapter 3, Section 3.5 (Fish and Wildlife), pgs. 3-52 to 3-74 (BLM 2015) Additional information regarding changes to wildlife habitat is provided in Section 3.5 of this chapter.
Livestock Grazing	Chapter 3, Section 3.8 (Livestock Grazing/Range Management), pgs. 3-87 to 3-97 (BLM 2015) Additional information regarding current livestock grazing conditions and changes with the RNAs since the 2015 ARMPA ROD is provided in Section 3.6 of this chapter.
Socioeconomics	Chapter 3, Section 3.21 (Socioeconomics), pgs. 3-164 to 3-194 (BLM 2015) and 2015 Final EIS Appendix R Additional information regarding general economic conditions involving RNA pastures is provided in Section 3.8 of this chapter.

3.3 GREATER SAGE-GROUSE

The population trends of Greater Sage-Grouse in the planning area is described in the 2015 Final EIS in Section 3.3.2. Greater Sage-Grouse populations exhibit density-dependent fluctuations over time (Garton et al. 2011). The fluctuation in the annual population size noted in the 2015 Final EIS since at least 1980 continued in 2016 and 2017.

The spring breeding population of Greater Sage-Grouse in Oregon increased 14 percent in 2016 and decreased 7.7 percent in 2017, based on counts of a large proportion of known lek sites (66 percent and 58 percent in 2016 and 2017) (Foster 2016, 2017). The population increase in 2016 was the third consecutive year of population growth, while the decline in 2017 was the first state-wide decline since 2012. In addition to inter-annual variation, population trends varied across the state. In 2016, the Baker Resource Area was the only BLM-administrated unit to experience a decline. In 2017, population trends ranged from a 17.1 percent decline in the Burns District to a 1.1 percent increase in the Vale District. Despite periods of population growth over the past 14 years, the Oregon population estimate has remained below the Oregon Department of Fish and Wildlife (ODFW) statewide population goal of 29,237; however, it has not reached levels that are outside the range of natural variation (Foster 2017).

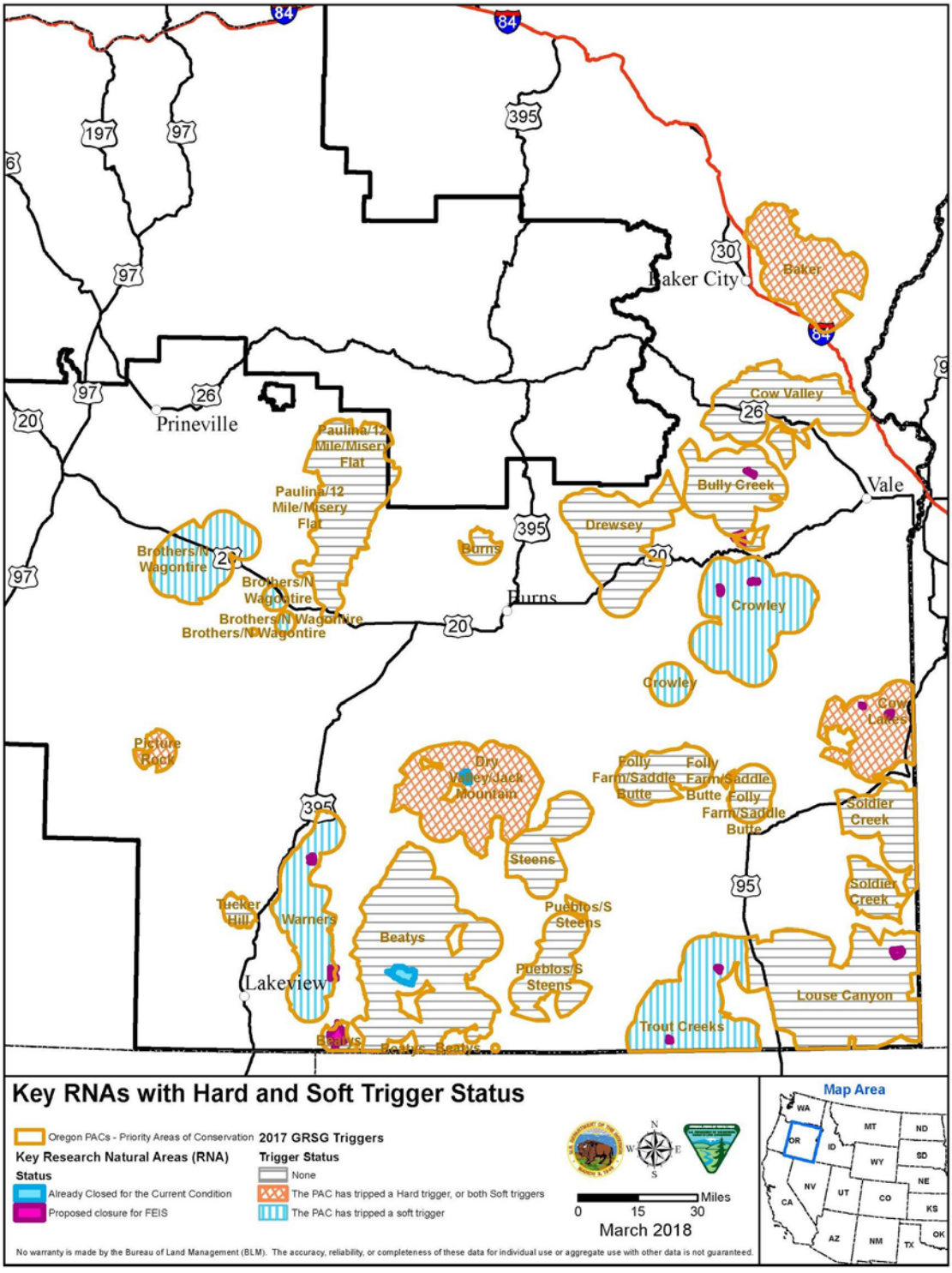
The adaptive management strategy outlined in Appendix J of the 2015 ROD/ARMPA requires the BLM to annually calculate the hard and soft trigger for habitat and populations within each Oregon PAC. Tripping a soft trigger indicates that management changes may be needed at the implementation level to reduce the likelihood of tripping a hard trigger. Tripping a hard trigger requires the BLM to take immediate and more restrictive plan-level action to address Greater Sage-Grouse conservation objectives.

Results from the calculations of the 2016 and 2017 triggers are presented in Information Bulletins OR-2017-040 and OR-2018-039. Population triggers were tripped in 8 PACs in 2016 and 7 PACs in 2017 (**Table 3-2**, below; **Figure 3-1**, Key RNAs with Soft and Hard Trigger Status). Key RNAs occur in five of the PACs with tripped triggers. Foster Flat RNA is located in a PAC that tripped a hard population trigger in 2017. The Cow Lakes PAC tripped a hard trigger in both 2016 and 2017, because both the population and habitat soft triggers were tripped (when a PAC trips both the habitat and population soft triggers a combined hard trigger results).

Table 3-2
RNAs within PACs with Tripped Triggers

Mahogany Ridge	Cow Lakes	Soft population and habitat (hard trigger)
Spring Mountain	Cow Lakes	Soft population and habitat (hard trigger)
Lake Ridge	Crowley	Soft population
South Bull Canyon	Crowley	Soft population
Foster Flat	Dry Valley/Jack Mountain	Hard population
Dry Creek Bench	Trout Creeks	Soft habitat
East Fork Trout Creek	Trout Creeks	Soft habitat
Fish Creek Rim	Warners	Soft population
Foley Lake	Warners	Soft population

Figure 3-1
Key RNAs with Soft and Hard Trigger Status



When an adaptive management trigger is tripped in Oregon, the 2015 ARMPA requires the BLM to conduct a causal factor analysis (CFA) to identify possible causes for crossing the population and/or habitat threshold. The BLM, in cooperation with the ODFW and USFWS, has prepared CFA reports for the five PACs that contain key RNAs. Common and widespread causes identified include fire, invasive annual grasses, degraded native understory vegetation, and fence collision risk. Factors with a possibly significant role are human infrastructure (mostly roads and power lines), and recurring drought.

It is unclear how much the West Nile virus has caused Greater Sage-Grouse population declines or prevented an increase during favorable environmental conditions. The role of geographic and genetic isolation in causing population declines is also unclear.

Of the Oregon PACs with CFAs, the interdisciplinary team for the Cow Lakes PAC lacked sufficient information to determine what role, if any, current grazing practices and the condition of allotments may be playing in the loss of sagebrush cover and Greater Sage-Grouse population declines. Available information on vegetation condition suggests that grazing may play a role, especially as it relates to understory forbs that are important to hens and chicks; however, without land health assessments, the team could not be certain that grazing is a causal factor in any part of the Cow Lakes PAC.

For the other four PACs, livestock grazing was not identified as a causal factor in tripping an adaptive management trigger (**Table 3-2**, RNAs within PACs with Tripped Triggers).

3.3.1 Changes Based on Threats

Wildland Fire

The wildland fire threat was discussed in the 2015 Final EIS (Section 3.7, pgs. 3-79 to 3-87) and is hereby incorporated by reference. From 2013 to 2017 there have been a variety of wildfires and habitat treatments intended to improve Greater Sage-Grouse habitat across the West. Since the 2015 range-wide plan decisions, there has been more habitat lost to wildfire than has been gained through treatment; however, the BLM nationally intends to implement more habitat improvements per decisions in the 2015 plans. Projects such as the Great Basin Ecosystem Strategy, under which two programmatic EISs will be prepared for fuel breaks and fuels reduction and rangeland restoration, will further define the tools and priorities for these activities.

This analysis discusses wildfire on the three Oregon districts with key RNAs. RNAs are not subject to vegetation treatments, with the exception of invasive plants; however, none of the invasive plant treatments since the 2015 Final EIS was prepared have occurred in any of the key RNAs.

Over the last ten years (2008–2017) 2,271,740 acres have burned in 1,250 wildfires within the district boundaries. Seventy percent of this acreage occurred in only 2 years: 2012 (1,057,018 acres) and 2014 (533,897 acres). In contrast, the fewest acres in the 10-year period burned in 2010 (1,456 acres). Three years (2012, 2014, and 2015) were above the 10-year average for the three districts, at 227,174 acres burned.

Since 2000, 8 of the 15 key RNAs have been affected by wildfires, although the degree of impact varied (**Table 3-3**). Of particular concern are North Ridge Bully Creek and South Ridge Bully Creek, both of which were affected in 2012 and 2015, as well as in the mid-1990s.

Table 3-3
Key Research Natural Areas Affected by Wildfires from 2000 through 2017

Research Natural Area	Fire Year	Fire Name	Approximate Area within Fire Perimeter	Oregon PAC
Dry Creek Bench	2012	Holloway	100%	Trout Creek
East Fork Trout Creek	2012	Holloway	100%	Trout Creek
Foley Lake	2000	Abert	Approx. 10%	Warners
North Ridge Bully Creek	2012	Iron	100%	Bully Creek
	2015	Pole Gulch[1]	100%	
South Bull Canyon	2016	Sheep Rock	Approx. 25%	Crowley
South Ridge Bully Creek	2012	Iron	Approx. 90%	Bully Creek
	2015	Pole Gulch[1]	100%	
Spring Mountain	2007	Old Maid	100%	Cow Lakes
Toppin Creek Butte	2013	Sharon Creek	Approx. 30%	Louse Canyon

[1] Part of the Bendire Complex

The BLM does not know the specifics of how wildfire affected each RNA or which specific vegetation communities actually burned and at what severity; however, recent plot data indicate that North Ridge Bully Creek and South Ridge Bully Creek are now dominated by invasive annual grasses, suggesting some level of interaction between frequent wildfires, drought, and grazing. In fall 2015 following the last fire, aerial herbicide treatments were done to reduce invasive annual grass to maintain values of the two Bully Creek RNAs.

Most of the large fires in eastern Oregon are wind driven, which often creates a complex mosaic of fire effects, ranging from unburned to all vegetation burned. Monitoring trends in burn severity (MTBS) analyses (https://mtbs.gov/viewer/index.html) indicate that most of the RNAs experienced low severity to unburned, although data are not yet available for 2016 and 2017 fires.

The Old Maid fire produced areas of high and moderate severity on the eastern portion of Spring Mountain RNA. The Iron fire was classified with areas of moderate severity that likely affected both North Ridge Bully Creek and South Ridge Bully Creek RNAs. Although less certain, the Holloway fire appears to have burned with low to moderate severity in Dry Creek Bench RNA but with low to unburned severity in East Fork Trout Creek RNA. These estimates of fire severity have not been ground-truthed. Observations of the Holloway fire indicate the MTBS underestimates fire severity.

3.4 Vegetation, including Noxious Weeds, Riparian Areas, and Wetlands

The existing conditions of vegetation and noxious weeds in the planning area are described in the 2015 Final EIS in Sections 3.4 (pgs. 3-26 to 3-52), 3.5 (pgs. 3-52 to 3-74), and 3.8 (pgs. 3-87 to 3-93); they are hereby incorporated by reference.

Since 2013, a total of 404,118 acres of vegetation have been treated or are planned for treatment in Greater Sage-Grouse habitat: conifer removal (227,149 acres), invasive plant control (56,547 acres), habitat protection (89,075 acres), habitat restoration (5,642 acres), and fuelbreaks (25,705 acres). None of these treatments occurred or will occur in key RNAs.

Due to the scale of analysis involved, vegetation descriptions were not specific for the key RNAs in the 2015 ARMPA. More detailed descriptions of the vegetation within each key RNA follows, based on

establishment reports for each RNA, descriptions within the Final EISs for the applicable resource management plans, and any available plot data. The description includes an assessment of which general vegetation type described in the ARMPA (BLM 2015, pp. 3-32 through 3-38) occurs in each key RNA; most often more than one general vegetation type is present. See **Appendix A** for additional information about other features of the key RNAs.

Also present are vegetation types that are ecotonal, including a mix of warm and cool sites and moist and dry site indicator species. These types were classified as Cool-Moist Sagebrush bordering on Warm-Dry Sagebrush, if more cool-moist indicator species were present in the community than warm-dry indicators. Alternatively, they were classified as Warm-Dry Sagebrush bordering on Cool-Moist Sagebrush, if more warm-dry indicator species were present. For example, Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and Thurber's needlegrass (*Achnatherum thurberianum*) are warm-dry site indicators, while mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), antelope bitterbrush (*Purshia tridentata*), and Idaho fescue (*Festuca idahoensis*) are cool, moist indicators.

Bluebunch wheatgrass (*Pseudoroegneria spicata*) is found on both warm-dry sites and cool-moist sites, while threetip sagebrush (*Artemisia tripartita*) grows on sites that are cooler and moister than typical Wyoming big sagebrush sites but warmer and drier than typical mountain big sagebrush sites.

Low sagebrush (*Artemisia arbuscula*), black sagebrush (*A. nova*), and stiff sagebrush (*A. rigida*) all indicate shallow soils, with black sagebrush also indicating calcareous soils and stiff sagebrush indicating high amounts of surface rock. Silver sagebrush (*A. cana*) indicates alkaline soils and playas.

Whether sites are cool and moist, warm and dry, shallow, calcareous, or alkaline has implications for the types and abundance of forbs and insects important to Greater Sage-Grouse. These conditions also indicate what times of the year and types of year (dry, average, wet) forbs are likely to be green and growing.

Ecological site descriptions provide information useful for assessing probable plant community composition and responses to disturbance, including grazing. The Natural Resources Conservation Service has the primary responsibility for developing and finalizing ecological site descriptions, which are usually developed at the same time as more detailed soil mapping.

Soil mapping is incomplete for Malheur County, so ecological sites have not been described for Dry Creek Bench, Lake Ridge, Mahogany Ridge, South Bull Canyon, and Spring Mountain RNAs; mapping is incomplete for North Ridge Bully Creek and South Ridge Bully Creek RNAs.

Because Foster Flat and Guano Creek-Sink Lakes would remain closed to grazing under both alternatives (in accordance with pre-2015 ROD/ARMPA decisions), ecological site descriptions are not included below. All RNAs include multiple ecological sites.

In the ecological site name, PZ means precipitation zone, which is an estimate of the average annual precipitation and an indicator of the probable resistance to invasion by annual grasses and resilience from disturbance (resistance and resilience). The lower the precipitation, the lower the resistance and resilience (Chambers et al. 2014a, 2014b).

Sites with less than 12 inches average annual precipitation are usually considered to have low resistance and resilience. Sites with average annual precipitation of 12 to 16 inches are usually considered moderately resistant and resilient, and sites with greater than 16 inches average annual precipitation are usually considered to have high resistance and resilience. These rough guidelines are further modified by temperature and aspect (Chambers et al. 2014a, 2014b). Generally, the warmer the site, the lower the resistance and resilience.

Black Canyon RNA. The Oregon Natural Heritage Plan (ONHP 2015) cells included in this RNA are stiff sagebrush/Sandberg bluegrass (*Poa secunda*) (Shallow-Dry Sagebrush), and western juniper/big sagebrush/bluebunch wheatgrass (*Juniperus occidentalis*/Arte*misia tridentata*) (Western Juniper) (BLM 2002). Stiff sagebrush communities cover large areas of the more level upland plateau, and some large areas have so little soil that only Sandberg bluegrass and early-blooming forbs are present.

North aspects also support Wyoming big sagebrush/Idaho fescue (Warm-Dry Sagebrush bordering on Cool-Moist) and bluebunch wheatgrass canyon grasslands. Alluvial deposits in the canyon bottom support small patches of basin big sagebrush/Nevada bluegrass (*Artemisia tridentata* ssp. *tridentata*/*Poa nevadensis*) (Warm-Dry Sagebrush) (BLM 1996). Although once considered a separate species, Nevada bluegrass is now considered Sandberg bluegrass by NRCS and *Poa secunda* ssp. *juncifolia* in the Flora of Oregon (Halvorson 2011).

The RNA also includes an intermittent stream that carries water long enough in the year to support a riparian wetland, dominated by coyote willow (*Salix exigua*) and Pacific willow (*S. lucida* ssp. *lasiandra*) (BLM 2002). Alder also is present (RNA observation record 2006).

Other species associated with the riparian areas and seeps include aspen (*Populus tremuloides*), serviceberry (*Amelanchier alnifolia*), mock orange (*Philadelphus lewsii*), gooseberry (*Ribes* spp.), and hairy snowberry (*Symphoricarpos mollis*) in the headwaters area. Willows are located farther down in the canyon, along with bitter cherry (*Prunus emarginata*) (BLM 1996a). There also is a small stand of black cottonwood lower down in the riparian drainage. Small areas of the invasive whitetop (*Cardaria draba*) and scotch thistle (*Onopordum acanthium*) are documented at Antelope Spring (RNA observation records 2004, 2007).

The three most common ecological sites are JD Clayey 12- to 16-inch PZ (approx. 31 percent), JD Mahogany Rockland 9- to 12-inch PZ (approx. 35 percent), and JD North 12- to 16-inch PZ (approx. 8 percent). The coyote willow riparian ecological site, which is potentially important for Greater Sage-Grouse late brood-rearing habitat, comprises only 0.3 percent.

Other ecological sites in the 9- to 12-inch precipitation zone include Droughty Fan, JD Droughty Shallow South, JD Droughty South, JD North, JD Shallow, JD Shallow North, and JD Shallow South. Other ecological sites in the 12- to 16-inch precipitation zone include JD Mahogany Rockland, JD Mountain North, and JD Shallow South.

Recently completed assessment, inventory, and monitoring (AIM) plots indicate a high proportion (over 50 percent cover) of annual grasses dominated by cheatgrass are now present in the RNA. Wyoming big sagebrush cover is 7.3 percent and native perennial grass is 27.33 percent. Perennial and annual forb cover, including species that have value for Greater Sage-Grouse hens and chicks, is 4 percent.

Dry Creek Bench RNA. This RNA contains the ONHP cells mountain mahogany-mountain snowberry/Idaho fescue (*Cercocarpus ledifolius-Symphoricarpos oreophilus/Festuca occidentalis*) (Mountain Brush) and mountain mahogany-big sagebrush/Idaho fescue (Mountain Brush) (BLM 2002). Low sagebrush flats with Idaho fescue, Thurber's needlegrass, bottlebrush squirreltail (*Elymus elymoides*), Sandberg bluegrass, and several buckwheat species (*Eriogonum* spp.) (Shallow-Dry and Warm-Dry Sagebrush) surround the mountain mahogany stands (BLM 1996b).

Low sagebrush cover was documented in recent plots at 4.9 percent and Mountain big sagebrush was 3.1 percent cover. Mountain mahogany has 47.6 percent cover and snowberry is at 20 percent. The area has a diverse understory, with 49 forb species and 11 native perennial grass species.

Invasive annual grasses had fairly low cover of 9.3 percent, and bulbous bluegrass (*Poa bulbosa*) is present (RNA observation records 2008). Over 70 percent of the forb species documented are ones that have value as food and substrate for insects for Greater Sage-Grouse hens and chicks.

East Fork Trout Creek RNA. The ONHP cells included are a riparian community dominated by quaking aspen (*Populus tremuloides*) intermixed with Scouler's willow (*Salix scouleriana*) (Aspen or Riparian-Wetland) and a high elevation wet meadow (Riparian-Wetland) (BLM 2004). Quaking aspen covers about one-third of the RNA, with a dense canopy and little vegetation in the understory. The wet meadows occur in areas with several springs that keep the ground saturated. Sedges and rushes dominate with occasional willow patches and several wetland-associated forbs (BLM 2007).

Much of the RNA consists of mountain big sagebrush, with needlegrasses (*Achnatherum* spp.), mountain brome (*Bromus carinatus*) and Idaho fescue (Cool-Moist Sagebrush). Other shrubs present include wax currant (*Ribes cereum*), serviceberry, and roundleaf snowberry (*Symphoricarpos rotundifolius*); depending on the extent of these other shrubs, the plant community type may be Mountain Brush. Snow accumulation areas that melt late in the year support little to no sagebrush. Numerous forbs are also present (BLM 2007).

