Lakeview Draft Resource Management Plan Amendment and Draft Environmental Impact Statement

Volume 1 – Main Text

DOI-BLM-ORWA-L050-2018-0030-EIS

Bureau of Land Management
Lakeview District
Lakeview Field Office
1301 South G Street
Lakeview, Oregon 97630

May 2024

BLM

Lakeview District, Lakeview Field Office

DOI-BLM-ORWA-L050-2018-0030-RMP-EIS Amendment

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. Administration.

U.S. Department of the Interior
Bureau of Land Management
Lakeview District
Lakeview Field Office

Lakeview Draft
Resource Management Plan Amendment
and
Draft Environmental Impact Statement

May 2024

Recommended By:

Lakeview Field Office Manager: _____

Lakeview District Manager: _____

Approved By:

State Director: BARRY BUSHUE Digitally signed by BARRY BUSHUE Date: 2024.05.03 12:14:09 -07'00'

Abbreviations/Acronyms

ACEC	Area of Critical Environmental Concern
ARMPA	Approved Resource Management Plan Amendment
AUM	Animal Unit Month (of forage)
BA	Biological Assessment
BIA	Bureau of Indian Affairs
BMP	Best Management Practice
BOR	Bureau of Reclamation
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CWA	Clean Water Act
DEIS	Draft Environmental Impact Statement
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EDRR	Early Detection Rapid Response (weeds/invasive species)
ERMA	Extensive Recreation Management Area
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
FLPMA	Federal Land Policy and Management Act
FFR	Fenced federal range (allotment)
HAZMAT	hazardous materials
ICBEMP	Interior Columbia Basin Ecosystem Management Project
IDT	Interdisciplinary Team
ISA	Instant Study Area
LFO	Lakeview Field Office
LRA	Lakeview Resource Area
LWCF	Land and Water Conservation Fund
MLB	Management of Land Boundaries
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standards
NCA	National Conservation Area
NEPA	National Environmental Policy Act
NLCS	National Landscape Conservation System
NRHP	National Register of Historic Places
NOA	Notice of Availability
NOI	Notice of Intent
NPS	National Park Service
NRCS	National Resource Conservation Service
ODA	Oregon Department of Agriculture
ODEQ	Oregon Department of Environmental Quality
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
OHV	Off-Highway Vehicle
ORV	Outstanding Remarkable Value (associated with Wild and Scenic River)
PLSSDS	Public land survey system dataset

POO	Plan of Operations for locatable mineral development
RAC	Resource Advisory Council
RDF	Required Design Feature
RMP	Resource Management Plan
RMPA	Resource Management Plan Amendment
RNA	Research Natural Area
ROD	Record of Decision
SHPO	State Historic Preservation Office
SBE	Standards for Boundary Evidence
SMA	Special Management Area
SRMA	Special Recreation Management Area
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRM	Visual Resource Management (class)
WSA	Wilderness Study Area
WSR	Wild and Scenic River

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Draft Environmental Impact Statement

DOI-BLM-ORWA-L050-2018-0030-EIS

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

2. Cooperating Agencies: Fremont-Winema National Forests, Lake County Commissioners, Oregon Department of Fish and Wildlife, and Lake County Soil and Water Conservation District

3. Type of Action: Administrative Action (X) Legislative Action ( )

3. Document Status: Draft (X) Final ( )

4. Abstract: The Lakeview Draft Resource Management Plan Amendment/Draft Environmental Impact Statement (RMPA/EIS) addresses six alternative management approaches to lands with wilderness characteristics, off-highway vehicle (OHV) allocations, and livestock grazing use on public lands in south central Oregon. The alternatives are described in detail in *Chapter 2*. A summary of the potential environmental effects of each alternative are listed in Table ES-1 of the *Executive Summary*.

5. Date: Comments must be received within 90 days after the U.S. Environmental Protection Agency publishes its *Notice of Availability* of the EIS in the *Federal Register*.

6. Contact: For Further information contact:

Michael Collins
Bureau of Land Management
Lakeview District Office
1301 South G Street
Lakeview, OR 97630

Email: mcollins@or.blm.gov
Telephone: (541) 947-6112

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Oregon State Office
1220 SW 3rd Ave., Portland, Oregon 97204
blm.gov/or

Dear Reader:

The Bureau of Land Management (BLM) is pleased to announce the availability of the Draft Lakeview Resource Management Plan Amendment (RMPA) and Environmental Impact Statement (EIS). The Federal Land Policy and Management Act (FLPMA) directs the BLM to prepare resource management plans that manage public lands under the principles of multiple use and sustained yield. The document addresses a range of reasonable, alternative management approaches to lands with wilderness characteristics, off-highway vehicle (OHV) allocations, and livestock grazing. While the BLM has identified a preferred alternative in accordance with 40 CFR 1502.14(d), this does not represent the final agency decision. For this reason, I encourage you to carefully review and provide substantive comments on all of the alternatives and their potential effects.