Four ecological sites are present in East Fork Trout Creek RNA. The most common is Aspen 16- to 35-inch PZ at nearly 62 percent of the area. Shallow Loam 16- to 25-inch PZ comprises about 27 percent of the RNA and Loamy 12- to 16-inch PZ about 12 percent. The remaining 1 percent is Deep North 12- to 18-inch PZ.

Fish Creek Rim RNA. The ONHP cells present include mountain big sagebrush-antelope bitterbrush/Idaho fescue (Cool-Moist Sagebrush), low sagebrush/Idaho fescue scabland (Cool-Moist Sagebrush), mountain mahogany-mountain big sagebrush (Mountain Brush), and the snowberry-bittercherry (*Symphoricarpos* spp.-*Prunus emarginata*) complex (Mountain Brush) (BLM 2003).

Low sagebrush plant communities dominate, with intermingled patches of big sagebrush, and an isolated grove of aspen, white fir (*Abies concolor*), and ponderosa pine (*Pinus ponderosa*) (TNC 1992, BLM 2000). Mountain mahogany forms extensive stands in the rimrock area, with bittercherry and snowbrush ceanothus (*Ceanothus velutinus*) (TNC 1992).

Western juniper is scattered across the site, especially in the eastern rimrock area (BLM 2000), with an average of 4 percent cover. Recent vegetation plots in the RNA list low sage cover at 11.8 percent and Mountain Big Sagebrush at 8.7 percent.

Within the sagebrush communities there is a rich understory of 37 forb species, 29 of which have high and moderate value as food for Greater Sage-Grouse hens and chicks.

Perennial grass cover is 18.67 percent, and there are no annual grasses documented in recent plots, although NISMIS (2018) documents less than 1 acre of cheatgrass (*Bromus tectorum*) in the RNA, with 30 percent cover. There are some areas along a road with 5 percent cover of an invasive mustard, whitetop (*Lepidium draba*) (NISMIS 2018). In 2014 and 2017 there were some roadside weed treatments in the RNA for whitetop.

The most common ecological site in the Fish Creek Rim RNA is Claypan 12- to 16-inch PZ, comprising about 67 percent of the area. South Slopes of 12- to 16-inch PZ covers around 16 percent and Loamy 12- to 16-inch PZ about 10 percent. The remaining ecological sites present include Loamy 10- to 12-inch PZ, North Slopes 10- to 12-inch PZ, and South Slopes 10- to 12-inch PZ.

Foley Lake RNA. This RNA contains the ONHP cell black sagebrush/bunchgrass (Shallow-Dry Sagebrush) (BLM 2003). Foley Lake is a seasonally dry playa; in wet years it holds some water until August. Black sagebrush has 13.54 percent cover and is intermingled with a diverse mosaic of Wyoming big sagebrush/bunchgrass (6.1 percent cover) and low sagebrush/bunchgrass communities with bud sage (*Picrothamnus desertorum*) in the area (Warm-Dry Sagebrush).

Bottlebrush squirreltail with scattered Idaho fescue occur within the Black Sagebrush community, while the Wyoming big sagebrush community contains nearly equal proportions of Idaho fescue and bottlebrush squirreltail.

Western wheatgrass (*Pascopyrum smithii*) and tufted hairgrass (*Deschampsia caespitosa*) are present along the margins of the playa. Cheatgrass is at 3.8 percent cover. Native perennial grass cover in the RNA averages about 9 percent.

Silver sagebrush dominates the southern edge of the playa (BLM 2000), with 18.1 percent cover. The RNA understory is not very diverse, with only 11 forb species documented in recent plots, and most of the cover is spike rush (*Elocharis* sp., 25 percent cover) and ruderal species, like Tansyleaved evening primrose (*Camissonia tanacetifolia*; 6.4 percent cover) and the nonnative hoarycress (*Lepidium draba*; 11 percent cover). The invasive plant spiny cocklebur is present in a small area (.003 acres), with 10 percent cover. Six forb species with value for Greater Sage-Grouse as food for hens and chicks collectively have cover of 4.5 percent.

Six ecological sites are found within the Foley Lake RNA, with Loamy 10- to 12-inch PZ the majority type, at nearly 73 percent of the area. Claypan 10- to 12-inch PZ is the next most common ecological site, at 17 percent of the RNA. Ponded Clay comprises about 2 percent of the area. The remaining ecological sites include Droughty Loam 11- to 13-inch PZ and North Slopes 10- to 12-inch PZ.

Foster Flat RNA. This RNA contains the ONHP cell silver sagebrush/Nevada bluegrass (*Poa nevadensis*) and a silver sagebrush/spike rush (*Eleocharis* sp.) (Playa). Silver sagebrush cover averages about 35 percent. Areas within the heart of the playa are dominated (55 percent cover) with tansyleaved evening primrose. Areas outside the playa contain low sagebrush/Sandberg bluegrass communities, with low sage cover of 44 percent and a rich understory of forbs.

The playa area also contains areas with basin wildrye (*Leymus cinereus*), creeping wildrye (*L. triticoides*), and silver sagebrush/green rabbitbrush (*Chrysothamnus viscidiflorus*), with greasewood (*Sarcobatus vermiculatus*) and a Wyoming big sagebrush/Thurber's needlegrass community (27 percent sagebrush cover) occurs around the rim (BLM 1991; Taylor 2004).

Forb species (annuals and perennials) collectively have an average cover of about 10.4 percent. Species that are important for Greater Sage-Grouse hens and chicks for food make up nearly 45 percent of all the forb species in the RNA.

Guano Creek-Sink Lakes RNA. This RNA contains ONHP cells for Wyoming big sagebrush/needle-and-thread grass (*Artemisia tridentata* ssp. *wyomingensis*/*Hesperostipa comata*) (Warm-Dry Sagebrush), low sagebrush/Sandberg's bluegrass (Shallow-Dry Sagebrush), and silver sagebrush/basin wildrye (Playa), along with a riparian-wetland type vernal pool and a riparian community dominated by willow (*Salix* spp.) (BLM 2003).

The Sink Lakes portion contains low sagebrush/Sandberg bluegrass scabland (Shallow-Dry Sagebrush) on the uplands and two vernal lakes surrounded by silver sagebrush plant community types with silver sagebrush/Nevada bluegrass in the middle on the northwestern lake (Playa). In wetter years, the playas support a number of forbs and alkaline-tolerant grasses and rushes (BLM 2000). The Guano Creek portion contains the Wyoming big sagebrush/needle-and-thread plant community, along with a willow-dominated riparian area in the lower creek bed and a rich community of basin wildrye and forbs in the upper creek bed. Some invasive plants are present although the nomination report does not state which species (BLM 2000). Sagebrush cover in the RNA is documented at 18.32 percent, and perennial grass cover is at 13.6 percent; no invasive annual grass cover was documented.

Lake Ridge RNA. The ONHP cells present include low sagebrush (*Artemisia arbuscula*)/bluebunch wheatgrass (Warm-Dry Sagebrush) and low sagebrush/Idaho fescue (Cool-Moist Sagebrush), along with a natural pond that provides a perennial source of water (Riparian-Wetland) (BLM 2002). The bluebunch wheatgrass type is more extensive than the Idaho fescue type. Low sagebrush cover averages 19.2 percent.

Some small areas with rigid sage are present, and Wyoming big sagebrush also exists in the southwestern edge of the RNA That same portion also includes a patch of Mountain Brush, dominated by mountain big sagebrush, mountain snowberry, golden currant (*Ribes aureum*) and serviceberry, with Idaho fescue, rough bluegrass (formerly *Poa scabrella*, now part of the *P. secunda* complex), and blue wildrye (*Elymus glaucus*), along with numerous forbs (BLM 1996c).

Vegetation plots document 24 forb species in the understory, with 17 (70.8 percent) of the species having value for Greater Sage-Grouse hens and chicks. Invasive annual grass is present in some areas, showing up in about 25 percent of the vegetation plots.

Lake Ridge RNA includes several small playas dominated by silver sagebrush (*Artemisia cana*)/Nevada bluegrass (Playa), with bottlebrush squirreltail and Idaho fescue present in small amounts (BLM 1996c).

Mahogany Ridge RNA. The ONHP cells have mountain mahogany-big sagebrush and mountain mahogany-Oregon grape (*Mahonia aquifolium*) complexes (Mountain Shrub) and mountain big sagebrush-

mountain mahogany/slender wheatgrass (*Elymus trachycaulus*)-bluebunch wheatgrass community (Cool-Moist Sagebrush) (BLM 2002).

Mountain mahogany and mountain big sagebrush have cover of 31.56 percent and 6.99 percent, respectively. The original RNA contained the mountain mahogany plant communities, with the addition of mountain big sagebrush-mountain mahogany/slender wheatgrass-big bluegrass.

Understory forb species are diverse, with 46 species being documented in plots, and 31 species having value for Greater Sage-Grouse forbs and chicks. The addition also includes considerable area in mountain big sagebrush/bluebunch wheatgrass (Cool-Moist Sagebrush bordering on Warm-Dry Sagebrush). This RNA has the most extensive stand of mountain mahogany in Oregon (BLM 1996d).

North Ridge Bully Creek RNA. The ONHP cells in this RNA include Wyoming big sagebrush-Thurber's needlegrass (Warm-Dry Sagebrush) and Wyoming big sagebrush-threetip sagebrush/Idaho fescue (Warm-Dry Sagebrush bordering on Cool-Moist Sagebrush) (BLM 1996e, 2002). Sagebrush cover is low, about 4 percent, and perennial grass cover is 21.33 percent.

Invasive annual grasses, especially cheatgrass, is present, with over 90 percent of recent plots having some cheatgrass present; The BLM weed database lists cheatgrass cover at 5 percent. Medusahead (*Taeniatherum caput-medusae*) is also documented, with cover estimated at 5 percent.

Additional plant communities present include Wyoming big sagebrush-wild crab apple (*Peraphyllum ramosissium*)/Idaho fescue, Wyoming big sagebrush-threetip sagebrush/bluebunch wheatgrass, threetip sagebrush/bluebunch wheatgrass (all Warm-Dry Sagebrush bordering on Cool-Moist Sagebrush), threetip sagebrush/Idaho fescue, and threetip sagebrush-wild crab apple/Idaho fescue (both Cool-Moist Sagebrush bordering on Warm-Dry Sagebrush).

The RNA also has small inclusions of stiff sagebrush/Sandberg bluegrass (Shallow-Dry Sagebrush).

Several species of tall, deep-rooted bunchgrasses are present, along with Sandberg bluegrass and small amounts of cheatgrass (BLM 1996e). Twenty-one understory forb species are documented in vegetation plots, with about half of them having value for Greater Sage-Grouse hens and chicks.

While the RNA includes several headwaters areas, flow is ephemeral and a distinctive riparian community is not present.

The most common ecological site in North Ridge Bully Creek RNA is SR Very Shallow 9- to 12-inch PZ at 55 percent of the area. SR Shallow South 9- to 12-inch PZ comprises 10 percent and SR South 9- to 12-inch PZ 6 percent of the RNA. Twenty-nine percent of the RNA has not been classified.

Following wildfire, the RNA was aerially sprayed in 2015 with Imazapic herbicide, targeting invasive annual grasses to help maintain the values (NISMIS treatment database 2015). The District Botanist in 2017 stated the treatment was effective, but longer-term effectiveness data is not available (Fritts 2018).

Rahilly-Gravelly RNA. This RNA contains ONHP cells western juniper/big sagebrush-antelope bitterbrush (Western Juniper), mountain big sagebrush-mountain snowberry-wild crab apple (Mountain Brush), and antelope bitterbrush-big sagebrush-mountain snowberry/Thurber's needlegrass mosaic

(Cool-Moist Sagebrush bordering on Warm-Dry Sagebrush). It also contains large areas of low sagebrush on lithic soil flats (Shallow-Dry Sagebrush) (BLM 2000).

Recent vegetation monitoring documented Wyoming big sagebrush at 19.7 percent cover and low sage at 34.3 percent cover on the flats. Perennial grasses are diverse, with 11 species documented and cover was between 9 and 13 percent. Invasive annual grass cover averaged 15.1 percent, dominated by cheatgrass and soft chess (*Bromus hordeaceus*). Several areas of other noxious weeds are documented, with populations of Mediterranean sage (*Salvia aethiopis*), Spiny cocklebur (*Xanthium spinosum*), bull and Canada thistle (*Cirsium vulgare*, *C. arvense*) present in small areas (NISMIS 2018).

The RNA is diverse in forb species, with 45 species documented and 29 species (64 percent of all forbs) that are important to Greater Sage-Grouse hens and chicks as food or substrate for insects.

Western juniper occurs across the site as open stands of older trees (Juniper Savanna) and occasional dense clumps of younger trees in small pockets on side slopes. Wyoming big sagebrush is common at the lower elevations and mountain big sagebrush at the upper elevations of the RNA.

Idaho fescue is the dominant grass species, with bluebunch wheatgrass, Sandberg bluegrass, and Thurber's needlegrass. Big sagebrush, low sagebrush, antelope bitterbrush, and wild crab apple have nearly equal cover across the RNA (BLM 2000).

Rahilly-Gravelly RNA includes 11 ecological sites. The most widespread ecological site is Thin Surface Claypan 10- to 16-inch PZ at 53 percent of the area, followed by Clayey 10- to 12-inch PZ (17 percent) and Loamy 8- to 10-inch PZ (16 percent). Ecological sites in the 6- to 10-inch PZ are Desert Loam, Loamy Slopes, Low Sodic Terrace, and Sodic Meadow. Ecological sites in the 12- to 16-inch PZ are Claypan, Deep Loamy, and South Slopes. The only other site in the 10- to 12-inch precipitation zone is South Slopes.

South Bull Canyon RNA. The ONHP cell in this RNA consists of Wyoming big sagebrush-antelope bitterbrush/Idaho fescue (Cool-Moist Sagebrush) (BLM 2002). Several phases of this plant community are present, including Wyoming big sagebrush-antelope bitterbrush/bluebunch wheatgrass (Warm-Dry Sagebrush bordering on Cool-Moist Sagebrush), Wyoming big sagebrush/Idaho fescue (Cool-Moist-Sagebrush bordering on Warm-Dry Sagebrush), Wyoming big sagebrush/Thurber's needlegrass (Warm-Dry Sagebrush), and basin big sagebrush-Wyoming big sagebrush/bluebunch wheatgrass (Warm-Dry Sagebrush).

A low sagebrush/bluebunch wheatgrass community is located on a flat at the south end of the RNA near Prava Peak Reservoir No. 3 (BLM 1996f). Low sagebrush cover averages 4.15 percent and Wyoming big sagebrush averages 5.55 percent cover in the RNA. The understory forb layer is fairly diverse, with 20 of the 32 herbaceous forb species having value for Greater Sage-Grouse hens and chicks. The frequency of invasive annual grasses was 88 percent in recent plots, but there is no information on cover percent associated with these plots.

Additional information from the BLM noxious weed layer (NISMIS 2018) lists medusahead rye at 1 percent cover on 13 acres in 2017. In 2007 RNA observation reports documented heavy tent caterpillar infestation on bitterbrush, and Aroga moth was documented on sagebrush in the west side of the RNA

in 2005. In a wildfire burn area in the southern part of the RNA, aerial spraying of Imazapic targeting annual grasses was done in 2017 to help maintain the values of the RNA (NISMIS 2018).

South Ridge Bully Creek RNA. The ONHP cells are Wyoming big sagebrush/Thurber's needlegrass (Warm-Dry Sagebrush) and Wyoming big sagebrush-wild crab apple/Idaho fescue (Warm-Dry Sagebrush bordering on Cool-Moist Sagebrush) (BLM 1996g, 2002). Wyoming big sagebrush has a cover of 4.6 percent and rabbitbrush (*Chrysothamnus* and *Ericameria* spp.) averages 4.1 percent.

Other plant communities present include Wyoming big sagebrush-threetip sagebrush/Idaho fescue, Wyoming big sagebrush-threetip sagebrush/bluebunch wheatgrass, threetip sagebrush/bluebunch wheatgrass (all Warm-Dry Sagebrush bordering on Cool-Moist Sagebrush), threetip sagebrush/Idaho fescue, threetip sagebrush-wild crab apple/Idaho fescue (both Cool-Moist Sagebrush bordering on Warm-Dry Sagebrush), and antelope bitterbrush-wild crab apple/Indian ricegrass (*Achnatherum hymenoides*).

Several species of tall, deep-rooted bunchgrasses are present, with most species typical of the Warm-Dry Sagebrush type. Cheatgrass is present in small amounts (BLM 1996g); however, recent plots documented cheatgrass in 79.8 percent frequency in plots; the level of cover is not known.

The invasive species white top (*Cardaria draba*) has been documented along the main road in the RNA (RNA observation report 2008), and small patches of scotch thistle (*Onopordum acanthium*) exist (RNA observation report 2005).

As with the North Ridge Bully Creek RNA, several headwater areas are present, but flow is ephemeral, with no distinct riparian community present (BLM 1996g). Some Aroga moth damage to sagebrush was documented in 2005 and 2008.

Following a recent wildfire, the RNA was aerially sprayed with Imazapic herbicide, targeting invasive annual grasses to help maintain the values (NISMIS treatment database 2015). The District Botanist in 2017 stated that the treatment was effective, but longer-term effectiveness data is not available (Fritts 2018).

Only a small portion of South Ridge Bully Creek RNA has not been classified. The most common ecological site is SR Loamy 9- to 12-inch PZ at 82 percent of the area, followed by SR Shallow South 9- to 12-inch PZ (9 percent) and SR South 9- to 12-inch PZ (7 percent). The remaining ecological site is SR Very Shallow 9- to 12-inch PZ.

Spring Mountain RNA. This RNA includes ONHP cells for mountain big sagebrush/Idaho fescue (Cool-Moist Sagebrush), low sagebrush/bluebunch wheatgrass (Warm-Dry Sagebrush), and Riparian-Wetland communities dominated by peachleaf willow (*Salix amygdaloides*) and coyote willow, with the quaking aspen/mountain snowberry (Aspen) cell present (BLM 2002). Sagebrush cover is 14.6 percent.

The northern portion of the RNA consists of steep scree, with chokecherry (*Prunus virginiana*), mountain snowberry, aspen, and mock orange (*Philadelphus lewisii*). Low sagebrush/bluebunch wheatgrass occurs on the northwestern portion of the tableland above the scree, with low sagebrush/Idaho fescue (Cool-Moist Sagebrush) and low sagebrush/Thurber's needlegrass (Warm-Dry Sagebrush) along the eastern edge.

Mountain big sagebrush plant communities dominate the higher peaks, ridges, and slopes, with mountain big sagebrush/Idaho fescue (Cool-Moist Sagebrush) being the most widespread, mixing with mountain big sagebrush-mountain snowberry/Idaho fescue (Cool-Moist Sagebrush) on steeper north and east aspects (BLM 1996h).

Understory forb species diversity is not high—only 19 species are documented—but ten species (52.6 percent) have value for Greater Sage-Grouse hens and chicks for food. The documented perennial grass cover is very high (88 percent), perhaps due to recent fire wildfires or to data entry errors. Cheatgrass cover was documented at 12.6 percent.

This RNA includes several springs, usually supporting small stands of aspen. A willow stand with several different species of willow occurs below a spring on the north end (BLM 1996h).

Toppin Creek Butte RNA. The ONHP cells included in this RNA are low sagebrush/Idaho fescue (Cool-Moist Sagebrush) and low sagebrush/bluebunch wheatgrass (Warm-Dry Sagebrush) (BLM 2002). A large playa named Bull Flat Lake lies at the lowest elevations and is a source for Bull Creek, which flows through the southeast part of the RNA.

The silver sagebrush/Nevada bluegrass (Playa) plant community type encircles Bull Flat Lake. The low sagebrush/Idaho fescue plant community dominates Toppin Creek Butte. Low sagebrush cover is between 14 and 17.8 percent. Sandberg bluegrass dominates on shallower soils, while bluebunch wheatgrass dominates on deeper soils.

Perennial grass cover is documented at between 35 and 48 percent. The area supports a variety of forbs and one lone western juniper tree. Thirty-six forb species are documented in recent plots, with 24 species (66.6 percent) having important value for Greater Sage-Grouse hens and chicks.

Invasive plants are present in disturbed areas and along the road that bisects the RNA (BLM 1996i). Cheatgrass is present, occurring in 70 percent of all plots, but a recent site evaluation listed cheatgrass as present in trace amounts and patchy. The exact cover percent is not known.

Cattle use in most of the RNA is low (little water), with most of the spring use at Bull Flat Playa (RNA observation records 2011). An occurrence of *Pogogyne floribunda* (profuse-flowered pogogyne), a BLM sensitive plant, occurs at Bull Flat Playa under the silver sage.

Toppin Creek Butte contains five ecological sites, with nearly equal presence of Ashy Plateau 11- to 13-inch PZ (29 percent), Shallow Claypan 11- to 13-inch PZ (29 percent), and Loamy 11- to 13-inch PZ (28 percent). Loamy 8- to 11-inch PZ covers 12 percent of the RNA and the remaining 2 percent consists of Ponded Clay.

The existing conditions of riparian/wetland areas are described in Section 3.5, pgs. 3-35 through 3-36, in the 2015 Final EIS; they are hereby incorporated by reference. Prior to 2012, 8 of the 13 key RNAs had land health assessments completed (see Appendix N in the 2015 Final EIS).

Standard 2 (Watershed Function-Riparian/Wetlands) was not met, due to livestock grazing in one allotment within the Black Canyon RNA and one allotment within the Foley Lake RNA. Management changes were implemented to make progress toward attainment of the standard. Since 2013 (results

post-2013 were not included in Appendix N in the 2015 ARMPA). Land health assessments were completed in allotments in East Fork of Trout RNA (2015), Fish Creek Rim RNA (2013), and Rahilly Gravelly RNA (2013). All rangeland health standards were met, indicating that no adjustments to current grazing management is needed.

3.5 FISH AND WILDLIFE

The existing conditions of fish and wildlife in the planning area are described in the 2015 Final EIS in Section 3.5.1 (pgs. 3-56 to 3-70) and trends are described in Section 3.5.2 (pgs. 3-71 to 3-74); they are hereby incorporated by reference.

Since 2015, the BLM has obtained no new monitoring data or other information that would indicate a change in the status and trends of fish and wildlife occurring in the key RNAs. Wildfires likely altered vegetation components of wildlife habitat in some key RNAs since 2015, although the effects have not been monitored. As noted above, wildfires burned all or a portion of three key RNAs in 2015–2016. Two of the RNAs (North Ridge Bully Creek and South Ridge Bully Creek) burned in 2012 and 2015. These wildfires are too closely spaced in time for substantial changes to the habitat to occur since the 2012 fire. The third RNA (South Bull Canyon) was partially burned in 2016. The BLM did not monitor wildlife use of burned areas of the South Bull Canyon RNA, so it does not know what impacts if any occurred on other wildlife.

Wildlife is identified in the RNA establishment reports as a relevant and important value for six RNAs: Black Canyon, Lake Ridge, Mahogany Ridge, North Ridge Bully Creek, South Ridge Bully Creek, and Toppin Creek Butte.

Mule deer, bighorn sheep, and pronghorn antelope are specifically mentioned in the RNA establishment reports for four RNAs on the Lakeview District (Fish Creek Rim, Foley Lake, Guano Creek–Sink Lakes, and Rahilly-Gravelly) and two RNAs on the Burns District (East Fork Trout Creek and Foster Flat); however, none of the establishment reports for these six RNAs in Lakeview and Burns identified wildlife as meeting the RNA establishment criterion for relevance and importance. This was due to the absence of crucial habitat.

3.6 SPECIAL STATUS SPECIES

The existing conditions of special status species in the planning area are described in the 2015 Final EIS in Section 3.5.1 (pgs. 3-56 to 3-70) and trends are described in Section 3.5.2 (pgs. 3-71 to 3-74). They are hereby incorporated by reference.

The BLM updated its special status species list on July 29, 2015 (see Instruction Memorandum No. OR-2015-028). Since 2015, the agency has obtained no new monitoring data or other information that would indicate a change in the status and trends of special status species identified in the 2015 list occurring in the key RNAs. A few key RNAs contain current or former BLM special status species.

No critical habitat has been designated within the key RNAs. Most information comes from the BLM Geographic Observation data base (GeoBOB), and observation data from the Oregon Biodiversity Information Center (ORBIC). These databases and the Forest Service's Region 6 Wildlife Database were queried for wildlife records that intersect with the key RNAs (GeoBOB 2018; ORBIC 2018). There are no known populations of any federally listed endangered plants in any of the key RNAs.

Foley Lake RNA contains a candidate for Oregon state listing, *Rorpipa columbiae* (Columbia cress), a playa "edge" species that is in decline range-wide (*Roripppa columbiae* Conservation Strategy 2016). This species has a NatureServe rank of global and state vulnerable (G3 S3) and is listed in the State of Washington. This rare plant is known from about 15 occurrences in Northern California, 13 in southern Oregon, and at the Hanford Reach in Washington. At Foley Lake, 85 stems were last documented in 2016.

In southern Oregon approximately 11,380 plants are documented at 13 sites, but 8 sites have fewer than 85 plants. Also occurring is profuse-flowered pogogyne (*Pogogyne floribunda*), a state imperiled (G4 S1) species in the silver sage community. This tiny annual member of the mint family occurs in the intermediate moisture zone of the playa edge, outside the habitat occupied by Columbia cress. Three Greater Sage-Grouse leks are documented within 1 to 2 miles of the RNA (BLM 2015, Key RNA descriptions).

Rahilly-Gravelly RNA contains five occurrences of Cooper's goldflower (*Hymenoxys cooperii* var. *canescens*). This rare aster has a global and state rank of G4 S1 (state critically imperiled), with fewer than 400 plants total in the RNA (BLM GeoBOB 2014), mostly in the Sucker Creek pasture. Only one other location is known in Oregon, in the Trout Creek Mountains in southeastern Oregon. Other populations occur across the California border in Modoc County, in the Sierra Nevada, and scattered populations in the Great Basin in Nevada, Utah, and Arizona. Eight Greater Sage-Grouse leks are documented in the RNA and two additional leks occur within 1 to 2 miles of the RNA.

The East Fork of Trout Creek RNA contains the grass, rock melic (*Melica stricta*), an Oregon Biodiversity Information Center G4 S3 (state vulnerable), Oregon List 2 species (threatened in Oregon but secure elsewhere), and a former BLM sensitive species. Large populations of Rock melic are documented throughout this area, both in the RNA and outside the RNA in the surrounding landscape. Columbia spotted frog is identified in the RNA establishment report. A Greater Sage-Grouse lek is documented 0.8 miles east of the RNA, and Greater Sage-Grouse have been recorded within the RNA.

Mahogany ridge RNA contains three occurrences of Owyhee clover (*Trifolium owyheeense*), out of 81 sites documented on the Vale District and in the state. The species is listed by the State of Oregon as endangered. All sites are small, and the total known occupied area is 254 acres (GeoBOB 2014), or about 3 acres per site. This endemic clover has a NatureServe rank of G2 S2 (globally and state imperiled). Last documented in 2001, the three sites were estimated to have about 2,000 plants (GeoBOB, 2018). The species was located in the RNA, outside the area designated as unavailable to grazing in the 2015 AMRPA. The species occurs in Wyoming big sagebrush communities. Two Greater Sage-Grouse leks occur 3 to 4 miles from the RNA, to the northeast and southeast.

The North. Ridge of Bully Creek has a documented occurrence of thyme-leaved buckwheat (*Eriogonum thymoides*). This former BLM sensitive species is still tracked by ORBIC as a list 3 species (still some concern), but it has been found to be more abundant elsewhere in the state. No population level information is available other than presence. Greater Sage-Grouse were also observed in 2008 (RNA Observation reports 2008). In 2007, the invasive species whitetop was documented close to an active Greater Sage-Grouse lek. Five Greater Sage-Grouse leks are within the RNA, and eight leks are known within 2 to 4 miles of the RNA, including one lek in the adjacent South Ridge Bully Creek RNA.

South Ridge of Bully Creek RNA has documented occurrences of Greater Sage-Grouse, with one lek documented inside the RNA. Pygmy rabbits have also been documented.

Toppin Creek RNA has an occurrence of profuse-flowered pogogyne, a BLM sensitive plant, on the playa. This G4 S1 (state imperiled) species occurs at Bull Flat Playa with silver sage plants. This population was last documented to have 4,000 plants in 2005.

Toppin Creek Butte is identified as a particularly important area for neotropical migratory birds, possibly including special status species. Greater Sage-Grouse are documented in the RNA, with one lek within the RNA and two more within 1.6 to 2.6 miles of the RNA boundary.

Black Canyon RNA contains Columbia spotted frog and Redband trout (species of concern), as identified in the RNA establishment report, dated April 12, 1996. Greater Sage-Grouse have been observed in the RNA (RNA Observation Report 2002, 2004, 2005). Two Greater Sage-Grouse leks occur 2 to 3 miles to the north and east of the RNA.

Foster Flat RNA contains pygmy rabbit, as identified in the RNA establishment report. Two Greater Sage-Grouse leks occur 2 to 3 miles east of the RNA. Greater Sage-Grouse have been documented within the RNA, and this area has long been used for hunting Greater Sage-Grouse (Taylor 2004).

South Bull Canyon RNA: RNA Observation Reports (2003) mention Greater Sage-Grouse use and nesting habitat and concern for level of grazing utilization. There are 10 Greater Sage-Grouse leks occurring within 1.4 to 2.4 miles of the RNA.

Dry Creek Bench RNA is within a block of land that the BLM is managing for Lahontan cutthroat trout, but there are no records of the species occurring within in the RNA. Three Greater Sage-Grouse leks occur between 1.5 and 2.5 miles north and west of the RNA.

Lake Ridge RNA has documented use by Greater Sage-Grouse; one female was observed in 2005 (RNA Observation Reports 2005). In 2004, RNA Observation Reports documented some use by domestic sheep potentially affecting forbs that are used by Greater Sage-Grouse. One Greater Sage-Grouse lek occurs in the RNA and 4 leks occur 0.1 to 1 mile north of the RNA boundary.

Spring Mountain RNA has 15 Greater Sage-Grouse leks occurring within 1.8 to 3.8 miles of the RNA to the east, south, and west.

Guano Creek - Sink Lakes RNA has documented occurrences of Greater Sage-Grouse and contains two more leks 1 to 2 miles to the north and southwest in the High Lakes ACEC. This currently ungrazed RNA has one occurrence of a BLM sensitive species, grimy ivesia (*Ivesia rhypara* var. *rhypara*), a G2 S1 state critically imperiled species, and another endemic, Crosby's buckwheat (*Eriogonum crosbyae*), a G3 S2 species (state imperiled) species.

The ivesia occupies 0.2 acres and contains 39 plants from observations in 2012. The Crosby's buckwheat occurs in 3 patches on 12 acres and had an estimated 1,990 plants in 2012.

Pallid bat, Sheldon tui chub, and Greater Sage-Grouse have been reported in the RNA. Another plant, Fassett's water starwort (*Callitiche fassettii*), a very uncommon submerged aquatic plant, has been

documented in Guano Creek. This species has a NatureServe rank of G1Q SNR (Globally imperiled but not ranked in the state). Not enough is known about its taxonomy and relation to other water starworts to be able to list it as a BLM sensitive species.

Fish Creek Rim RNA, has six Greater Sage-Grouse leks occurring within 2 to 3 miles to the west. Radio telemetry has documented Greater Sage-Grouse in the northern and southern portion of the RNA, in low sage habitats (Fish Creek RIM telemetry map 2014 [internal document]).

Wildfires likely altered vegetation components of wildlife habitat in some key RNAs since 2015, although the effects have not been monitored. The amount of habitat that was burned in these RNAs is so minor as to be undetectable using standard wildlife monitoring techniques.

3.7 LIVESTOCK GRAZING

The existing conditions and trends of livestock grazing in the planning area are described in the 2015 Final EIS in Section 3.8 (pgs. 3-87 to 3-93), hereby incorporated by reference. Livestock were grazing in the 13 key RNAs prior to the 2015 ARMPA. Because the 2015 ARMPA decision made those key RNAs unavailable to grazing, the 2-year closure process has not been initiated and grazing in the key RNAs has continued.

In addition, since the issuance of the 2015 ROD/ARMPA in September 2015, Table 2-6 has been updated to more accurately reflect district-verified calculations of acreage and AUMs made unavailable in all or portions of the 13 RNAs (see **Table 2-2** in **Chapter 2** of this RMPA/EIS). The acres unavailable for livestock grazing remain at 21,959, and the estimated unavailable AUM numbers changed from 2,388 to 1,772.

Prior to 2012, 8 of the 13 key RNAs had land health assessments completed (see Appendix N in the 2015 ARMPA). Standard 2 (Wetlands-Riparian/Wetlands) was not met due to livestock grazing in one allotment within the Black Canyon RNA and one allotment within the Foley Lake RNA. Management changes were implemented to make progress toward attainment of the standard. The results of these land health assessments from 2013 were not included in Appendix N of the 2015 ARMPA. Land health assessments were completed in the allotments in East Fork of Trout RNA (2015), Fish Creek Rim RNA (2013), and Rahilly Gravelly RNA (2013). All rangeland health standards were met, indicating that adjustments to current grazing management are not needed.

3.8 SOCIOECONOMICS

The existing socioeconomic conditions and trends within the planning area are described in the 2015 Final EIS in Section 3.21 (pgs. 3-164 through 3-194) and are hereby incorporated by reference. The scope of the economic analysis covered seven counties in eastern Oregon, which contain 12,083,622 acres of public land that are available for grazing and 771,773 AUMs of active use. The 2015 Final EIS noted the importance of livestock grazing to the three counties where the key RNAs occur; this is because the greatest amount of Greater Sage-Grouse habitat is concentrated in those counties.

Two of the key RNAs were closed to livestock grazing before the 2015 ARMPA via decisions in the prior, underlying land use plans. The 2015 ARMPA identified that 21,959 acres of public land would be unavailable to livestock grazing, resulting in a loss of 1,772 AUMs of active use.

At the statewide scale the loss of 1,772 AUMs (out of 771,773, or less than 1 percent) was found to be negligible; however, the economic impact on individual permittees, through expected loss of AUMs, was substantial in some cases. The 2-year notification process to reduce AUMs on the 13 RNAs due to lands being no longer available for livestock grazing has not been initiated, due to other ARMPA plan implementation priorities.

Chapter 4. Environmental Impacts

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**. The purpose of this chapter is to describe to the decision-maker and the public how the environment could change if either of the alternatives in **Chapter 2** were implemented. It is meant to aid in the decision of which alternative, if any, to adopt.

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

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

- The BLM planning team's knowledge of resources and the 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 process. At times, impacts are described using ranges of potential impacts or in qualitative terms.

4.2 Analytical Assumptions

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

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

- Sufficient funding and personnel would be available for implementing the final decision.
- Implementation-level actions necessary to execute any activity-level decisions in this LUPA would be subject to further environmental review, including that under NEPA.
- Direct and indirect impacts of implementing the LUPA would primarily occur on the public lands administered by the BLM in the planning area.
- The BLM would carry out appropriate maintenance for the functional capability of all developments.

- The discussion of impacts is based on best available data. Knowledge of the planning area and decision area and professional judgment, based on observation and analysis of conditions and responses in similar areas, are used for environmental impacts where data are limited.
- Restrictions (such as siting, design, and mitigation measures) would apply, where appropriate, to surface-disturbing activities associated with land use authorizations and permits issued on BLM-administered lands and federal mineral estate.
- Acreage figures and other numbers are approximate 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 qualitatively, when appropriate.
- Achieving or maintaining Standards for Rangeland Health and Guidelines for Livestock Grazing Management (described in Section 3.8 of the 2015 Final EIS, Livestock Grazing and Range Management) generally are effective in managing the effects on soils from livestock grazing when properly implemented and monitored. Grazing authorizations will be adjusted on a case-by-case basis when site-specific studies indicate changes in management are needed. Analysis of Soil Resources in the 2015 Final EIS, Section 4-17 (pgs. 4-281 to 4-300) are hereby incorporated by reference.

The BLM would continue to manage all RNAs for the values they were designated for, per district resource management plans, following existing management guidance and consistent with direction for PHMA.

The following information is the most current information available on conditions in the RNAs and is therefore used as the basis for the analysis in this chapter. As described in the 2015 Final EIS (pgs. 3-134 and 135), and hereby incorporated by reference, one of the guiding principles in managing RNAs is to prevent unnatural encroachment or activities that directly threaten or indirectly modify ecological processes or conditions. Permitted actions that could impair scientific or educational values of the RNA (including grazing) are generally limited, restricted, or not allowed so as to provide areas in the RNA that have intact ecological processes and conditions.

Oregon BLM Manual 1623, Section 37C says livestock grazing should be managed to promote maintenance of the key characteristics for which the area is recognized. These are areas that can serve as long-term baseline areas for plant community monitoring and as controls for BLM treatments and activities outside the RNA, including grazing treatments.

With the exception of the 2013 rangeland health assessments done in Lakeview District for Rahilly-Gravelly RNA, the 2013 Fish Creek Rim RNA, and the 2015 East Fork of Trout Creek RNA, recent rangeland health assessments have not been done on the RNA allotments since 2011. For the RNAs without recently completed rangeland health assessments (see **Chapter 3**, **Section 3.7** of this RMPA/EIS), it is not known at this time if grazing within those RNAs is maintaining the key characteristics, conditions, and ecological processes for which the RNAs were designated in the various district plans.

Prior to 2011, only 8 of the 13 RNAs had rangeland health assessments done: North and South Ridge Bully Creeks RNAs, Black Canyon RNA, Toppin Butte RNA, Fish Creek Rim RNA, Foley Lake RNA, Rahilly Gravelly RNA, and East Fork of Trout Creek RNA (Internal Summary of Land Health

Assessments, April 6, 2018). Rangeland health Standard 2 (watershed function-riparian/wetlands) was not met due to livestock grazing in one allotment within the Black Canyon RNA and one allotment within the Foley Lake RNA.

4.3 General Method for Analyzing Impacts

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

Type of impact—Impacts are characterized using the indicators described 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 southeast 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, the impacts of the management actions for a particular alternative on a specific resource are generally compared to the status quo or baseline for that resource; however, in order to properly and meaningfully evaluate the impacts, those expected under the Management Alignment Alternative should be measured against the impacts projected to occur under the No-Action Alternative. The No-Action Alternative is the baseline, as it represents what is anticipated to occur should the LUPAs not take place.

Irreversible and irretrievable commitment of resources is discussed in **Section 4.11**. Irreversible commitments of resources result from actions in which resources are considered permanently changed; irretrievable commitments of resources result from actions in which resources are considered permanently lost.

Impacts from the No-Action Alternative

The effects of the No-Action Alternative, or current management, of this RMPA/EIS were analyzed as the Proposed Plan (Section 4.4.10) in the 2015 Final EIS, and they are hereby incorporated by reference. The BLM has also reviewed new information to verify that the analysis in the 2015 Final EIS remains

sound; therefore, impacts from implementing the No-Action Alternative are substantially the same as those analyzed in the 2015 Final EIS, except as updated or made more specific in this RMPA/EIS.

Table 4-1, below, shows where information related to the impacts of the No-Action Alternative can be found in the 2015 Final EIS. The impact analysis and discussion in this chapter are more detailed than was possible in the 2015 Final EIS, due to the scale of analysis for that document.

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

Decision Topic	Related Resource Topic	Location in 2015 Final EIS
Modifying livestock grazing decisions within 13 RNAs	Greater Sage-Grouse	Chapter 4, Section 4.3 (GRSG and GRSG Habitat), pgs. 4-7 to 4-93
	Vegetation, including Noxious Weeds, Riparian Areas and Wetlands	Chapter 4, Section 4.4 (Vegetation), pgs. 4-94 to 4-122
	Fish and Wildlife	Chapter 4, Section 4.5 (Fish and Wildlife), pgs. 4-122 to 4-144
	Livestock Grazing	Chapter 4, Section 4.8 (Livestock Grazing and Range Management), pgs. 4-179 to 4-204
	Socioeconomics	Chapter 4, Section 4.20 (Social and Economic Impacts (Including Environmental Justice)), pgs. 4-324 to 4-357

The impacts of removing grazing from key RNAs is analyzed in the 2015 ARMPA, Section 4.4.10, pg. 4-121. Removing grazing would aid in the recovery of the limited riparian areas, playas, and mesic areas within the 13 key RNAs where grazing has been allowed. This is because these areas have been more heavily grazed than other areas within the key RNAs (TNC 1992; BLM 1996a, 1996c, 1996d, 1996f). Because little to no research has been conducted on the impacts of grazing on forbs and insects used by Greater Sage-Grouse and on special status plants, the BLM is uncertain how these resources would respond to not being grazed. Ungrazed comparison areas representing the seasonal needs of Greater Sage-Grouse are lacking (Beck and Mitchell 2000; Hockett 2002).

The assumption is that, by allowing natural succession to proceed without any livestock grazing and in the absence of invasive plants, the 13 key RNAs would have in increased native forb species richness and cover, especially for forb species that are palatable or preferred by livestock. Managing as unavailable for grazing those areas that contain any BLM sensitive plants would increase the protection for those species (Final EIS, page 4-100). Removing improper livestock grazing in the key RNAs that support special status species of fish and wildlife could reduce competition for forage and potentially increase Greater Sage-Grouse cover and nesting habitat, while protecting riparian areas that support riparian-dependent, aquatic, and fish species (2015 Final EIS, pg. 4-126). Impacts would vary depending on the extent of vegetation removal, type of habitat grazed, and timing of the grazing period.

Whether removal of grazing would reduce the risk of invasive plant spread into the key RNAs is uncertain, as there are many vectors for invasive plants besides livestock, but reducing the physical disturbance from grazing is likely to reduce one of those vectors. Implementation-level actions necessary

to close and eliminate grazing would be subject to further environmental review, including that under NEPA (2015 Final EIS, Section 4.2).

Impacts from Management Alignment Alternative

Table 4-2, below, summarizes how the potential decision of choosing the Management Alignment Alternative of this RMPA was previously considered in the 2015 Final EIS as Alternative A (No Action), and it is hereby incorporated by reference. Issues needing updates or more specific analysis are discussed under the resource headings in this chapter.

Table 4-2
Consideration of Management Alignment Alternative Components in the 2015 Final EIS

Plan Amendment Issue	Considered in 2015 Final EIS?
Modifying livestock grazing decisions within RNAs	Livestock grazing decisions in the key RNAs were considered and analyzed in the 2015 Final EIS as approved in the 2015 Greater Sage-Grouse Approved Resource Management Plan Amendment (for Oregon) and Record of Decision. The decision to make livestock grazing unavailable in 13 key RNAs is subject to change in this RMPA/EIS, which considers the key RNAs and the livestock grazing availability decision in more detail. The No-Action Alternative of the 2015 Final EIS (Chapter 2, Section 2.8.2; Appendix B; and Chapter 4, Section 4.4.4) considered that the livestock grazing decisions in the RNAs subject to change would continue to be available for livestock grazing. The Proposed Plan of the 2015 Final EIS (Chapter 2, Sections 2.6, 2.8, and 2.9; Appendix B; and Chapter 4, Section 4.8.10) described the impacts of making the key RNAs, subject to change in this RMPA/EIS, unavailable for livestock grazing.