Electronic copies of the Lakeview Draft RMPA/EIS and supporting documents are available on the BLM's ePlanning website at https://eplanning.blm.gov/eplanning-ui/home. If you do not have access to the internet, you may request a digital copy of the document. Hard copies of the document are available for viewing by contacting the Field Manager at the address below.

A 90-day public comment period is being provided for review of this document and will begin when the U.S. Environmental Protection Agency publishes its Notice of Availability for the Lakeview Draft RMPA/EIS in the *Federal Register*. The BLM will hold three public meetings during the comment period. The specific dates and locations of these meetings will be announced at least 15 days in advance through public notices, media releases, social media, and/or mailings.

You must submit written comments to the Field Manager prior to the close of the comment period via one of the following methods.

Regular mail:

Lakeview Field Office
Bureau of Land Management
1301 South G Street
Lakeview, OR 97630

Email: blm_or_lv_rmp_team@blm.gov

ePlanning website: https://eplanning.blm.gov/eplanning-ui/project/114300/510

Comments, including names and street addresses of respondents, will be available for public review at the Lakeview Field Office during regular business hours 8:00 a.m. to 4:30 p.m., Monday through Friday, except holidays, and may be published as part of the Final EIS. Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review, or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of

your written comments. Such requests will be honored to the extent allowed by law. All submissions from organizations and businesses, or from individuals identifying themselves as representatives or officials of organizations or businesses, will be available for public inspection in their entirety.

All written comments will be fully considered and evaluated in the preparation of the Proposed RMPA and Final EIS. I appreciate your help in this planning effort and look forward to your continued interest and participation. For additional information or clarification regarding this document or the planning process, please contact Michael Collins at (541) 947-6112 or mcollins@blm.gov.

Sincerely,

BARRY BUSHUE

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Date: 2024.05.03 11:54:09 -07'00'

Barry R. Bushue
State Director

Executive Summary

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Summary

The *Lakeview Draft Resource Management Plan Amendment and Draft Environmental Impact Statement* addresses options for future management of approximately 3.2 million acres of Federal surface and mineral estate in south central Oregon in accordance with a 2010 Settlement Agreement. The planning area is located in Lake and Harney Counties and is managed by the Lakeview Field Office of the Lakeview District, Bureau of Land Management (BLM). The document addresses wilderness characteristics management, off-highway vehicle (OHV) use and travel management, and livestock grazing management. All other management goals and direction described in the *Lakeview Resource Management Plan/Record of Decision* (RMP/ROD; as maintained and amended, BLM 2003b, 2015b) are not addressed by this RMP Amendment and remain unchanged. The existing management is described in Appendix 3.

The final decision resulting from this planning process will amend the *Lakeview RMP/ROD* (BLM 2003b). Following is a brief overview of the document to assist in your review and to help you better understand the planning process.

Chapter 1 - Introduction

Chapter 1 identifies the purpose and need for the plan, describes the planning area, and summarizes the 2010 Settlement Agreement that is driving the plan amendment process. This chapter also identifies the planning criteria used as guidelines in the planning process and are based on law, regulation, and policy.

The main planning issues are identified within a 2010 Settlement Agreement and include:

- How would applying different levels of protection to lands with wilderness characteristics affect other resources or multiple uses[1]?
- How would other resources or multiple uses[1] be affected if all WSAs and lands with wilderness characteristics were closed to off-highway vehicle (OHV) use?
- How would other resources or multiple uses[1] be affected if OHV use in WSAs and lands with wilderness characteristics were limited to roads and trails that existed at the time the area became a WSA or when the BLM first recognized the area possessed wilderness characteristics?
- How would other resources or multiple uses[1] be affected by closing pastures or allotments to livestock grazing, either temporarily or for the duration of the plan amendment, where BLM determines that existing grazing management practices or levels of grazing use are a significant factor in an allotment or pasture failing to achieve standards for rangeland health?
- How would other resources or multiple uses[1] be affected if NLCS lands (WSAs[2]) were no longer available for livestock grazing use following voluntarily relinquishment of a grazing permit?

[1] Other resources or multiple uses in the planning area include lands, realty, and cadastral survey, minerals and energy, visual resources, vegetation, fire and fuels, facilities, off-highway vehicle use, livestock grazing, soils, watershed and water quality, fish and aquatic wildlife, wildlife and wildlife habitat, recreation, wild horses, WSAs, ACEC/RNAs, suitable wild and scenic rivers, cultural and paleontological resources, and social and economic values.