The impacts of retaining grazing in the 13 key RNAs is discussed in the 2015 ARMPA in Section 4.4.4 (Alternative A) on pg. 4-106. Special status species in key RNAs open to grazing would remain vulnerable to grazing due to scattered and limited distribution and small populations (2015 Final EIS, pg. 4-100). Livestock grazing would continue to have a greater impact on the limited riparian areas, playas, and mesic areas within these key RNAs similar to what has been observed in the past. This is largely due to the limited availability of surface water in these areas. Because little to no research has been conducted on the impacts of grazing on forbs and insects used by Greater Sage-Grouse and special status plants, the BLM is uncertain how these species would respond. Whether continued grazing would increase the risk of invasive plant spread into the key RNAs is uncertain, as there are many vectors for invasive plants besides livestock.

4.4 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, Subpart 1502.22). If the information is essential to a reasoned choice among alternatives, it must be included or addressed in an EIS, unless the cost of obtaining such information is exorbitant. Knowledge and information is, and would always be, incomplete, particularly with infinitely complex ecosystems considered at various scales.

The best available information pertinent to the decisions to be made was used in developing both the 2015 ARMPA and this RMPA/EIS. The BLM made a considerable effort to acquire and convert resource data into digital format for use in the 2015 ARMPA planning process, from the BLM and from outside sources. That information has been considered in this RMPA/EIS and has been updated and supplemented as needed and appropriate.

Under the FLPMA, the inventory of public land resources is ongoing and continuously updated; however, certain information was unavailable for use in developing this RMPA/EIS because inventories either have not been conducted or are not complete.

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

- Comprehensive planning area-wide inventory of wildlife and special status species occurrence and condition
- GIS data used for disturbance calculations on private lands
- Site-specific surveys of cultural and paleontological resources
- The exact extent, location, and fine scale condition of Greater Sage-Grouse habitat for the key RNAs
- Effects of grazing on the elements and values for which the RNAs were designated in the district plans (prior to the 2015 ROD/ARMPA)

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 analyses would provide the opportunity to collect and examine site-specific inventory data to determine appropriate application of LUP-level guidance. In addition, the BLM and other agencies in the planning area continue to update and refine information used to implement this plan.

4.5 IMPACTS ON GREATER SAGE-GROUSE

General impacts from grazing on Greater Sage-Grouse are described in the 2015 Final EIS, Section 4.3, pgs. 4-7 to 4-94, and are hereby incorporated by reference. More specifically, pages 4-16 to 4-20 describe the impacts on Greater Sage-Grouse and its habitat from improper livestock grazing, an identified threat in the COT Report. However, properly managed livestock grazing is compatible with managing for Greater Sage-Grouse conservation outcomes.

The key RNAs are all within Greater Sage-Grouse habitat, identified as PHMA in the 2015 ARMPA; therefore, the goals, objectives, and management directions of the 2015 AMRPA overlay the various district plans and apply to both the No-Action Alternative and Management Alignment Alternative of this EIS. Under the No-Action Alternative the key RNAs would remain unavailable to livestock grazing. Under the Management Alignment Alternative grazing management would be governed by the livestock grazing provisions in the 2015 ARMPA. The exception is Livestock Grazing Objective 2 and Management Decision 1, which would be amended and the key RNAs would be available for livestock grazing. In

addition, under both alternatives the key RNAs would be required to meet rangeland health standards and other applicable policies.

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

Grazing impacts would vary under the Management Alignment Alternative, depending on site productivity, timing of grazing, stocking intensity, and duration of grazing within the 13 RNAs allocated as unavailable, but not currently closed to grazing. While ungrazed comparison areas, based on seasonal needs of Greater Sage-Grouse, are lacking (Beck and Mitchell 2000; Hockett 2002), current information on impacts of grazing suggest that impacts would be reduced or eliminated within areas closed to grazing under the No-Action Alternative; however, some impacts of historic overuse would persist for months or years (Davies et al. 2014). Degraded sagebrush communities may demonstrate little to no recovery with intermediate-term (five and six years) rest from grazing, as compared with well-managed, moderate grazing (Davies et al. 2016).

Three studies of how grazing may affect Greater Sage-Grouse populations have been published since 2015 (Carter et al. 2018; Hanser et al. 2018). In Wyoming, Monroe et al. (2017) found grazing effects depended on the timing and level of grazing. At high grazing levels, Greater Sage-Grouse populations declined when grazing occurred before the peak in vegetation productivity and increased when grazing occurred later. At low grazing levels, the effects of grazing were minimal and did not vary with the timing of when grazing occurred; however, the effects of grazing can depend on local vegetation productivity. One study in Montana found no evidence that rotational grazing systems or rest from grazing (12 months) increased nest success in the study area (Smith et al. 2017). The Montana study authors urged caution in extrapolating results to other areas because of different precipitation regimes. In another study, Dahlgren et al. (2015) hypothesized that sagebrush treatments, coupled with rest-rotation grazing, increased the amount of grass and created additional forb availability and subsequent Greater Sage-Grouse population increases, relative to surrounding populations.

The Management Alignment Alternative would result in fewer undisturbed areas within Oregon available for research in plant communities important to Greater Sage-Grouse to determine the impact of livestock grazing on Greater Sage-Grouse and their habitats. Beck and Mitchell (2000) indicated there is a lack of ungrazed comparison areas for evaluating livestock impacts on seasonal needs of Greater Sage-Grouse. Hockett (2002) noted the lack of large representative tracks of ungrazed habitat makes it nearly impossible to determine and monitor the actual consequences of livestock grazing. However, the USFWS has determined that improper livestock grazing is a secondary threat to Greater Sage-Grouse and its habitat range-wide, so impacts on Greater Sage-Grouse are likely minimal.

The 2015 Final EIS also addressed the effects of fire, stating that its Alternative A (Management Alignment Alternative in this RMPA/EIS) "allows for potentially less effective" fire and fuels management for habitat restoration (pg. 4-82).

4.6 IMPACTS ON VEGETATION, INCLUDING NOXIOUS WEEDS, RIPARIAN AREAS, AND WETLANDS

Many studies have demonstrated the importance of forbs to Greater Sage-Grouse, providing food both directly and indirectly by supporting insects and providing cover (e.g., Connelly et al. 2011; Dumroese et al. 2015; Pennington et al. 2016). Oregon BLM wildlife biologists have a list of high and moderate value species important to Greater Sage-Grouse that has been refined since the 2015 Final EIS (BLM Sage Grouse Forb List August 2017).

Forb richness and abundance are controlled by site characteristics and climate, with drought a particularly important driver (Blomberg et al. 2014; Pennington et al. 2016; Blomberg et al. 2017; Gibson et al. 2017; Pennington et al. 2017). Only a few studies have examined forb response to disturbance, such as fire, and even fewer have attempted to correlate forb response to drought status, changes in temperature and precipitation regimes, and soil water availability whether in the absence or presence of grazing (Davies et al. 2012a; Davis and Crawford 2015; Ellsworth et al. 2016; Pennington et al. 2016). A global literature review of the impacts of grazing on grouse species found too few studies that had enough detail concerning animal type, animal distribution, stocking rates, grazing timing, duration, and frequency, and similar factors to develop BMPs for grazing in Greater Sage-Grouse habitat (Dettenmaier et al. 2017).

Most of the recent studies in Oregon that include forb responses, and the responses of forbs consumed by Greater Sage-Grouse, involve juniper reduction with and without fire (e.g., Bates et al. 2014a, 2014b; Miller et al. 2014; Bates et al. 2017). One recent study examined the different impacts of mowing and burning sagebrush (Davies et al. 2012a, 2012b). The Miller et al. (2014) study excluded grazing for the duration of the study (4 years). The Bates et al. (2014b) study noted that post-treatment grazing occurred but did not include it as a variable. All other studies were unclear on whether grazing occurred post-treatment or not and did not include it as a variable.

None of the recent studies included weather/climate information beyond precipitation amount over the study period or soil water availability as a variable. All were inconsistent in noting whether any portion of the study period was in drought. Only Miller et al. (2014) provided any correlation on forb response, based on soil variables, such as soil temperature and moisture regime. Most recent studies in Oregon have been restricted to Cool-Moist Sagebrush sites (Davies et al. 2012b, 2012a; Bates et al. 2013, 2014a; Miller et al. 2014; Bates and Davies 2016; Bates et al. 2017), with only one study on a Warm-Dry Sagebrush site (Ellsworth et al. 2016).

Understanding what role, if any, livestock grazing may be playing in the responses of important forbs and insects to disturbance events, changing climate, and soil water availability requires that the BLM have access to long-term ungrazed control sites that cover a variety of ecological settings and habitats. Understanding which forb responses are due to changes in climate and which are due to the interaction between changing climate and grazing becomes ever more important for informing subsequent management direction. This is given the potential impacts of changing climate on Greater Sage-Grouse habitat (Bradley 2009, 2010; Bradley et al. 2010; Polley et al. 2013; Germino et al. 2014; Creutzburg et al. 2015; Bradley et al. 2016; Palmquist et al. 2016a, 2016b; Mankin et al. 2017).

General impacts of grazing on riparian/wetland habitat (including playas) are described in the 2015 Final EIS, Section 4.3, pgs. 4-16 through 4-20, and they are hereby incorporated by reference. The analytical

assumptions stated in the 2015 Final EIS on pg. 4-94 would remain the same, and they are also hereby incorporated by reference. These types of impacts would continue to occur in the 13 RNAs if and where livestock grazing is allowed.

New infestations of invasive plants remain possible, whether grazing is present or absent, due to the number of alternative vectors (e.g., wind, wildlife, and recreation users). Impacts would increase or decrease depending on the time and/or the season of use, grazing intensity, and duration. In drier years, where water availability is reduced, there would be a greater impact on riparian/wetland areas, due to the concentration of livestock.

Additional changes to grazing systems that could occur as a result of nonattainment of land health standards include, but are not limited to, change in season of use, temporary and/or permanent reduction of livestock numbers or AUMs, and implementation of range improvements that exclude livestock. Maintaining and improving riparian and wetland plant communities indirectly benefits livestock grazing and sagebrush obligate species by improving forage availability/quantity and water quality.

The No-Action Alternative would retain the decision to make livestock grazing unavailable in all or parts of 13 RNAs, per the 2015 ARMPA. All 15 key RNAs, including the two that were previously closed to grazing, would cover seven major vegetation types (**Table 4-3**) and 48 vegetation communities (**Table 4-4**), thereby representing both the geographic and climatic variability of conditions in Oregon's Greater Sage-Grouse habitat.

Table 4-3
Vegetation Types Found in Different Key RNAs Made Unavailable to Grazing under the 2015 ARMPA and the Two Key RNAs Already Closed to Grazing

Vegetation Type	Research Natural Area
Cool-Moist Sagebrush	East Fork Trout Creek, Fish Creek Rim, Lake Ridge, Mahogany Ridge, Rahilly-Gravelly, South Bull Canyon, Spring Mountain, Toppin Creek Butte
Ecotone between Cool-Moist and Warm-Dry Sagebrush	Black Canyon, Mahogany Ridge, North Ridge Bully Creek, South Bull Canyon, South Ridge Bully Creek,
Warm-Dry Sagebrush	Black Canyon, Dry Creek Bench, Foley Lake, Foster Flat, Guano Creek-Sink Lakes, Lake Ridge, North Ridge Bully Creek, Rahilly-Gravelly, South Bull Canyon, South Ridge Bully Creek, Spring Mountain, Toppin Creek Butte
Shallow-Dry Sagebrush	Black Canyon, Dry Creek Bench, Fish Creek Rim, Foley Lake, Foster Flat, Guano Creek-Sink Lakes, Rahilly-Gravelly, Spring Mountain
Mountain Brush	Dry Creek Bench, East Fork Trout Creek, Fish Creek Rim, Lake Ridge, Mahogany Ridge, Rahilly-Gravelly, Spring Mountain
Riparian-Wetland	Black Canyon, East Fork Trout Creek, Fish Creek Rim, Guano Creek-Sink Lakes, Lake Ridge, Spring Mountain
Playa	Foley Lake, Foster Flat, Guano Creek-Sink Lakes, Lake Ridge, Toppin Creek Butte

Table 4-4
Vegetation Types Found in Different Key RNAs Made Unavailable to Grazing under the 2015 ARMPA That Are Important Habitats to Greater Sage-Grouse at Some Point in Their Life Cycle (e.g. Nesting and Brood Rearing)

Vegetation Type	Plant Communities
Cool-Moist Sagebrush	Mountain big sagebrush/Idaho fescue Mountain big sagebrush-antelope bitterbrush/Idaho fescue Mountain big sagebrush-mountain mahogany/slender wheatgrass-bluebunch wheatgrass Mountain big sagebrush-antelope bitterbrush-mountain snowberry/Thurber's needlegrass Mountain big sagebrush-mountain snowberry/Idaho fescue Low sagebrush/Idaho fescue Wyoming big sagebrush-antelope bitterbrush/Idaho fescue
Ecotone between Cool-Moist and Warm-Dry Sagebrush	Mountain big sagebrush/bluebunch wheatgrass Wyoming big sagebrush/Idaho fescue Wyoming big sagebrush-antelope bitterbrush/bluebunch wheatgrass Wyoming big sagebrush-threetip sagebrush/Idaho fescue Wyoming big sagebrush-wild crab apple/Idaho fescue Wyoming big sagebrush-threetip sagebrush/bluebunch wheatgrass Threetip sagebrush/Idaho fescue Threetip sagebrush-wild crab apple/Idaho fescue Threetip sagebrush/bluebunch wheatgrass
Warm-Dry Sagebrush	Basin big sagebrush/Nevada bluegrass Basin big sagebrush/bluebunch wheatgrass Basin big sagebrush-Wyoming big sagebrush/bluebunch wheatgrass Wyoming big sagebrush/Idaho fescue-bottlebrush squirreltail Wyoming big sagebrush/needle-and-thread Wyoming big sagebrush/Thurber's needlegrass Low sagebrush/bottlebrush squirreltail-Idaho fescue Low sagebrush/bluebunch wheatgrass Low sagebrush/Idaho fescue-Thurber's needlegrass Low sagebrush/Thurber's needlegrass
Shallow-Dry Sagebrush	Low sagebrush/Sandberg bluegrass Stiff sagebrush/Sandberg bluegrass Black sagebrush/Sandberg bluegrass
Mountain Brush	Mountain mahogany-mountain snowberry/Idaho fescue Mountain mahogany-mountain big sagebrush/Idaho fescue Serviceberry-snowberry-mountain big sagebrush Snowberry-bittercherry complex Mountain big sagebrush-mountain snowberry/Idaho fescue Mountain mahogany-Oregon grape Mountain big sagebrush-mountain snowberry-wild crab apple Mountain mahogany-chokecherry scrub
Riparian-Wetland	Willow-mixed shrub Scouler's willow-aspen Wet meadow Aspen-white fir-ponderosa pine Willow Pond

Table 4-4
Vegetation Types Found in Different Key RNAs Made Unavailable to Grazing under the 2015 ARMPA That Are Important Habitats to Greater Sage-Grouse at Some Point in Their Life Cycle (e.g. Nesting and Brood Rearing)

Vegetation Type	Plant Communities
Playa	Silver sagebrush/Sandberg bluegrass Silver sagebrush/Nevada bluegrass Sliver sagebrush-green rabbitbrush Silver sagebrush/Baltic rush Silver sagebrush-basin wildrye

All vegetation types include multiple plant communities, averaging six to seven community types per major vegetation type. This level of variation would allow the BLM to understand how grazing may or may not be impacting a wide array of forbs and insects used by pre-laying hens and chicks in different ecological settings and in different types of years (wet, average, or dry).

Mesic habitats are particularly important for pre-laying hens and chicks (Donnelly et al. 2016; Freese et al. 2016; Pennington et al. 2016; Pennington et al. 2017) with late brood-rearing habitat. This is a shortage category in eastern Oregon due to the lack of surface water. Both the Wetland-Riparian and Playa major vegetation types provide late brood-rearing habitat, but the Playa type does so only in wet years; in dry years, it is typically dry and does not provide late brood-rearing habitat and may not provide early brood-rearing or pre-laying habitat.

The Management Alignment Alternative would reverse the 2015 ARMPA decision to make grazing unavailable in 13 of the 15 key RNAs. Livestock grazing would, therefore, be available in these 13 RNAs. Foster Flat and Guano Creek-Sink Lakes RNAs will remain closed to grazing. They were closed to grazing in the Three Rivers (1991) and Lakeview (2003) RMPs, respectively, and subsequent closure actions. These two RNAs include four major vegetation types and nine plant communities (**Table 4-5**), thereby providing a limited representation of the geographic and climatic variability in Oregon's Greater Sage-Grouse habitat.

Table 4-5
Vegetation Types and Plant Communities Available for Understanding the Impacts of Disturbances and Changing Climate on Forbs and Insects in the Absence of Livestock Grazing in the Key RNAs Closed to Grazing prior to the 2015 ARMPA

Vegetation Type	Research Natural Area	Vegetation Communities
Warm-Dry Sagebrush	Foster Flat, Guano Creek-Sink Lakes	Basin big sagebrush/bluebunch wheatgrass Wyoming big sagebrush/needle-and-thread
Shallow-Dry Sagebrush	Foster Flat, Guano Creek-Sink Lakes	Low sagebrush/Sandberg bluegrass
Riparian-Wetland	Guano Creek-Sink Lakes	Willow
Playa	Foster Flat, Guano Creek-Sink Lakes	Silver sagebrush/Nevada bluegrass Silver sagebrush-green rabbitbrush Silver sagebrush/Baltic rush Silver sagebrush/basin wildrye Silver sagebrush/Sandberg bluegrass

Conditions in Malheur County, which is generally lower in elevation and drier overall, would not be represented. This lower level of variation would reduce the BLM's ability to understand how grazing may or may not be impacting a more complete array of forbs and insects used by Greater Sage-Grouse in different seasons and different ecological settings.

Findings based solely on Foster Flat and Guano Creek-Sink Lakes RNAs could not be extrapolated to other vegetation types and plant communities or to the eastern portion of Oregon's Greater Sage-Grouse habitat. This was due to differences in climate and site conditions. Only one Riparian-Wetland vegetation community and only one Shallow-Dry Sagebrush vegetation community would be included in the potential study sites. The greatest number of vegetation communities would occur in the Playa major vegetation type, largely because playas are a dominant feature in both RNAs.

Although playas could be considered a riparian-wetland type, they serve this function only in wet years. During drought periods, these playas are dry and not used by Greater Sage-Grouse for late brood-rearing and may not be wet enough to provide forbs for pre-laying hens and insects for early brood-rearing.

4.7 Impacts on Fish and Wildlife

General impacts of livestock grazing on wildlife are described in the 2015 Final EIS, Section 4.5, pgs. 4-122 to 4-141, and they are hereby incorporated by reference. Under the No-Action Alternative, grazing would be closed in part or all of 13 key RNAs. Implementation-level actions necessary to close and eliminate grazing would be subject to further environmental review, including that under NEPA (2015 Final EIS, Section 4.2). Since 2015, the types of impacts described in the 2015 Final EIS could have continued to occur in the key RNAs that are open to grazing.

Fish and wildlife that use rangelands can benefit from the proper management of livestock. These benefits include providing a sustainable, diverse, and vigorous mixtures of native vegetation for forage and habitat. If grazing results in overutilization of forage by livestock, it could lead to increased competition with wildlife for forage and potentially reduced hiding cover and nesting habitat for other species.

Livestock could also spread invasive plants, which would degrade habitats; however, BLM grazing policy requires that all wildlife habitat achieve or make significant progress toward achieving land health standards, including the standard for wildlife and special status species. For allotments not meeting the BLM's Standards for Rangeland Health and where livestock grazing is determined to be a significant factor, appropriate changes in grazing management would be implemented prior to the start of the next grazing year.

4.8 Special Status Species

Under the No-Action Alternative, livestock grazing within part or all of 13 key RNAs is unavailable. Implementation-level actions necessary to close and eliminate grazing would be subject to further environmental review, including that under NEPA (2015 Final EIS, Section 4.2). All federal actions also must comply with ESA consultation requirements, and all implementation actions would be subject to further review before site-specific projects are authorized or implemented. If adverse impacts are identified, mitigation measures, including avoidance, would be implemented to minimize or eliminate the impacts.

Impacts of grazing on special status species of fish and wildlife are described in the 2015 Final EIS, Section 4.5, pgs. 4-122 to 4-144, and they are hereby incorporated by reference. Special status species that use the key RNAs can benefit from proper management of livestock (2015 Final EIS, pg. 4-126). Benefits include providing sustainable, diverse, and vigorous mixtures of native vegetation for forage.

Also, proper management of grazing livestock can control invasive plants and reduce fuel accumulations, protect intact sagebrush habitat, and increase habitat extent and continuity. Conversely, improper grazing can result in overutilization of forage by livestock, leading to increased competition with wildlife for forage and potentially reduced cover and nesting habitat. Livestock can spread invasive plants, which 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.

Some special status species are riparian dependent. Livestock often use riparian and wetland areas for water and shade. Improper livestock grazing of riparian areas can degrade habitat condition for riparian-dependent, aquatic, and fish species. Elimination of livestock in riparian systems at Hart Mountain National Antelope Refuge in southeastern Oregon resulted in decreased channel widths and eroding banks and the amount of bare soil and increased the herbaceous cover (Batchelor et al. 2015).

In another study on the Hart Mountain National Antelope Refuge, Earnst et al. (2012) recorded substantial regeneration of aspen shoots, increased densities of riparian forbs and shrubs, and increased avian abundances in riparian and quaking aspen woodland 12 years after grazing had been eliminated. Removal of livestock grazing from riparian areas of the key RNAs over the long term would likely produce similar benefits to habitat for riparian-dependent special status species.

BLM sensitive plant species are known to occur in 7 of the 15 key RNAs (see **Chapter 3** of this RMPA/EIS). Complete botanical inventories of the RNAs are lacking, so additional BLM sensitive plants could occur and be undocumented. There are no known federally listed plants in the 13 key RNAs. As stated on pg. 4-100 in the 2015 Final EIS, managing areas as unavailable to livestock grazing increases protection of any special status species in the closed area.

Two species adapted to playas occur at Foley Lake and Toppin Butte RNAs. Columbia cress (*Rorippa columbiae*) and profuse flowered pogogyne (*Pogogyne floribunda*) occur around the margin of Foley lake. A small enclosure protects most of the Columbia cress, but the pogogyne is within the grazed pasture. Under the No-Action Alternative the enclosure would likely be removed once it is replaced by a larger exclosure under a separate NEPA environmental assessment.

At Toppin Creek Butte RNA, profuse-flowered pogogyne, which is a former candidate for listing and a USFWS species of concern, occurs at Bull Flat, which is also grazed. Bull Flat playa is one of the only places for water in the RNA. The last observation of profuse-flowered pogogyne was in 2005, and an estimated 4,000 plants were documented under the silver sage (GeoBOB 2018).

These tiny, diminutive annual plants in the mint family are prolific seed producers, and seed can remain viable for many years, an evolutionary advantage for drought years in playas and vernal systems. In wet years the annual plants germinate in the fall and winter and reproduce and then die back in the spring; in drought years they remain dormant. The assumption is that the plant still occurs at the site; however, there is no recent information on the effects of grazing on that species at the playa; however, in a

conservation status report, Dr. Robert Meinke (2006) documented concern about the grazing impact at Bull Flat and on the population at the Foley Lake RNA. The concern was physical grazing impacts could lead to introduction of invasive species adapted to the playa, which could outcompete the pogogyne. The removal of grazing from these key RNAs would remove these potential threats.

The Rahilly Gravelly RNA has several occurrences of Cooper's goldflower (*Hymenoxys cooperii*), a type of aster, in the Sucker Creek pasture. With only 400 plants documented in 2014 at five sites (GeoBOB 2018), this is a small population and small populations are inherently vulnerable; the removal of grazing may benefit the species. In a recent rangeland health assessment for Rahilly Gravelly allotment, however, it met all standards for rangeland health. Recent vegetation plots, specifically in the RNA and in the Sucker Creek pasture, which was to be closed, documented functioning plant communities rich in forbs, good cover for Greater Sage-Grouse, and low cover of invasive species. The level of grazing appears light and to be maintaining the RNA elements. Grazing in this pasture is on a rest and rotation system, with alternating years being rested from grazing.

Cooper's goldflower is likely a moderately important species for Greater Sage-Grouse as food and substrate for insects for hens and chicks. It occurs close to a Greater Sage-Grouse lek and near nesting/brood-rearing areas. At the northern edge of its range in the Great Basin (this is the most northerly documented location), the exact effect of grazing on Cooper's goldflower is unknown. It flowers later in the summer and early fall, so depending on the season of use it may or may not be grazed by cattle. Many aster species are browsed, but whether this is a preferred species by cattle is not known, so the effect of grazing is unknown.

In the East Fork of Trout Creek RNA, large areas contain rock melic (*Melica stricta*), a former BLM sensitive species and a perennial grass. Since large populations of rock melic are known in the Trout Creek Mountains, outside the RNA, the removal of grazing in the small RNA would have little effect on the species.

Mahogany Ridge RNA has three small occurrences of the BLM sensitive plant Owyhee clover (*Trifolium owyheense*). Legumes and clover species are favored by cattle, so the removal of grazing would likely benefit this BLM sensitive species. The current impact on the population is not known. The population was last visited in 2001, when 2,000 plants were documented at the three sites (GeoBOB 2018). Native clovers are also high value forb species for Greater Sage-Grouse hens and chicks, but utilization by Greater Sage-Grouse at these sites is not known.

The North Ridge of Bully Creek has a population of thyme-leaved buckwheat (*Eriogonum thymoides*), a former BLM sensitive species that is still tracked by the Oregon Biodiversity Information Center as a List 3 species (a review species). There is no information on the status of this occurrence or any effects from current grazing. Buckwheat species are favored by Greater Sage-Grouse hens and chicks for food and substrate for insects, but utilization by Greater Sage-Grouse at this site is not known.

Several BLM sensitive plants occur in Guano Creek-Sink Lakes RNA. As this RNA is already closed to grazing and would continue to be closed to livestock grazing under both alternatives, there would be no change in effects on special status species.

Under the Management Alignment Alternative, the decision from the ARMPA (2015) to remove grazing from the 13 out of the 15 RNAs would be reversed. Grazing can have direct and indirect effects on BLM

sensitive plants. Direct effects would occur from direct consumption (if the plant is palatable), reduction in reproductive capacity (fewer flowers), and direct physical disturbance from being trampled or crushed by loafing cattle. Indirect effects tend to occur from grazing that modifies the environment, which later affects the plants. For instance, improper, repeated, or long duration grazing can reduce vegetation cover of selected plants (Davies et al. 2014) and can increase the percentage of bare ground and loss of biological crusts (Anderson et al. 1982; Jones and Carter 2016). This could open niches to be invaded by exotic or invasive species, including exotic annual forbs and annual grasses (Hayes et al. 2003; Beschta et al. 2014). The grasses and forbs could then compete with sensitive plants for water, space and nutrients.

As stated in Davies (2014) the shifts in vegetation and other effects depends on the grazing system, the timing, intensity, duration of grazing, the plant community composition, the kind and class of grazing animals, the site characteristics, and interactions between grazing and other disturbances, such as fire. Compared with the No-Action Alternative, there would be an increased risk of loss of BLM sensitive plant individuals from direct and indirect effects, potentially decreasing population size and resulting in an increased potential for extirpation at the site scale.

The Columbia cress population would likely be maintained in the existing enclosure at Foley Lake RNA. In a species conservation strategy prepared for the BLM (*Rorippa columbiae* Conservation Strategy 2017), grazing was identified as one of the major threats to this species. At Foley Lake, a long-term exclosure has documented an increase in Columbia cress in the enclosure and a decrease outside of it.

Profuse-flowered pogogyne would still be subject to direct and indirect effects from grazing in the playas at Foley Lake and Toppin Creek RNA. As most of the sensitive plant populations in the key RNAs have small areas of occupied habitat, and many with small population size, they are inherently vulnerable to disturbance (Kaye et al. 1997), including grazing, and other random events that could extirpate populations.

4.9 IMPACTS ON LIVESTOCK GRAZING MANAGEMENT

General impacts on grazing are described in the 2015 Final EIS, Section 4.8, pgs. 4-179 to 4-204, and they are hereby incorporated by reference. The analytical assumptions stated in the 2015 Final EIS on pg. 4-180 would remain the same.

The 2015 ROD/ARMPA made the key RNAs unavailable for livestock grazing; however, the 2-year process required to remove livestock from the area was never initiated and livestock grazing use has remained unchanged.

The No-Action Alternative would retain management direction to remove grazing from key RNAs as identified in the 2015 ROD/ARMPA. The impacts of this action as identified in the 2015 Final EIS have not yet been realized given that action has not been taken under the federal grazing regulations. However, the long-term impacts of properly managed livestock grazing, identified in the 2015 Final EIS (Proposed Plan Alternative), would remain the same. The Management Alignment Alternative would represent a change in land use allocation; however, no actual management change or impact would occur on the ground since permitted grazing has not been formally removed from the key RNAs. The impact of properly managed livestock grazing on Greater Sage-Grouse habitat in the key RNAs would be the same in the short term (within three years) under both Alternatives A and B.

The contrasting impacts of proper and improper livestock grazing on Greater Sage-Grouse, Vegetation, Fish and Wildlife, and Special Status Species are discussed in detail in this RMPA/EIS in **Sections 4.5**, **4.6**, **4.7**, and **4.8** respectively. As noted in other sections of this EIS, all activities and uses within Greater Sage-Grouse habitats will follow existing and current land health standards (Standards for Rangeland Health and Guidelines for Livestock Grazing Management, 1997).

Impacts of improper livestock grazing on Greater Sage-Grouse and its habitat were discussed in detail in the 2015 FEIS; see Section 4.3 (pages 4-7 to 4-94, and specifically pages 4-16 to 4-20), Sections 4.4 (page 4-112), 4.5 (page 4-133), 4.7 (4-170), and are hereby incorporated by reference. Pages 4-16 to 4-20 describe the impacts of improper livestock grazing on Greater Sage-Grouse as an identified threat in the COT Report (USFWS 2013). The 2015 FEIS noted that improper grazing could result in overutilization of forage by livestock, leading to increased competition with wildlife for forage, and potentially reduced cover and nesting habitat for other species. Livestock could also spread invasive plants, which would degrade habitats. Special status wildlife could be displaced from their habitats, which could increase competition for resources in adjacent habitats. Impacts would vary depending on the extent of vegetation removal, type of habitat impacted, and season of use and duration of the grazing period. Livestock could degrade riparian areas, which could impact riparian-dependent, aquatic, and fish species.

The 2015 FEIS also discussed the beneficial impact proper livestock grazing can have on Greater Sage-Grouse and its habitat (Sections 4.3, 4.4, 4.5 and 4.8). Sections 4.5, 4.6, 4.7, and 4.8 of this EIS similarly discuss the beneficial impact of properly managed grazing on habitat conditions for Greater Sage-Grouse. When properly grazed beneficial impacts can include sustainable, diverse, and vigorous mixtures of native vegetation for Greater Sage-Grouse forage and habitat. In addition, proper management of grazing livestock can control invasive plants and reduce fuel accumulations, protect intact sagebrush habitat, and increase habitat extent and continuity.

Under the No-Action Alternative there would be additional range improvements constructed (e.g., additional fencing to exclude livestock), some existing range improvements could be removed or modified, and salt and mineral blocks would be removed. Range improvements are not considered a surface-disturbing activity subject to the 3 percent cap.

The 2015 Final EIS describes the nature and types of impacts from new and renewed permits and leases, range improvements, construction and maintenance of range improvements, and the continued importance of livestock grazing to local economies (pgs. 4-201 to 4-204); these impacts are hereby incorporated by reference.

In addition, Section 4.8.10 of the 2015 Final EIS addresses the direct impacts on livestock grazing management from making areas unavailable to grazing, limiting available AUMs, and changing or modifying grazing strategies, such as changing season of use, rotation systems, or intensity and duration of use (pgs. 4-201 to 4-204); these impacts are hereby incorporated by reference. Similarly, the section discusses direct and indirect impacts on permittees if management systems change, AUMs are reduced, or areas are unavailable to livestock grazing (pgs. 4-201 to 4-204); these impacts are hereby incorporated by reference.

The impacts of implementing the No-Action Alternative are the same as described in the 2015 Final EIS. Implementation of this alternative would require construction of approximately 39 miles of fence (see pgs. 4-203 and 4-280). Placement and construction of fencing would require site-specific, project-level

NEPA analysis and appropriate surveys. There would be impacts on the operators and their livestock grazing management through changes to grazing practices (see **Section 4.10** of this RMPA/EIS).

The analytical assumptions stated in the 2015 Final EIS on pg. 4-180 would remain the same: under the Management Alignment Alternative, the RNAs would have to meet or make significant progress toward meeting rangeland health standards.

Livestock continue to be an important component of the local economy. In addition, livestock grazing would need to support the purposes of the RNAs, as described in **Section 1.3** of this RMPA/EIS.

The fencing needed to implement the No-Action Alternative would not need to be constructed under the Management Alignment Alternative. There would be no impacts on the operators and their livestock grazing management through changes to grazing practices or authorized use (see **Section 4.10** of this RMPA/EIS).

4.10 IMPACTS ON SOCIOECONOMICS

The general socioeconomic impacts described in the 2015 Final EIS, Section 4.20, pgs. 4-324 through 4-333 and pgs. 4-348 to 4-355, remain valid and are hereby incorporated by reference. The analytical assumptions stated in the 2015 Final EIS on pg. 4-325 remain the same for this analysis. In the 2015 Final EIS, the IMPLAN model was used for the economic analysis. That quantitative analysis remains valid, but the impact of making the key RNAs unavailable to livestock grazing was at the scale of the 2015 planning area (more than 12 million acres). The analysis in this RMPA/EIS is limited to the key RNAs and is more qualitative, based on a lack of financial information about the individual operators.

No-Action Alternative

The BLM assumes that a loss of AUMs will result in a socioeconomic impact on permittees. Construction and maintenance of fences are an economic cost to either the operator, the government, or both and are costs in both the short term and long term.

Under the No-Action Alternative, all or parts of the key RNAs would be unavailable to livestock grazing. Actual closure and reduction of AUMs would be determined by the BLM Authorized Officer. Minor loss of acreage that does not affect an allotment's livestock carrying capacity, forage use levels, or distribution patterns may not merit the need for permitted use reductions.

If the magnitude of the decrease in available public land acreage for grazing and associated forage loss cannot be absorbed into the remaining permit area, then the direct impact would be a reduction in AUMs. This would result in a direct economic impact on the operator, because they would need to reduce herd size, find alternative pasture, increase the time when they provide feed and water on the base property, or some combination of the three.

Preliminary analysis indicates that in at least 5 of the 13 key RNAs (Black Canyon, Fish Creek Rim, Rahilly-Gravelly, Spring Mountain, and Toppin Creek Butte) there would be direct economic impacts on permittees due to the loss of AUMs. All permittees would likely experience management changes (e.g., rotation or season of use) due to new fencing and loss of acres available to grazing.

Management Alignment Alternative

There would be no impact on the livestock operators from continuing grazing in the key 13 RNAs. No additional fencing would need to be constructed or maintained along with the associated cost impacts.

4.11 CUMULATIVE EFFECTS ANALYSIS

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

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

This RMPA/EIS incorporates by reference the analysis in the 2015 Final EIS, which comprehensively analyzed the cumulative impacts associated with the planning decisions under consideration in that process, including the impacts associated with what became the Selected Alternative in the 2015 ROD. The 2015 Final EIS thus evaluated the cumulative impacts associated with the No-Action Alternative in this RMPA/EIS, as well as the cumulative impacts associated with its Management Alignment Alternative; it comprises planning decisions evaluated by the 2015 Final EIS; therefore, the Management Alignment Alternative's effects, including its cumulative effects, are entirely within the range of effects analyzed by the 2015 Final EIS. This includes the cumulative impacts associated with the other five state-wide BLM RMPA/EISs occurring in the Greater Sage-Grouse range and similar plan amendments being undertaken by the Forest Service.

While the analysis for the 2015 Final EIS is quite recent, the BLM has reviewed conditions in Oregon to verify that they have not changed significantly. The agency's assessment that conditions and cumulative impacts have not changed significantly is based, in part, on the USGS science review (see **Chapter 3**), as well the BLM's review of additional past, present, and reasonably foreseeable actions in 2018.

Because the nature and context of the cumulative effects scenario has not appreciably changed since 2015, and the 2015 analysis covered the entire range of the Greater Sage-Grouse, the cumulative effects analysis in the 2015 Final EIS applies to this planning effort and provides a foundation for the BLM to identify any additional cumulative impacts.

No Oregon-specific cumulative impacts were identified that had not already been analyzed and discussed in the 2015 Final EIS.

Unless otherwise addressed in this chapter, the cumulative effects of the alternatives analyzed in this RMPA/EIS were covered under the 2015 Final EIS. This includes the incremental impacts across the

range of BLM-administered lands being amended in concurrent plan amendment efforts. See Chapter 5 of the 2015 Final EIS, which is hereby incorporated by reference for the resources in **Table 4-6**.

Table 4-6
Cumulative Effects
Analysis Incorporated by Reference

Resource Topic	Location of Cumulative Effects Analysis	Additional Cumulative Impacts not Analyzed in the 2015 Final EIS
Greater Sage-Grouse	Chapter 5, Section 5.3, pg. 5-2	No additional cumulative impacts were identified.
Vegetation, Including Noxious Weeds, Riparian Areas and Wetlands	Chapter 5, Section 5.6, pg. 5-137	No additional cumulative impacts were identified.
Fish and Wildlife	Chapter 5, Section 5.7, pg. 5-139	No additional cumulative impacts were identified.
Livestock Grazing	Chapter 5, Section 5.10, pg. 5-144	No additional cumulative impacts were identified.
Socioeconomics	Chapter 5, Section 5.22, pg. 5-177	No additional cumulative impacts were identified.

The increased flexibility in these amendments can allow for responsible development of other uses in Greater Sage-Grouse habitat and may reduce costs to proponents; however, it is not expected to result in a large increase in development proposals on public land.

Similarly, the increased protections from the 2015 Final EIS have not resulted in a large decrease in ROW applications or an increase in rejected applications; therefore, the changes proposed under the two alternatives analyzed in this RMPA/EIS are not expected to result in any changes to the rate of development in Oregon or in its economy.

Some 350 species of plants and wildlife rely on sagebrush steppe ecosystems. They coexist with Greater Sage-Grouse and may be similarly affected by development or disturbance; however, nothing in the considered alternatives would lessen the BLM's authority nor responsibility to provide for the needs of special status species, as described in BLM RMPs, policies, and laws, including Manual 6840, the Endangered Species Act, and FLPMA. Increased flexibility for other uses within Greater Sage-Grouse habitat does not necessarily increase potential impacts on other wildlife or plant species. Site-specific NEPA analysis, including an evaluation of impacts on special status species, is required for on-the-ground projects within the planning area.

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

Under the Management Alignment Alternative, 21,959 acres in 13 key RNAs would be available for livestock grazing. As described more fully in **Section 4.5**, Impacts on Greater Sage-Grouse, this change in acres available for livestock grazing would not appreciably impact Greater Sage-Grouse or other resources or resource uses. This is because, as with all livestock grazing, such grazing in these areas would be subject to standards that ensure land health is maintained and improper grazing will be managed in keeping with applicable laws and BLM regulations; therefore, there would be no appreciable

additive impact from the implementation of the Management Alignment Alternative, as compared to the No-Action Alternative.

Cumulatively, because the individual management actions considered under the Management Alignment Alternative are not expected to have appreciable additive impacts, if any, the environmental consequence of implementing the Management Alignment Alternative is similar to the No-Action Alternative.

Table 4-7 represents the past, present, and reasonably foreseeable actions across the entire range for Greater Sage-Grouse, which are separated by state. When assessing the cumulative impact of the RMPA/EIS on Greater Sage-Grouse and its habitat, there are multiple geographic scales that the BLM has considered, including the appropriate WAFWA management zone. WAFWA Management Zones have biological significance to Greater Sage-Grouse. Established and delineated in 2004 in the *Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats* (Connelly et al. 2004), the zones are based on floristic provinces that reflect ecological and biological issues and similarities, not political boundaries.

At the regional scale, WAFWA Greater Sage-Grouse management zones and responsible BLM offices include I (Great Plains: BLM Montana and Wyoming), II (Wyoming Basins: BLM Wyoming, Colorado, and Utah), III (Southern Great Basin: BLM Nevada, Northeastern California, and Utah), IV (Snake River Plain: BLM Idaho, Oregon, Nevada, Colorado, Utah, and Montana), V (Northern Great Basin: BLM Oregon, Northeastern California, and Nevada), VI (Columbia Basin: BLM Oregon), and VII (Colorado Plateau: BLM Northwest Colorado and Utah). These zones are an important resource for Greater Sage-Grouse management; and at a regional scale, the following projects are past, present, and reasonably foreseeable that cumulatively effect one or more of the WAWFA management zones. For the Oregon, those actions in WAFWA Zones IV, V, and VI, which overlap the Idaho, Oregon, Nevada, northeastern California, Colorado, and Utah, would have the greatest potential to contribute to cumulative effects. Note that not all of the projects listed for Idaho, Oregon, Nevada, northeastern California, Colorado, and Utah are in WAFWA Zones IV, V, and VI, and so may not contribute to cumulative effects.

Further, the entire sum of the past, present, and reasonably foreseeable actions listed below represent cumulative effects across the range of Greater Sage-Grouse habitat and management areas. These effects are important to consider for future management of the species as a whole, and are not solely being analyzed at the local or state level. This is why all ongoing BLM RMPAs/EISs refer to every past, present, and reasonably foreseeable action across all states undergoing a plan amendment.

Wildland fire and invasive species remain the greatest threats to Greater Sage-Grouse in the Great Basin. Between 2008 and 2017, wildfires burned an average of approximately 900,000 acres per year in Greater Sage-Grouse habitat management areas range-wide[1]; this is within the range of projected wildland fire analyzed in the 2015 Final EIS. The BLM has committed resources to habitat restoration and has treated 1.4 million acres of Greater Sage-Grouse habitat range-wide over the past 5 years.

[1]Removing 2012 and 2017, which were above-average wildland fire years, the 8-year average is approximately 500,000 acres burned per year.

Table 4-7
Range-wide Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Action	Type	Effects
Great Basin		
Habitat Restoration Programmatic EIS	Great Basin-wide programmatic habitat restoration project	Programmatic document effects will be realized when the field implements projects. This action will provide opportunities to improve and enhance habitat through vegetation treatments.
Fuel Breaks Programmatic EIS	Great Basin-wide programmatic habitat fuel break project	Programmatic document effects will be realized when the field implements projects. This action will help to reduce the loss of habitat due to catastrophic fires.
Northwest Colorado		
Integrated program of work	Habitat restoration and improvement projects	Potential localized, short-term, adverse impacts on Greater Sage-Grouse habitat, with beneficial long-term impacts. Actions are consistent with those foreseen in the 2015 Final EIS and are therefore within the range of cumulative effects analyzed in the 2015 Final EIS.
Travel management	White River Field Office: Area-wide travel designations being considered through an ongoing plan amendment Little Snake Field Office: Travel Management plan, identifying route designations consistent with criteria in the 2015 LUPA	These actions represent implementation of objectives from 2015 ARMPA to prioritize travel management in Greater Sage-Grouse habitat. Impacts are covered in the cumulative impacts of the 2015 Final EIS as reasonably foreseeable.
Continued oil and gas development	Disturbance and fragmentation	Development is consistent with the reasonably foreseeable development scenarios analyzed as part of the 2015 Final EIS and the associated field office RMPs. Additional impacts are expected to be within the range analyzed in 2015 Final EIS cumulative impacts analysis.
Plans		
Northwest Colorado Programmatic Vegetation Treatment Environmental Assessment (DOI-BLM-CO-N000-2017-0001-EA) decision	Programmatic NEPA document for streamlining habitat treatments in sagebrush	Impacts were consistent with those identified in the 2015 Final EIS; the Programmatic Vegetation Treatment EA was to facilitate implementation of projects to achieve the vegetation objectives.
Idaho		
Wildland fires 2015–2017	BLM: Past acres burned on BLM-administered land	534,744 acres of HMA burned since the ROD was signed in 2015. Post-fire rehabilitation was implemented. Too soon to determine the effectiveness of rehabilitation.
Habitat treatments 2015–2017	BLM: Past habitat improvement projects	431,295 acres treated to restore or improve potential Greater Sage-Grouse habitat. Too soon to determine the effectiveness of treatment.

Table 4-7
Range-wide Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Action	Type	Effects
ROWs issued 2015–2017	BLM: Past ROWs issued on BLM-administered land	97 ROWs were issued in the planning area but **fewer than 10 were in Greater Sage-Grouse habitat and resulted in new habitat loss**. The effects were mitigated using the mitigation hierarchy.
Soda Fire restoration	BLM: Present habitat restoration and fuel break construction	Restoration of previously burned Greater Sage-Grouse habitat. Results in a net benefit to Greater Sage-Grouse habitat.
Twin Falls Vegetation Project	BLM: Present habitat treatment project that improves Greater Sage-Grouse habitat district-wide	Restoration of Greater Sage-Grouse habitat and improved rangeland conditions. Results in a net benefit to Greater Sage-Grouse habitat.
Idaho Falls Vegetation Project	BLM: Present habitat treatment project that improves Greater Sage-Grouse habitat district-wide	Restoration of Greater Sage-Grouse habitat and improved rangeland conditions. Results in a net benefit to Greater Sage-Grouse habitat.
Natural gas-producing well near Weiser, Idaho	Private: Present active gas well on private land	Well is not in Greater Sage-Grouse habitat.
Conifer removal	NRCS: Present (2018) 1,862 acres of conifer removal on private land to improve Greater Sage-Grouse habitat	Conifer removal would improve Greater Sage-Grouse habitat and open areas to Greater Sage-Grouse that were previously unavailable because of juniper encroachment.
Weed treatments	NRCS: Present (2018) 95 acres of weed treatments on private land to reduce noxious weeds in Greater Sage-Grouse habitat	Weed treatments allow the native vegetation to outcompete weeds on treated acres.
Water development	NRCS: Present (2018) 21,308 feet of pipeline and 40 watering tanks installed on private land	Water development to move livestock out of natural springs and wet meadows
Pending ROWs 2015–2017	BLM: Future ROW under analysis on BLM-administered land	123 ROW applications have been submitted and are pending review and analysis.
Boise District Vegetation Project	BLM: Future habitat treatment project that improves Greater Sage-Grouse habitat district-wide	Restoration of Greater Sage-Grouse habitat and improved rangeland conditions result in a net benefit to Greater Sage-Grouse habitat.
Tristate Fuel Breaks Project	BLM: Future Greater Sage-Grouse habitat protection	Fuel breaks would protect habitat from wildfires. Some sagebrush may be lost during fuel break construction. Results in a net benefit to Greater Sage-Grouse habitat.
Bruneau-Owyhee Sage-Grouse Habitat Project (BOSH)	BLM: Future removal of juniper encroaching into Greater Sage-Grouse habitat	BOSH would remove encroaching juniper from Greater Sage-Grouse habitat and render the habitat usable for Greater Sage-Grouse. Results in a net benefit to Greater Sage-Grouse habitat.

Table 4-7
Range-wide Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Action	Type	Effects
Conifer removal	NRCS: Future (2019–2023) 5,541 acres of conifer removal on private land to improve Greater Sage-Grouse habitat	Conifer removal would improve Greater Sage-Grouse habitat and open areas to Greater Sage-Grouse that were previously unavailable because of juniper encroachment.
Weed treatments	NRCS: Future (2019–2023) 357 acres of weed treatments on private land to reduce noxious weeds in Greater Sage-Grouse habitat	Weed treatments allow the native vegetation to outcompete weeds on treated acres.
Water development	NRCS: Present (2019–2023) 82,502 feet of pipeline and 46 watering tanks installed on private land	Water development to move livestock out of natural springs and wet meadows
Nevada and Northeast California		
Wildland Fires 2015-2017	BLM: Past – Acres burned on BLM administered land	Approximately 1.3 million acres of HMA burned between 2015 and 2017. Post fire restoration is being implemented as described below.
Fire Restoration (Emergency Stabilization and Rehabilitation)	BLM: Past and Present – Habitat restoration following wildland fires	1.8 million acres of habitat are either currently being treated, or scheduled to be treated according to specific prescriptions outlined in Emergency Stabilization and Burned Area Rehabilitation plans following wildfire.
Habitat Treatments	BLM Past – Habitat improvement projects	Over 176,000 acres of Greater Sage-Grouse habitat was treated between 2015 and 2017 to maintain or improve conditions for Greater Sage-Grouse. Treatments included conifer removal, fuel breaks, invasive species removal and habitat protection/restoration.
Land Use and Realty (issued and pending) 2015-2018	BLM: Past ROWs issued on BLM land	227 ROWs were issued in the planning area between 2015 and 2017. This includes amendments and reauthorizations, which may not have resulted in new disturbance. For ROWs occurring in Greater Sage-Grouse habitat, effects were offset using the mitigation hierarchy.
	BLM: -Future pending	85 ROW applications are pending review and analysis. New ROWs would be held to the same mitigation standard under the management alignment alternative as described in the 2015 EIS, so no additional cumulative impacts beyond those described in 2015 are anticipated. In addition, BLM Nevada is also currently evaluating a proposed withdrawal for expansion of the Fallon Naval Air Station, Fallon Range Training Complex for defense purposes.

Table 4-7
Range-wide Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Action	Type	Effects
Oil and Gas	BLM: Past	BLM has offered for lease 425,711 acres in HMAs; 407,478 of that total was leased. Lease stipulations apply as described in the leases according to HMA category.
	BLM: Future pending	BLM has a scheduled lease sale in June 2018 that will offer 110,556 acres in HMAs. Lease stipulations would still be as described in 2015 until a decision is made on this RMPA/EIS.
Geothermal	BLM: Past and Present	Between 2015 and 2017, the BLM has offered for lease 24,468 acres within HMAs. Lease stipulations apply as described in the leases as analyzed in the 2015 Final EIS. 6 geothermal development permits have been approved and drilled on existing pads on existing leases. McGinness Hills Phase 3 EA authorized up to 42 acres of disturbance on existing leases, which will be offset according to the mitigation hierarchy.
Geothermal	Forest Service: Future Pending	6,901 acres of HMA pending forest service concurrence to lease, no pending geothermal development permits. If in HMAs, stipulations would be as described in 2015.
Locatable Mineral Projects	BLM: Past and Present	Between 2015 and 2017, the BLM has approved 18 new mines and/or expansions in the planning area, which is within the reasonably foreseeable development scenario outlined in the 2015 Final EIS (Section 5.1.16).
	BLM: Future pending	The BLM is currently reviewing 20 plans of development for new mines or expansions, which is within the reasonably foreseeable development scenario outlined in the 2015 Final EIS (Section 5.1.16).
Sage-Grouse Conservation	Forest Service: Future	Forest Service has indicated they will also be amending their land use plans. Specific details of their proposed changes are not yet known, but it is anticipated they propose alignment with state management plans and strategies.

Table 4-7
Range-wide Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Action	Type	Effects
Oregon		
Emergency Stabilization and Rehabilitation in South Bull Ridge RNA	Aerial herbicide application	Preliminary results indicate success in treating annual grasses (2017).
Emergency Stabilization and Rehabilitation in South Ridge Bully Creek RNA	Aerial herbicide application	Preliminary results indicate success in treating annual grasses (2015).
Emergency Stabilization and Rehabilitation in North Ridge Bully Creek RNA	Aerial herbicide application	Preliminary results indicate success in treating annual grasses (2015).
Trout Creek Mountain	Grazing permit renewal	Grazing permit renewal allotment includes the East Fork Trout Creek RNA (2016).
Utah		
Fire and Fuels		
Wildland Fires 2015-2017	Acres burned on BLM administered land	Approximately 61,262 acres of PHMA/GHMA burned between 2015 and 2017. Post fire restoration is being implemented across all population areas that are affected. Effects: Potential loss of habitat value due to the removal of vegetation by fire.
Fire Restoration (Emergency Stabilization and Rehabilitation)	Acres of habitat restoration following wildland fires	Approximately 173,100 acres of HMA were treated/restored between 2015 and 2017. All of these acres are being restored in according to specific prescriptions outlined in Emergency Stabilization and Burned Area Rehabilitation plans following wildfire across all population areas that are affected. Effect: Potentially improve or increase habitat due to vegetative restoration activities.
Vegetation		
Habitat Treatments	Acres of habitat improvement projects	Past: Over 219,000 acres of Greater Sage-Grouse habitat was treated between 2015 and 2017 to maintain or improve conditions for Greater Sage-Grouse across all populations. Treatments included conifer removal, fuel breaks, invasive species removal and habitat protection/restoration. Effect: Potentially improve or increase habitat due to vegetative restoration activities

Table 4-7
Range-wide Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Action	Type	Effects
		Future: Over 524,702 acres of Greater Sage-Grouse habitat is being proposed for treatment over the next 5 years. Treatments will include conifer removal, fuel breaks, invasive species removal and habitat protection/restoration across all populations. Effect: Potentially improve or increase habitat due to vegetative restoration activities.
Lands and Realty		
Land Use and Realty (issued and pending) 2015-2018	ROWs issued or pending on BLM land	Past: Issued 841 ROWs were issued in the planning area between 2015 and 2017. Effect: This includes amendments and reauthorizations, which may not have resulted in new disturbance. For ROWs occurring in Greater Sage-Grouse habitat, effects were offset using the mitigation hierarchy. Future: 380 ROW applications are pending review and analysis. Effect: New ROWs would be held to the same mitigation standard under the management alignment alternative as described in the 2015 EIS, so no additional cumulative impacts beyond those described in 2015 are anticipated.
Zephyr Transmission Line	500 kV transmission line	Application received – could impact the Bald Hills, Uintah, Carbon, Strawberry, Emery, and Sheeprocks populations. Effects: May remove vegetation due to construction activities. Towers may provide perching opportunities for avian predators. However, most of these impacts should be removed by management standards identified in the selected alternative.
Parker Knoll Pump Storage Hydroelectric Federal Energy Regulatory Commission Project	Create electricity using a two-reservoir, gravity-fed system; approximately 200 acres of Greater Sage-Grouse habitat would be lost; mitigation involves Greater Sage-Grouse habitat-improvement work in areas adjacent to the lost habitat.	Still in planning and NEPA stages – could impact the Parker Mountain population. Effects: May remove vegetation due to construction activities. Increased maintenance activities could lead to an increase in collision mortalities. Any associated tall structures may provide

Table 4-7
Range-wide Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Action	Type	Effects
		perching opportunities for avian predators. However, most of these impacts should be removed by management standards identified in the selected alternative.
Enefit Utility Project	Five rights-of-way across public lands for infrastructure (a road, 3 pipelines, and 2 powerlines) to support development of a mine on private lands. Estimated 1,037 acres of disturbance for the rights-of-way (7,000-9,000 acre mine and 320-acre processing plant).	Still in planning and NEPA stages – could impact the Uintah population. Effects: May remove vegetation due to construction activities. Increased maintenance activities could lead to an increase in collision mortalities. Any associated tall structures may provide perching opportunities for avian predators. However, most of these impacts should be removed by management standards identified in the selected alternative.
Leasable Minerals (Oil and Gas, Non-energy Leasable Minerals, Coal, and Oil Shale and Tar Sands)		
Oil and Gas Leases	Acres of BLM land leased for Oil and Gas development	Past: From 2105-2017 the BLM has leased approximately 25,000 acres in HMAs, of which approximately 25 of those acres were located in PHMA. Lease stipulations apply as described in the leases according to HMA category. Effects: The act of leasing would have no direct effect Future: BLM has a scheduled lease sale in June 2018 that will offer 646 acres in HMAs. Additionally, the BLM is required to conduct quarterly lease sales which could include parcels in HMA. Lease stipulations would still be as described in 2015 until a decision is made on this RMPA/EIS. Effect: The act of leasing would have no direct effect, as no specific disturbance is taken as a result of purchasing a lease. Leasing could occur in any of the populations, but would be most likely to impact the Uintah, Carbon, Emery, and Rich populations due to mineral potential.
Oil and Gas Wells	Oil and Gas exploration and development	Based upon the reasonable and foreseeable development assumptions in Chapter 4, it is anticipated that 2,968 oil and gas wells will be drilled within

Table 4-7
Range-wide Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Action	Type	Effects
		occupied GRSG habitat within the population areas of which 2,289 wells are anticipated to be producing wells. Exploration wells expected in all populations. Development wells anticipated in Uintah, Carbon, Emery, and Rich populations. Effect: The development of wells within these areas could lead to fragmentation and loss of habitat due to construction activities. Increased noise levels associated with traffic and compressors may impact lek attendance. Increased traffic associated with day to day operations may also increase the potential for collision mortality. However, most of these impacts should be removed by management standards identified in the selected alternative.
Asphalt Ridge Tar Sands Development	Lease approximately 6,000 acres of Tar Sands Lands described in the Asphalt Ridge Tract, which is directly adjacent to existing approximately 16,000 acres of State leases	Still in planning and NEPA stages – could impact the Uintah population. Effect: As a largely underground operation on BLM-administered lands, this would disturb a small amount of land associated with ancillary features. On the portions of the mine that would be mined through surface means, habitat would be lost and noise, dust and light would affect adjacent areas.
Flat Canyon Coal Lease by application	The Flat Canyon Coal Lease Tract is approximately 2, 692 acres of federal coal reserves	Forest Service completed the consent to BLM. Approximately 23 acres out of the 2,692 acres are within the Emery Population Area. Effect: The act of leasing would have no direct effect. However, the activities associated with development of the lease could result in loss of habitat and vehicle mortality due to increased traffic. Most of these impacts should be removed by management standards identified in the selected alternative.
Alton Coal Tract Lease-by-Application	Add 3,576 acres of federal surface or mineral estate to existing 300-acre mine on private land.	Still in planning and NEPA stages – could impact the Panguitch population. Effect: Activities associated with development of the lease could result in loss of habitat and vehicle mortality due to increased traffic. Most of these

Table 4-7
Range-wide Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Action	Type	Effects
		impacts should be removed by management standards identified in the selected alternative
Williams Draw Coal Lease by Application	The proposed action includes 4,200 acres of federal surface and mineral estate; the proposal may have several vents, drilling exploration holes on the surface and underground, and load-out facilities	Still in planning and NEPA stages – could impact the Carbon population. Effect: The act of leasing would have no direct effect. However, the activities associated with development of the lease could result in loss of habitat and vehicle mortality due to increased traffic. Most of these impacts should be removed by management standards identified in the selected alternative
Greens Hollow Coal Lease by Application	Proposal includes 6,700 acres; a vent is proposed off site; minimal surface disturbances with the exception for exploration drilling	The area has been leased, but development is on hold due to litigation. Would affect the Emery population. Effect: Activities associated with development of the lease could result in loss of habitat and vehicle mortality due to increased traffic. Most of these impacts should be removed by management standards identified in the selected alternative
Flat Canyon Coal Lease by Application	Lease by Application 3,792 acres; and Exploration License, 595 acres	Leased and under production in the Carbon population. Effect: The act of leasing would have no direct effect. However, the activities associated with development of the lease could result in loss of habitat and vehicle mortality due to increased traffic. Most of these impacts should be removed by management standards identified in the selected alternative
Gilsonite Leasing	16,810 acres that are currently under prospecting permit application; the permits would either be issued or a Known Gilsonite Leasing Area would be established, thus allowing competitive leasing	The prospecting permit applications have been in place since the late 1980s; Known Gilsonite Leasing Area report ongoing, after which NEPA will begin to address backlogs for these areas in the Uintah population. Effect: Activities associated with development or prospecting of the permit / lease could result in loss of habitat and vehicle mortality due to increased traffic. Most of these impacts should be removed by management standards identified in the selected alternative

Table 4-7
Range-wide Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Action	Type	Effects
Phosphate Fringe Acreage Lease	1,627 acres of fringe acreage lease on BLM-administered lands	NEPA has started and awaiting a Development Scenario to complete the NEPA for this area in the Uintah population. Effect: The act of leasing would have no direct effect. However, the activities associated with development of the lease could result in loss of habitat and vehicle mortality due to increased traffic. Most of these impacts should be removed by management standards identified in the selected alternative
Phosphate Competitive Lease Application	1,186 acres on National Forest System lands	NEPA has started and awaiting a Development Scenario to complete the NEPA for this area in the Uintah population. Effect: Activities associated with development of the lease could result in loss of habitat and vehicle mortality due to increased traffic. Most of these impacts should be removed by management standards identified in the selected alternative.
Other Items		
Hard Rock Prospecting Permits being considered on Bankhead Jones	Hard rock exploration permits.	Pending Consideration for this area in the Sheeprocks population. Effect: Activities associated with development of the lease could result in loss of habitat, vehicle mortality due to increased traffic and disruption of seasonal use areas. Most of these impacts should be removed by management standards identified in the selected alternative.
Gooseberry Narrows Reservoir	Bureau of Reclamation project on Forest Service and private land; project is approximately 1,200 acres	EIS is complete, pending EPA review and approval for this portion of the Carbon population. Effect: Activities associated with construction and operation of the reservoir would result in loss of habitat within the project area and a potential increase for vehicle mortality due to increased traffic. However, the habitat lost within the project area may be supplemented by improving the quality and seasonal functionality of the adjacent habitat. Most of the impacts should be

Table 4-7
Range-wide Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Action	Type	Effects
		removed by management standards identified in the selected alternative.
Motorized Travel Plan Implementation	Implementation of motorized route designation plans across the planning region	Implementation actions underway statewide, with travel planning reasonably foreseeable in the Sheeprocks, Uintah, Carbon and Panguitch populations. Effect: The development of a motorized travel plan would potential help to reduce fragmentation of habitat and centralizing disturbance into areas of lesser importance.
Grand Staircase-Escalante National Monument Management Plan	Development of a resource management plan	Still in early planning stages for this area that overlaps the Panguitch population. Effect: This action would provide a framework to manage both the remaining monument areas and the areas no longer within the monument boundaries. It is too early in the process to determine a cumulative effect since the proposed plan is unknown.
Forest Service Sage-Grouse Planning	Forest Service and Utah Division of Wildlife Resources	Forest Service has indicated they will also be amending their land use plans. Specific details of their proposed changes are not yet known, but it is anticipated they propose alignment with state management plans and strategies. Applicable to all Greater Sage-Grouse populations with National Forest System Lands. Effect: This effort will help to align the Forest Service's plan to be more consistent with the State of Utah's plan and provide the adequate management actions necessary to protect and conserve the Greater Sage-Grouse.
State of Utah Greater Sage-Grouse Management	Update of the State's Conservation Plan for Greater Sage-grouse in Utah, as well as implementation of the State's compensatory mitigation rule	Past: The Conservation Plan for Greater Sage-grouse in Utah was finalized in 2013; it was designed to be updated every 5 years. While it requires a 4:1 mitigation ratio in the State's Sage-Grouse Management Areas (SGMA), there was no established approach to implement that mitigation standard to the State's 11 SGMAs. Effect: The plan establishes the management actions necessary for the State of Utah to continue to enhance and

Table 4-7
Range-wide Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Action	Type	Effects
		conserve the Greater Sage-Grouse while still allowing for economic opportunities. Future: The State is updating their Greater Sage-Grouse plan and incorporating the compensatory mitigation rule that provides a process to develop a banking system to apply the state's 4:1 mitigation ratio that is designed to improve habitat for Greater Sage-Grouse. Effect: This effort will help to refine and identify areas to improve management actions and allow for the incorporation of new and local science to better balance Greater Sage-Grouse management across the state. It will also provide an opportunity for economic development to occur while offsetting the impacts to habitat quality.
Wyoming		
Wildland Fires 2015-2017	BLM: Past – Acres burned on BLM-administered land	Approximately 137,000 acres of HMA burned between 2015 and 2017. Post fire restoration and habitat treatments are being implemented, as described below, to diminish impacts of habitat lost to wildland fire.
Fire Restoration (Emergency Stabilization and Rehabilitation)	BLM: Past and Present – Habitat restoration following wildland fires	Approximately 4,030 acres of BLM-administered habitat are either currently being treated, or scheduled to be treated according to specific prescriptions outlined in Emergency Stabilization and Burned Area Rehabilitation plans following wildfire.
Habitat Treatments	BLM: Past – Habitat improvement projects	More than 96,000 acres of Greater Sage-Grouse habitat were treated between 2015 and 2017 to maintain or improve conditions for Greater Sage-Grouse. Treatments included conifer removal, fuel breaks, invasive species removal and habitat protection/restoration.
Land Use and Realty (issued and pending) 2015-2018	BLM: Past ROWs issued on BLM land	BLM Wyoming issued approximately 3,000 ROWs in the planning area between 2015 and 2017. This includes amendments and reauthorizations, which may not have resulted in new disturbance. For ROWs occurring in sage grouse habitat, effects were offset by the management prescriptions in the RMPs and ARMPA.

Table 4-7
Range-wide Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Action	Type	Effects
	BLM: Future pending	There are approximately 590 ROW applications pending review and analysis. New ROWs under the Management Alignment Alternative would align with the management prescriptions of the Core Area Strategy and State of Wyoming Mitigation Framework. No additional cumulative impacts are anticipated, beyond those described.
Oil and Gas	BLM: Past	BLM Wyoming has offered for lease 861,634 acres; 812,123 acres of that total was leased. Leases followed management prescriptions in the RMPs and ARMPA and stipulations apply as described in the leases according to HMA category.
	BLM: Future pending	BLM Wyoming has a scheduled lease sale in June 2018 that will offer 198,588 acres for lease. The actions proposed in the Management Alignment Alternative to not propose to change stipulations analyzed in the 2014 and 2015 plans.
Locatable Mineral Projects	BLM: Past and Present	Between 2015 and 2017, the BLM has approved 17 new mines and/or expansions within the planning area (including non-habitat). The Management Alignment Alternative does not propose changes to any decisions associated with locatable minerals, which were sufficiently analyzed on the existing plans.
	BLM: Future pending	The BLM is currently reviewing 26 plans of operation for new mines, mine expansions and notice-level activities. This number also includes 10 pending mine patents, which are in the process of being patented into private ownership. The Management Alignment Alternative does not propose changes to any decisions associated with locatable minerals, and future impacts would be analyzed in future EISs, adhering to existing requirements of the RMPs and ARMPA.
Leasable Mineral Projects (Coal)	BLM: Past and Present	Two coal lease modifications were issued in 2018, totaling 1,306.61 acres. For lease modifications occurring in sage grouse habitat, effects were offset by the management prescriptions in the RMPs and ARMPA.

Table 4-7
Range-wide Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Action	Type	Effects
	BLM: Future-Pending	BLM Wyoming is currently reviewing 4 coal lease applications/modifications totaling 10,148.56 acres. No management decisions for leasable minerals are proposed for change under the Management Alignment Alternative.
Sage-Grouse Conservation	Forest Service: Future	Forest Service has indicated they will also be amending their land use plans. Specific details of their proposed changes are not yet known, but it is anticipated they will propose alignment with state management plans and strategies.

4.12 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 proposal should it be implemented. An irretrievable commitment of a resource is one in which the resource or its use is lost for a period (e.g., extraction of 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).

There are no known irreversible or irretrievable commitment of resources under either alternative analyzed.

4.13 UNAVOIDABLE ADVERSE IMPACTS

Section 102(C) of NEPA requires disclosure of any adverse environmental impacts that could not be avoided should the proposal be implemented. Unavoidable adverse impacts are those that remain following the implementation of mitigation measures or impacts for which there are no mitigation measures. Others are a result of public use of BLM-administered lands within the planning area. There are no known unavoidable adverse impacts associated with either alternative analyzed.

4.14 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 and 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/EIS.

Properly grazed, these areas are not expected to lose productivity in either the short term or long term. Changes in vegetation communities or components of the vegetation communities may occur, but the shifts would be site-specific.

Chapter 5. Consultation and Coordination

This chapter describes the efforts undertaken by the BLM throughout the process of developing the RMPA/EIS to ensure the process remained open and inclusive to the extent possible. This chapter also describes efforts taken to comply with legal requirements to consult and coordinate with various government agencies. These efforts include public scoping; identifying and designating cooperating agencies; consulting with applicable federal, state, and tribal governments; and identifying "any known inconsistencies with State or local plans, policies or programs" (43 CFR 1610.3-2(e)).

5.1 Public Involvement

5.1.1 Public Scoping

As defined under NEPA, the scoping period began with the publication of the NOI in the *Federal Register* on October 11, 2017. The NOI was titled Notice of Intent to Amend Land Use Plans Regarding Greater Sage-Grouse Conservation and Prepare Associated Environmental Impact Statements or Environmental Assessments. The NOI acknowledged that Greater Sage-Grouse land management issues may warrant development of LUPAs.

During the scoping period, the BLM sought public comments on whether all, some, or none of the 2015 Greater Sage-Grouse plans should be amended, what issues should be considered, and whether the BLM should pursue a state-by-state amendment process or structure its planning effort differently, for example by completing a national programmatic process. Representatives of the BLM engaged with the Western Governors' Association Sage Grouse Task Force in October of 2017 and January of 2018 to discuss the progress of scoping efforts. In addition, the DOI Deputy Secretary has emphasized that input from state governors would weigh heavily when considering what changes should be made and ensuring consistency with the BLM's multiple use mission.

Information about scoping meetings, comments received, comment analysis, and issue development can be found in the scoping report available online here: https://goo.gl/FopNgW.

5.1.2 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 the Draft RMPA/EIS during the comment period. This Proposed RMPA/Final EIS responds to all substantive comments received during the 90-day comment period. A Proposed RMPA and Final EIS will be provided for a 30-day period providing the public opportunity to protest proposals. A Governor's Consistency Review will occur concurrent with this protest period. Such protests will be addressed in the RODs, and necessary adjustments may be made to the RMPA/EIS. A ROD 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.

5.2 Cooperating Agencies

Federal regulation directs the BLM to invite eligible federal agencies, state and local governments, and federally recognized Indian tribes to participate as cooperating agencies when amending RMPs (43 CFR 1610.3-1(b)). A cooperating agency is any such agency or tribe that enters into a formal agreement with

the 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 Land Use Planning Handbook H-1601-1). These agencies are invited to participate because they have jurisdiction by law or can offer special expertise. Cooperating agency status provides a formal framework for these government units to engage in active collaboration with a lead federal agency in the planning process.

The Oregon-Washington BLM has for many years been an active partner with the State of Oregon (including its many agencies), other local and federal agencies, as well as non-governmental organizations in an collaborative Greater Sage-Grouse planning and implementation process called SageCon. Since the October 2017 national BLM Notice of Intent initiating the current plan amendment process, BLM Oregon-Washington has continued to actively coordinate and collaborate with the SageCon partnership, including numerous discussions about this plan amendment process.

On March 9, 2018, the BLM Oregon-Washington State Director invited 32 federal, state, and local governments and agencies to become cooperating agencies. The invitation included an initial teleconference meeting date and time along with an initial purpose and need statement for an Oregon plan amendment. Included in the mailing list were several local governments and agencies who had previously requested cooperating agency status (e.g., during the comment period of the October 2107 Notice of Intent). Nine federal, state, and local governments and agencies attended the teleconference held on March 30, 2018. Five local, state, and federal governments/agencies have confirmed their commitment to be cooperating agencies.

Table 5-1
Cooperating Agencies

Tribes and Agencies Invited to be Cooperators	Agencies that Accepted	Agencies that Signed Memoranda of Understanding
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		
Baker County		
Crook County		
Deschutes County		
Grant County		
Harney County	X	X*

Table 5-1
Cooperating Agencies

Tribes and Agencies Invited to be Cooperators	Agencies that Accepted	Agencies that Signed Memoranda of Understanding
Jefferson County		
Lake County		
Malheur County		
Governor's Natural Resources Office	X	X*
Oregon Department of Agriculture		
Oregon Department of Energy		
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 University		
Natural Resources Conservation Service		
USDA Rural Development		
US Environmental Protection Agency		
US Fish and Wildlife Service	X	X*
US Forest Service		
Harney Soil and Water Conservation District	X	X*
Lake Soil and Water Conservation District	X	MOU in development
Malheur Soil and Water Conservation District		
PNW Research Station (USFS)		
PSU - ORBIC (INR)		
Burns ARS Research Station		
Oregon Department of Parks and Recreation		

X* - previously signed MOU is being updated

As noted in **Chapter 1**, in its November 30, 2017, response to the Notice of Intent, the Office of Governor Kate Brown concluded that there are important consistencies between Oregon BLM's 2015 Approved Resource Management Plan Amendment (ARMPA) and the State of Oregon's 2015 Oregon Sage-grouse Action Plan. Further, the Office of Governor Kate Brown indicated that a major plan amendment was not needed in Oregon, that implementation of the 2015 ARMPA should continue, that additional discussion and coordination was needed to refine some plan and policy interpretations, and that those discussions and refinement efforts should occur via the ongoing SageCon partnership. **Chapter 1**, **Section 1.5.2** describes the minor adjustments that are being or will be coordinated with the State of Oregon to bring the Oregon ARMPA into further alignment with the State's conservation plan.

5.3 AMERICAN INDIAN TRIBAL CONSULTATION

Various federal laws require the BLM to consult with American Indian tribes during the planning/NEPA decision-making process. This section documents the specific consultation and coordination efforts undertaken throughout the process of developing the LUPA/EIS.

Shortly after the October 2017 Notice of Intent, the Oregon-Washington BLM invited the 11 tribes listed in **Table 5-1** to consult on the potential plan amendment. On November 6, 2017, two tribes met (in person or via phone) with the BLM at the Burns Paiute Tribe Community Center in Burns, Oregon, to provide additional information about the potential amendment process. On March 8, 2018, the BLM invited the same 11 tribes to become NEPA cooperating agencies and hosted a teleconference to provide additional information on March 30, 2018. One tribe called in to the teleconference and asked for additional information, but did not request to become a cooperating agency.

5.4 LIST OF PREPARERS

This RMPA/EIS was prepared by an interdisciplinary team of staff from the BLM, in collaboration with Environmental Management and Planning Solutions, Inc.

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Fiorella Maria	GIS, Mapping
Jeanne Debenedetti Keyes	GIS, Mapping
Lee Folliard	Reviewer
Kathy Stangl	Reviewer

5.5 RMPA/EIS DISTRIBUTION

A notification of the availability of this Draft RMPA/EIS is published in the *Federal Register*. Notice that the RMPA/EIS is available on the BLM ePlanning website was emailed to approximately 150 tribes; local, state, and federal governments and agencies; non-governmental organizations; and individuals. A press release was also issued announcing availability of the document.

Chapter 6. References

Anderson D. C., K. T. Harper, S. R. Rushforth. 1982. "Recovery of crytogamic soil crusts from grazing on Utah winter ranges." *Journal Of Range Management* 35(3): 355–359

Batchelor, J. L., W. J. Ripple, T. M. Wilson, and L. E. Painter. 2015. Restoration of riparian areas following the removal of cattle in the northwestern Great Basin. Environmental Management:1-13. Internet website: https://dx.doi.org/10.1007/s00267-014-0436-2.

Bates, J. D., and K. W. Davies. 2016. "Seasonal burning of juniper woodlands and spatial recovery of herbaceous vegetation." *Forest Ecology and Management* 361: 117–130

Bates, J. D., K. W. Davies, A. Hulet, R. F. Miller, and B. Roundy. 2017. "Sage grouse groceries: forb response to piñon-juniper treatments." *Rangeland Ecology & Management* 70: 106–115.

Bates, J. D., R. O'Connor, and K. W. Davies. 2014a. "Vegetation recovery and fuel reduction after seasonal burning of western juniper." *Fire Ecology* 10: 27–48.

Bates, J. D., R. N. Sharp, and K. W. Davies. 2013. "Sagebrush steppe recovery after fire varies by development phase of *Juniperus occidentalis* woodland." *International Journal of Wildland Fire* 23: 117–130.

Bates, J. D., R. N. Sharp, and K. W. Davies. 2014b. "Sagebrush steppe recovery after fire varies by development phase of *Juniperus occidentalis* woodland." *International Journal of Wildland Fire* 23: 117–130.

Beck, J. L. and D. L. Mitchell . 2000. "Influences of livestock grazing on sage grouse habitat." *Wildlife Society Bulletin* 28: 993–1002.

Beschta, R. L., D. L. Donahue, D. A. DellaSala, J. J. Rhodes, J. R. Karr, M. H. O'Brien, T. L. Fleischner, and C. D. Williams. 2014. "Reducing livestock effects on public lands in the western United States as the climate changes: A reply to Svejcar et al." *Environmental Management* 53: 1039–1042.

Blomberg, E. J., D. Gibson, M. T. Atamian, and J. S. Sedinger. 2017. "Variable drivers of primary versus secondary nesting: Density-dependence and drought effects on greater sage-grouse [Abstract]." *Journal of Avian Biology* 48: 827–836.

Blomberg, E. J., J. S. Sedinger, D. Gibson, P. S. Coates, and M. L. Casazza. 2014. "Carryover effects and climatic conditions influence the post-fledging survival of greater sage-grouse." *Ecology and Evolution* 4: 4488–4499.

Bock, C. E., J. H. Bock, and H. M. Smith. "Proposal for a system of federal livestock exclosures on public rangelands in the western United States." *Conservation Biology* 7(3): 731–733.

Boyd, C. S., K. W. Davies, and G. H. Collins. 2017. "Impacts of feral horse use on herbaceous riparian vegetation within a sagebrush steppe ecosystem." *Rangeland Ecology & Management* 70: 411–417.

Bradley, B. 2010. "Assessing ecosystem threats from global and regional change: Heirarchial modeling of risk to sagebrush ecosystems from climate change, land use, and invasive species in Nevada, USA." *Ecogeography* 33: 198–208.

Bradley, B. A. 2009. "Regional analysis of the impacts of climate change on cheatgrass invasion shows potential risk and opportunity." *Global Change Biology* 15: 196–208.

Bradley, B. A., D. M. Blumenthal, D. S. Wilcove, and L. H. Ziska. 2010. "Predicting plant invasions in an era of global change." *Trends in Ecology & Evolution* 25: 310–318.

Bradley, B. A., C. A. Curtis, and J. C. Chambers. 2016. "Bromus response to climate and projected changes with climate change." In: *Exotic Brome-Grasses in Arid and Semiarid Ecosystems of the Western US* (M. J. Germino, J. C. Chambers, and C. S. Brown, editors). Springer, New York, New York. Pp. 257–274.

Brooks, M. L., J. R. Matchett, D. J. Shinneman, and P. S. Coates. 2015. Fire Patterns in the Range of the Greater Sage-Grouse, 1984–2013—Implications for Conservation and Management. Open-File Report 2015-1167. US Department of the Interior, US Geological Survey, Reston, Virginia. Internet website: http://dx.doi.org/10.3133/ofr20151167.

BLM (Bureau of Land Management). 1985. Oregon Manual 1623. Research Natural Areas. Supplement. Bureau of Land Management, Oregon/Washington State Office, Portland, Oregon.

_____. 1991. Proposed Three Rivers Resource Management Plan and Final Environmental Impact Statement: Volume II - appendices. US Department of the Interior, Bureau of Land Management, Burns District Office, Burns, Oregon.

_____. 1996a. Assessment of Relevance and Importance: Black Canyon ACEC/RNA. Unpublished report on file at Bureau of Land Management, Vale District Office, Vale, Oregon.

_____. 1996b. Assessment of Relevance and Importance: Dry Creek Bench ACEC/RNA. Unpublished report on file at Bureau of Land Management, Vale District Office, Vale, Oregon.

_____. 1996c. Assessment of Relevance and Importance: Lake Ridge ACEC/RNA. Unpublished report on file at Bureau of Land Management, Vale District Office, Vale, Oregon.

_____. 1996d. Assessment of Relevance and Importance: Mahogany Ridge Addition to Mahogany Ridge ACEC/RNA. Unpublished report on file at Bureau of Land Management, Vale District Office, Vale, Oregon.

_____. 1996e. Assessment of Relevance and Importance: North Ridge Bully Creek ACEC/RNA. Unpublished report on file at Bureau of Land Management, Vale District Office, Vale, Oregon.

_____. 1996f. Assessment of Relevance and Importance: South Bull Canyon ACEC/RNA. Unpublished report on file at Bureau of Land Management, Vale District Office, Vale, Oregon.

_____. 1996g. Assessment of Relevance and Importance: South Ridge Bully Creek ACEC/RNA. Unpublished report on file at Bureau of Land Management, Vale District Office, Vale, Oregon.

Bureau of Land Management (BLM). 1996h. Assessment of Relevance and Importance: Spring Mountain ACEC/RNA. Unpublished report on file at Bureau of Land Management, Vale District Office, Vale, Oregon.

Bureau of Land Management (BLM). 1996i. Assessment of Relevance and Importance: Toppin Creek Butte ACEC/RNA. Unpublished report on file at Bureau of Land Management, Vale District Office, Vale, Oregon.

_____. 1997. Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the States of Oregon and Washington. Bureau of Land Management, Oregon/Washington State Office, Portland, Oregon.

_____. 2000. Areas of Critical Environmental Concern Nomination Analysis Report for the Lakeview Resource Area resource Management Plan. US Department of the Interior, Bureau of Land Management, Lakeview District, Lakeview, Oregon.

_____. 2002. Southeastern Oregon Resource Management Plan and Record of Decision. US Department of the Interior, Bureau of Land Management, Vale District Office, Vale, Oregon.

_____. 2003. Lakeview Proposed Resource Management Plan and Final Environmental Impact Statement: Volume 2 - Appendices. US Department of the Interior, Bureau of Land Management, Lakeview District Office, Lakeview, Oregon.

_____. 2004. Andrews Management Unit/Steens Mountain Cooperative Management and Protection Area Proposed Resource Management Plan and Final Environmental Impact Statement: Volume 2. US Department of the Interior, Bureau of Land Management, Burns District Office, Burns, Oregon.

_____. 2007. East Fork Trout Creek Research Natural Area/Area of Critical Environmental Concern Management Plan. Unpublished plan on file at Bureau of Land Management, Vale District Office, Vale, Oregon.

Bureau of Land Management Sage-Grouse Forb List August 2017. Internal Document.

Carter, S. K., D. J. Manier, R. S. Arkle, A. N. Johnston, S. L. Phillips, S. E. Hanser, and Z. H. Bowen. 2018. Annotated bibliography of scientific research on greater sage-grouse published since January 2015: US Geological Survey Open-File Report 2018–1008. Internet website: https://doi.org/10.3133/ofr20181008.

Chambers, J. C., D. A. Pyke, J. D. Maestas, M. Pellant, C. S. Boyd, S. B. Campbell, S. Espinosa, et al. 2014a. Using Resistance and Resilience Concepts to Reduce Impacts of Invasive Annual Grasses and Altered Fire Regimes in the Sagebrush Ecosystem and Greater Sage Grouse: A Strategic Multi-Scale Approach. General Technical Report RMRS-GTR-326. US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, Colorado. Internet website: http://www.fs.fed.us/rm/pubs/rmrs_gtr326.html.

Chambers, J. C., R. F. Miller, D. I. Board, D. A. Pyke, B. A. Roundy, J. B. Grace, E. W. Schupp, and R. J. Tausch. 2014b. "Resilience and resistance of sagebrush ecosystems: Implications for state and transition models and management treatments." *Rangeland Ecology & Management* 67: 440–454.

Chung, W. 2015. "Optimizing fuel treatments to reduce wildland fire risk." *Current Forestry Reports* 1: 44–51.

Coates, P. S., M. A. Ricca, B. G. Prochazka, M. L. Brooks, K. E. Doherty, T. Kroger, E. J. Blomberg, et al. 2016. "Wildfire, climate, and invasive grass interactions negatively impact an indicator species by reshaping sagebrush ecosystems." *Proceedings of the National Academy of Sciences* 113: 12745–12750.

Coates, P. S., M. A. Ricca, B. G. Prochazka, K. E. Doherty, M. L. Brooks, and M. L. Casazza. 2015. Long-Term Effects of Wildfire on Greater Sage-Grouse—Integrating Population and Ecosystem Concepts for Management in the Great Basin. Open-File Report 2015-1165. US Department of the Interior, US Geological Survey, Reston, Virginia. Internet website: http://dx.doi.org/10.3133/ofr20151165.

Condon, L. A., and D. A. Pyke. 2018. Fire and grazing influence site resistance to *Bromus tectorum* through their effects on shrub, bunchgrass and biocrust communities in the Great Basin (USA). Ecosystems. Internet website: https://dx.doi.org/10.1007/s10021-018-0230-8.

Connelly, J. W., E. T. Rinkes, and C. E. Braun. 2011. "Characteristics of greater sage-grouse habitat." *in* "Greater sage-Grouse: Ecology and conservation of a landscape species and its habitats." *Studies in Avian Biology* 38: 69–83. University of California Press, Berkley.

Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Conservation assessment of greater sage-grouse and sagebrush habitats. Western Association of Fish and Wildlife Agencies, Cheyenne, Wyoming. Internet website: http://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1079&context=govdocs.

Coppock, D. L., D. M. Swift, and J. E. Ellis. 1986. "Seasonal nutritional characteristics of livestock diets in a nomadic pastoral ecosystem." *Journal of Applied Ecology* 23: 585–595.

Creutzburg, M. K., J. E. Halofsky, J. S. Halofsky, and T. A. Christopher. 2015. "Climate change and land management in the rangelands of central Oregon." *Environmental Management* 55: 43–55.

Dahlgren, D. K., R. T. Larsen, R. Danvir, G. Wilson, E. T. Thacker, T. A. Black, D. E. Naugle, et al. 2015. "Greater sage-grouse and range management: Insights from a 25-year case study in Utah and Wyoming." *Rangeland Ecology & Management* 68(5): 375–382.

Davies, K. W., J. D. Bates, C. S. Boyd, and T. J. Svejcar. 2016a. "Prefire grazing by cattle increases post-fire resistance to exotic annual grass (*Bromus tectorum*) invasion and dominance for decades. Ecology and Evolution 6:3356–3366. https://dx.doi.org/10.1002/ece3.2127

Davies, K. W., J. D. Bates, and C. S. Boyd. 2016. "Effects of intermediate-term grazing rest on sagebrush communities with depleted understories: Evidence of a threshold." *Rangeland Ecology and Management* 69: 173–178.

Davies, K. W., J. D. Bates, and A. M. Nafus. 2012a. "Comparing burned and mowed treatments in mountain big sagebrush steppe.: *Environmental Management* 50: 451–461.

. 2012b. "Mowing Wyoming big sagebrush communities with degraded herbaceous understories: Has a threshold been crossed?" Rangeland Ecology & Management 65: 498–505.

Davies, K. W., J. D. Bates, T. J. Svejcar, and C. S. Boyd. 2010. "Effects of long-term livestock grazing on fuel characteristics in rangelands: An example from the sagebrush steppe." *Rangeland Ecology & Management* 63: 662–669.

Davies, K. W., C. S. Boyd, J. L. Beck, J. D. Bates, T. J. Svejcar, and M. A. Gregg. 2011. "Saving the sagebrush sea: An ecosystem conservation plan for big sagebrush plant communities." *Biological Conservation* 144: 2573–2584.

Davies, K.W., C. S. Boyd, J. D. Bates, and A. Hulet. 2015. "Dormant-season grazing may decrease wildfire probability by increasing fuel moisture and reducing fuel amount and continuity." *International Journal of Wildland Fire* 24: 849–856.

_____. 2016b. "Winter grazing can reduce wildfire size, intensity and behaviour in a shrub-grassland." *International Journal of Wildland Fire* 25: 191–199.

Davies, K. W., G. Collins, and C. S. Boyd. 2014. "Effects of feral free-roaming horses on semi-arid rangeland ecosystems: An example from the sagebrush steppe." *Ecosphere* 5:art127. Internet website: https://dx.doi.org/10.1890/ES14-00171.1.

Davies, K. W., A. Gearhart, C. S. Boyd, and J. D. Bates. 2017. "Fall and spring grazing influence fire ignitability and initial spread in shrub steppe communities." *International Journal of Wildland Fire* 26: 485–490.

Davies, K. W., T. J. Svejcar, and J. D. Bates. 2009. "Interaction of historical and nonhistorical disturbances maintains native plant communities." *Ecological Applications* 19: 1536–1545.

Davies, K. W., M. Vavra, B. W. Schultz, and N. Rimby. 2014. "Implications of longer term rest from grazing in the sagebrush steppe." *Journal of Rangeland Applications* 1: 14–24.

Davis, D. M., and J. A. Crawford. 2015. "Case study: Short-term response of greater sage-grouse habitats to wildfire in mountain big sagebrush communities." *Wildlife Society Bulletin* 39: 129–137.

Dettenmaier, S. J., T. A. Messmer, T. J. Hovick, and D. K. Dahlgren. 2017. "Effects of livestock grazing on rangeland biodiversity: A meta-analysis of grouse populations." *Ecology and Evolution* 7: 7620–7627.

Diamond, J. M., C. A. Call, and N. Devoe. 2009. "Effects of targeted cattle grazing on fire behavior of cheatgrass-dominated rangeland in the northern Great Basin, USA." *International Journal of Wildland Fire* 18: 944–950.

Donnelly, J. P., D. E. Naugle, C. A. Hagen, J. D. Maestas, and C. Lepczyk. 2016. "Public lands and private waters: Scarce mesic resources structure land tenure and sage-grouse distributions." *Ecosphere* 7:e01208.

Dumroese, R. K., T. Luna, B. A. Richardson, F. F. Kilkenny, and J. B. Runyon. 2015. "Conserving and restoring habitat for greater sage-grouse and other sagebrush-obligate wildlife: The crucial link of forbs and sagebrush diversity." N*ative Plants Journal* 16: 276–299.

Dyrness, C. T., J. F. Franklin, C. Maser, S. A. Cook, J. D. Hall, G. Faxon. 1975. Research Natural Area Needs in the Pacific Northwest: A Contribution to Land-Use Planning. Gen. Tech. Rep. PNW-38. US Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.

Earnst, S. L., D. S. Dobkin, and J. A. Ballard. 2012. "Changes in avian and plant communities of aspen woodlands over 12 years after livestock removal in the northwestern Great Basin." *Conservation Biology* 26: 862–872.

Ellsworth, L. M., D. W. Wrobleski, J. B. Kauffman, and S. A. Reis. 2016. "Ecosystem resilience is evident 17 years after fire in Wyoming big sagebrush ecosystems." *Ecosphere* 7:e01618.

Finney, M. A. 2001. "Design of regular landscape fuel treatment patterns for modifying fire growth and behavior." *Forest Science* 47: 219–228.

Finney, M. A. 2007. "A computational method for optimising fuel treatment locations." *International Journal of Wildland Fire* 16: 702–711.

Fish Creek RIM Telemetry map, internal BLM document.

Freese, M. T., S. L. Petersen, R. F. Miller, A. C. Yost, and W. D. Robinson. 2016. "Spatial analysis of greater sage-grouse habitat use in relation to landscape level habitat structure." *Journal of Ecosystem and Ecography* 6: Article 100205.

Fritts, S. J. 2018. , personal communication with Mark Mousseaux, , on the effectiveness of South and North Ridge Bully Creek RNA herbicide treatment, April 12, 2018.

Foster, L. 2016. Oregon Greater Sage-Grouse Spring Population Monitoring: 2016 Annual Report. Oregon Department of Fish and Wildlife, Salem.

Ganskopp, D., and D. Bohnert. 2001. "Nutritional dynamics of 7 northern Great Basin grasses." *Journal of Range Management* 54: 640–647.

Garton, E. O., J. W. Connelly, J. S. Horne, C. A. Hagen, A. Moser, and M. A. Schroeder. 2011. "Greater sage-grouse population dynamics and probability of persistence." *In:* Greater sage-grouse: Ecology and conservation of a landscape species and its habitats," (S. T. Knick and J. W.

Connelly, editors). *Studies in Avian Biology* 38. University of California Press, Berkeley. Pp. 293–382.

GeoBOB. 2018. Bureau of Land Management, Oregon State Office, Geographic Biotic Observations (GeoBOB) Version 2.0 Database, fauna observations (points) and fauna sites (polygons), Data Snapshot - 2 April 2018. USDI BLM, Portland, Oregon.

Germino, M. J., K. Reinhardt, D. S. Pilliod, and D. Debinski. 2014. Sagebrush Ecosystems in a Changing Climate (unpublished report). US Geological Survey, Forest and Range Ecosystem Science Center, Boise, Idaho.

Gibson, D., E. J. Blomberg, M. T. Atamian, and J. S. Sedinger. 2017. "Weather, habitat composition, and female behavior interact to modify offspring survival in Greater Sage-Grouse." *Ecological Applications* 27: 168–181.

Gooch, A. M. J., S. L. Petersen, G. H. Collins, T. S. Smith, B. R. McMillan, and D. L. Eggett. 2017. "The impact of feral horses on pronghorn behavior at water sources." *Journal of Arid Environments* 138: 38–43.

Halvorson, R. 2011. "Sandberg bluegrass (*Poa secunda*)." *Kalmiopsis* 18: 10–15.

Hanser, S. E., P. A. Deibert, J. C. Tull, N. B. Carr, C. L. Aldridge, T. C. Bargsten, T. J. Christiansen, et al. 2018. Greater sage-grouse science (2015–2017)—Synthesis and potential management implications: US Geological Survey Open-File Report 2018–1017. Internet website: https://doi.org/10.3133/ofr20181017.

Hayes, G. F., and K D. Hall. 2003. "Cattle grazing impacts on annual forbs and vegetative composition of mesic grasslands in California." *Conservation Biology* 17(6): 1694–1702.

Hockett, G. A. 2002. "Livestock impacts on the herbaceous components of sage grouse habitat: A review." *Intermountain Journal of Sciences* 8(2): 105–114.

Kaye, T. N., R. J. Meinke, J. Kagan, S. Vrilakas, K. L. Chambers, P. F. Zika, and J. K. Nelson. 1997. "Patterns of rarity in the Oregon flora: Implications for conservation and management." *In:* "Conservation and management of native plants and fungi." Native Plant Society of Oregon, Corvallis. Pp. 1–10.

Mankin, J. S., J. E. Smerdon, B. I. Cook, A. P. Williams, and R. Seager. 2017. "The curious case of projected twenty-first-century drying but greening in the American West." *Journal of Climate* 30: 8689–8710.

Meinke, R. 2006. The Conservation status and natural history of *Pogogyne floribunda* in Oregon, OSU, 2006. Internet website: https://www.fs.fed.us/r6/sfpnw/issssp/documents/planning-tools/cpt-va-pogogyne-floribunda-cons-status-natural-history-2006-09.pdf.

Miller, R. F., J. Ratchford, B. A. Roundy, R. J. Tausch, A. Hulet, and J. Chambers. 2014. "Response of conifer-encroached shrublands in the Great Basin to prescribed fire and mechanical treatments." *Rangeland Ecology & Management* 67: 468–481.

Monroe, A. P., C. L. Aldridge, T. J. Assal, K. E. Veblen, D. A. Pyke, and M. L. Casazza. 2017. "Patterns in greater sage-grouse population dynamics correspond with public grazing records at broad scales." *Ecological Applications* 27(4): 1096–1107.

NISMIS. 2018. National Invasive Species Management Information System, internal BLM invasive species database.

ONAP (Oregon Natural Areas Plan). 2015. Oregon Parks and Recreation Department and the Oregon Biodiversity Information Center, Institute for Natural Resources, Portland State University, Portland, Oregon.

ORBIC. 2018. Oregon Biodiversity Information Center, Biotics Database, Element Occurrence (polygon), Sources (polygons), and related Visits (Table), Data Snapshot. Portland, Oregon. October 30, 2017.

Palmquist, K. A., D. R. Schlaepfer, J. B. Bradford, and W. K. Lauenroth. 2016a. "Mid-latitude shrub steppe plant communities: Climate change consequences for soil water resources." *Ecology* 97: 2342–2354.

Palmquist, K. A., D. R. Schlaepfer, J. B. Bradford, and W. K. Lauenroth. 2016b. "Spatial and ecological variation in dryland ecohydrological responses to climate change: Implications for management." *Ecosphere* 7:e01590.

Pennington, V. E., K. A. Palmquist, J. B. Bradford, and W. K. Lauenroth. 2017. "Climate and soil texture influence patterns of forb species richness and composition in big sagebrush plant communities across their spatial extent in the western U.S." *Plant Ecology* 218: 957–970.

Pennington, V. E., D. R. Schlaepfer, J. L. Beck, J. B. Bradford, K. A. Palmquist, and W. K. Lauenroth. 2016. "Sagebrush, greater sage-grouse, and the occurrence and importance of forbs." *Western North American Naturalist* 76: 298–312.

Polley, H. W., D. D. Briske, J. A. Morgan, K. Wolter, D. W. Bailey, and J. R. Brown. 2013. "Climate change and North American rangelands: Trends, projections, and implications." *Rangeland Ecology & Management*

Rorripa columbiae Conservation Strategy. 2017. Compiled by L. Kentnesse for USDI BLM.

Schmelzer, L., B. Perryman, B. Bruce, B. Schultz, K. McAdoo, G. McCuin, S. Swanson, et al. 2014. "Case study: Reducing cheatgrass (*Bromus tectorum* L.) fuel loads using fall cattle grazing [Abstract]." *The Professional Animal Scientist* 30: 270–278.

Schmidt, D. A., A. H. Taylor, and C. N. Skinner. 2008. "The influence of fuels treatment and landscape arrangement on simulated fire behavior, Southern Cascade range, California." *Forest Ecology and Management* 255: 3170–3184.

Smith, J. T., J. D. Tack, L. I. Berkeley, M. Szczypinski, and D. E. Naugle. 2017. "Effects of rotational grazing management on nesting greater sage-grouse." *Journal of Wildlife Management* 82(1): 103–112 and 66: 493–511.

Strand, E. K., K. L. Launchbaugh, R. Limb, and L. A. Torell. 2014. "Livestock grazing effects on fuel loads for wildland fire in sagebrush dominated ecosystems." *Journal of Rangeland Applications* 1: 35–57.

Svejcar, T., C. Boyd, K. Davies, M. Madsen, J. Bates, R. Sheley, C. Marlow, et al. 2014. "Western land managers will need all available tools for adapting to climate change, including grazing: A critique of Beschta et al." *Environmental Management* 53: 1035–1038.

Taylor, N. 2004. "Foster Flat." *Kalmiopsis* 11: 17–22.

TNC (The Nature Conservancy). 1992. Final Report Natural Area Inventory for the Lakeview Resource Area, Lakeview District, Bureau of Land Management. Unpublished report on file at Bureau of Land Management, Lakeview District Office, Lakeview, Oregon.

USFWS (US Fish and Wildlife Service). 2010. Endangered and threatened wildlife and plants; 12-Month findings for petitions to list the Greater Sage-Grouse (*Centrocercus urophasianus*) as threatened or endangered. *Federal Register* 75(55): 13910–14014.

_____. 2013. Greater sage-grouse (*Centrocercus urophasianus*) Conservation Objectives: Final Report. US Department of the Interior, Fish and Wildlife Service, Denver, Colorado.

Winchester, C.F., and M. J. Morris. 1956. "Water intake rates of cattle." *Journal of Animal Science* 15: 722–740.

Zeigenfuss, L. C., K. A. Schoenecker, J. I. Ransom, D. A. Ignizio, and T. Mask. 2014. "Influence of nonnative and native ungulate biomass and seasonal precipitation on vegetation production in a Great Basin ecosystem." *Western North American Naturalist* 74: 286–298.

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Glossary

Adaptive management. A type of natural resource management in which decisions are made as part of an ongoing science-based process. Adaptive management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices.

Amendment. The process for considering or making changes in the terms, conditions, and decisions of approved Resource Management Plans or management framework plans. Usually only one or two issues are considered that involve only a portion of the planning area.

Compensatory mitigation. Compensating for the residual impact by replacing or providing substitute resources or environments (40 CFR 1508.20).

Cooperating agency. Assists the lead federal agency in developing an environmental assessment or environmental impact statement. These can be any agency with jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6). Any tribe or Federal, State, or local government jurisdiction with such qualifications may become a cooperating agency by agreement with the lead agency.

Council on Environmental Quality (CEQ). An advisory council to the President of the US established by the National Environmental Policy Act of 1969. It reviews federal programs to analyze and interpret environmental trends and information.

Cumulative effects. The direct and indirect effects of a proposed project alternative's incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action.

Decision area. Public lands and mineral estate managed by the US Department of Interior, Bureau of Land Management that are within the planning area and are encompassed by all designated habitat.

Direct impacts. Direct impacts are caused by an action or implementation of an alternative and occur at the same time and place.

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.

General Habitat Management Area (GHMA). Areas of seasonal or year-round Greater Sage-Grouse habitat outside of priority habitat.

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.

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.

Impact. The effect, influence, alteration, or imprint caused by an action.

Indirect impacts. Indirect impacts result from implementing an action or alternative but usually occur later in time or are removed in distance and are reasonably certain to occur.

Lek. An arena where male sage-grouse display for the purpose of gaining breeding territories and attracting females. These arenas are usually open areas with short vegetation within sagebrush habitats, usually on broad ridges, benches, or valley floors where visibility and hearing acuity are excellent.

Long-term effect. The effect could occur for an extended period after implementation of the alternative. The effect could last several years or more.

Management decision. A decision made by the BLM to manage public lands. Management decisions include both land use plan decisions and implementation decisions.

Minimization mitigation. Minimizing impacts by limiting the degree or magnitude of the action and its implementation (40 CFR 1508.20 (b)).

Mitigation. Includes specific means, measures or practices that could reduce, avoid, or eliminate adverse impacts. Mitigation can include avoiding the impact altogether by not taking a certain action or parts of an action, minimizing the impact by limiting the degree of magnitude of the action and its implementation, rectifying the impact by repairing, rehabilitation, or restoring the affected environment, reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, and compensating for the impact by replacing or providing substitute resources or environments.

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.

Planning area. The geographical area for which resource management plans are developed and maintained regardless of jurisdiction.

Planning criteria. The standards, rules, and other factors developed by managers and interdisciplinary teams for their use in forming judgments about decision making, analysis, and data collection during planning. Planning criteria streamlines and simplifies the resource management planning actions.

Planning issues. Concerns, conflicts, and problems with the existing management of public lands. Frequently, issues are based on how land uses affect resources. Some issues are concerned with how land uses can affect other land uses, or how the protection of resources affects land uses.

Policy. This is a statement of guiding principles, or procedures, designed and intended to influence planning decisions, operating actions, or other affairs of the BLM. Policies are established interpretations of legislation, executive orders, regulations, or other presidential, secretarial, or management directives.

Priority Habitat Management Areas (PHMA). Areas that have been identified as having the highest conservation value to maintaining sustainable Greater Sage-Grouse populations; they include breeding, late brood-rearing, and winter concentration areas.

Resource management plan (RMP). A land use plan as prescribed by the Federal Land Policy and Management Act that establishes, for a given area of land, land-use allocations, coordination guidelines for multiple-use, objectives, and actions to be achieved.

Short-term effect. The effect occurs only during or immediately after implementation of the alternative.

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Appendix A
Additional RNA Information

Appendix A. Additional RNA Information

The following consists of additional information about the 15 key RNAs other than vegetation information. Information about wildlife species other than Bureau sensitive species is not included. This information is contained in establishment reports, final environmental impact statements for district RMPs, and management plans concerning each RNA. Each report or plan varies in its level of detail, and some information may be outdated.

Black Canyon RNA is located in Allotment #4 of the Malheur Resource Area. It includes redband trout and Columbia spotted frogs in the stream and was nominated for inclusion in the wild and scenic river system. Livestock tend to be concentrated near Antelope Spring, where water is provided. Potential trampling and overgrazing by livestock were identified as a threat to the condition of the vegetation community (BLM 1996a).

Dry Creek Bench RNA is located within the Twelvemile Creek Wilderness Study Area (WSA) and 15 Mile Community Allotment of the Malheur Resource Area. The BLM is managing portions of the RNA for Lahontan cutthroat trout habitat (BLM 1996b).

East Fork Trout Creek RNA is located in the Andrews Resource Area in the headwaters of the East Fork of Trout Creek and within the Mahogany Ridge WSA. Special status species present include Greater Sage-Grouse, ferruginous hawk, northern goshawk, and Columbia spotted frog. The RNA lies within the Trout Creek Mountain Allotment, with limited grazing in August and September. The management plan identifies grazing as an incompatible use for preservation of the key plant communities for which it was designated, but the limited grazing that occurs was considered acceptable (BLM 2007).

Fish Creek Rim RNA in located within the Fish Creek Rim WSA in the Lakeview Resource Area. Livestock grazing is permitted in the several allotments that the RNA straddles, although lack of water tends to restrict use except near two waterholes and along the small intermittent stream (TNC 1992). The RNA includes archaeological sites and culturally significant plants, such as *Lomatium* spp., *Calochortus* spp., onions, and bitterroot (BLM 2000), along with the rare cryptantha owl's-clover (*Orthocarpus cuspidatus* ssp. *Cryptanthus*; TNC 1992).

Foley Lake RNA is located in the Lakeview Resource Area. Livestock grazing is permitted, although an exclosure in the seasonally wet lake protects a population of the sensitive plant Columbia rockcress (*Rorippa columbiana*). The RNA also contains several archaeological sites (BLM 2000).

Foster Flat RNA in located in the Warm Springs Herd Management Area in the Three Rivers Resource Area and closed to grazing for both livestock and wild horses. The playa is the dominant feature, and the RNA includes the sensitive species desert combleaf (*Polyctenium fremontii* var. *confertum*) and pygmy rabbit (Taylor 2004).

Guano Creek-Sink Lakes RNA is located in the Guano Creek WSA in the Lakeview Resource Area adjacent to Hart Mountain Antelope Refuge and to Billy Burr Lake, which is owned by The Nature Conservancy. It includes cultural resources and two sensitive plant species: grimy ivesia (*Ivesia rhypara* var. *rhypara*) and Crosby's buckwheat (*Eriogonum crosbyae*; BLM 2000).

Lake Ridge RNA is located in the Camp Creek WSA and Jonesboro Allotment in the Malheur Resource Area. Greater Sage-Grouse use the area. Areas near water sources have been overgrazed and trampled, but otherwise grazing use appears to be light. Restricting livestock and off-highway vehicle use was recommended in the establishment report (BLM 1996c).

Mahogany Ridge RNA is located in the Malheur Resource Area and in the Mahogany Mountain Allotment. Cattle use was deemed light and to not have affected the vegetation, although changes in livestock were identified as a possible threat. The RNA provides summer habitat for broad-tailed hummingbird and other neotropical migratory birds. An addition in 1996 added considerable acreage of mountain big sagebrush/bluebunch wheatgrass plant community (BLM 1996d).

North Ridge Bully Creek RNA is located in the Ritchie Flat Allotment in the Malheur Resource Area. Livestock use was considered restricted due to limited availability of water, although the establishment report recommended restricting off-highway vehicle and livestock use. A central portion burned in a wildfire prior to 1996, but the year and name of the wildfire were not identified. Bunchgrasses were reported as thriving after the fire (BLM 1996e).

Rahilly-Gravelly RNA encompasses the Rahilly-Gravelly Allotment in the Lakeview Resource Area near the Nevada-Oregon state line. Livestock grazing has been light on the upper slopes due to lack of water but much heavier around Cahill Reservoir (TNC 1992). It contains several archaeological sites and all four Oregon populations of Cooper's goldflower (*Hymenoxys cooperi* var. *canescens*; BLM 2000).

South Bull Canyon RNA is located in the Boney Basin Allotment in the Malheur Resource Area. The establishment report identifies livestock grazing as a threat to the plant communities within the RNA as well as off-road vehicle travel (BLM 1996f).

South Ridge Bully Creek RNA in the Malheur Resource Area in an unidentified allotment, but likely the same allotment as North Ridge Bully Creek since these two RNAs are adjacent. Limited water availability appears to limit use by livestock. The area also supports loggerhead shrike and apparently burned in the same fire prior to 1996 that affected North Ridge Bully Creek (BLM 1996 g).

Spring Mountain RNA in located in the Spring Mountain Allotment in the Malheur Resource Area. The area may support spotted frogs (BLM 1996h).

Toppin Creek Butte RNA is located in the Anderson Allotment in the Malheur Resource Area, straddles Lookout Butte and Owyhee Canyon WSAs, and is between two wild and scenic river corridors. Breeding bird surveys indicate this RNA may contain one of the most complete Great Basin avian communities, including Greater Sage-Grouse (BLM 1996i).