[2] The only National Landscape Conservation System (NLCS) lands in the planning area are wilderness study areas (WSAs).

- How would other resources or multiple uses[1] be affected if NLCS lands (WSAs[2]), ACECs/RNAs, areas with BLM-identified wilderness characteristics, or designated critical habitats for species listed under the ESA were no longer available for livestock grazing use following voluntarily relinquishment of a grazing permit?

Chapter 2 - Alternatives

Chapter 2 presents six alternative management strategies for addressing wilderness characteristics management, OHV area designations, and two components of livestock grazing management: areas where Standards for Rangeland Health and Guidelines for Livestock Grazing are not being met due to livestock grazing, and the voluntary relinquishment of livestock grazing permits. Chapter 2 also addresses other alternatives that were considered but not analyzed in detail.

No Action Alternative - Continuation of Existing Management under 2010 Settlement Agreement

The Council on Environmental Quality (CEQ 1981) has defined the No Action Alternative for land use planning purposes as a continuation of current management. The purpose of this alternative is to serve as a baseline from which the effects of alternative actions can be measured (40 CFR 1502.14(d), in effect prior to September 14, 2020).

Wilderness Characteristics Management

This alternative would continue the BLM's current management approved in the *Lakeview RMP/ROD* (BLM 2003b), as amended by the *Oregon Greater Sage-grouse Approved RMP Amendment* (BLM 2015a) within wilderness characteristic units. The BLM would also continue to implement Provisions 18 and 19 of the 2010 Settlement Agreement which would prevent the BLM from taking actions that would reduce the size of a wilderness characteristics unit or cause an entire unit to no longer possess wilderness characteristics. The BLM identified 106 units (approximately 1,654,103 acres) in the planning area as possessing wilderness characteristics (see Appendix 2; Map W-1, Appendix 1).

Off-Highway Vehicle Use and Travel Management

Existing OHV area designations from the existing land use plan (as maintained and amended) would be retained throughout the planning area, including within BLM-identified wilderness characteristics units (Tables ES-1 and 3-3; Map OHV-1, Appendix 1).

Existing, open BLM roads, primitive roads, and trails that are currently in the Transportation Plan could be mechanically maintained in accordance with the existing maintenance management objective (maintenance level) specified in the existing Transportation Plan (see Appendix 9). However, mechanical maintenance of primitive routes/ways within the interior of WSAs and interior primitive routes within wilderness characteristics units would be precluded by compliance the *WSA Management Manual* (BLM 2012h) or the 2010 Settlement Agreement. Other BLM routes in the planning area outside of wilderness characteristics units could be mechanically maintained on as needed basis.

Livestock Grazing Management

Livestock grazing would continue to be managed in accordance with the livestock management goals and direction in the existing land use plan (BLM 2003b, 2015a, as maintained and amended). Most of the public land in the planning area would remain open to, or available for, livestock grazing use (Map G-1, Appendix 1).

Rangeland Health Management Changes

In areas where, based on completion of a rangeland health assessment, the BLM finds that existing livestock grazing management practices or levels of grazing use are a significant causal factor(s) in failing to achieve rangeland health standards (BLM 1997a; see Appendix 3), the BLM would take appropriate management actions in accordance with 43 CFR 4180.2(c). These actions could include changes to seasons and/or intensities of livestock use, rangeland project construction, temporary livestock exclusion, or long-term cancellation of grazing to control intensity, duration, and timing of grazing and/or provide for periodic deferment or rest to meet the physiological requirements of key plant species or other resource objectives. Administrative solutions (i.e., season of use revision, stocking level adjustment, and pasture exclusion) would continue to be the preferred solution to meet rangeland health/resource management objectives.

Voluntary Permit Relinquishment

When the BLM receives a properly executed letter of voluntary relinquishment anywhere in the planning area, the existing grazing permit or lease and associated permitted use (both active preference and suspended non-use) would terminate automatically without further notice, in accordance with current IMs, handbooks, manuals, and other policy guidance (*e.g*. BLM 1984d, WO IM 2013-184). However, these public lands would remain available for (or open to) grazing use and the BLM could receive an application(s) for livestock grazing from another qualified applicant and issue a new permit in accordance with 43 CFR 4110 and 4130.

The BLM could also consider designating the allotment as a Reserve Common Allotment (see MD LG-15, BLM 2015a) or allocating the forage for a different purpose or other resource uses. However, these actions would require the preparation of a separate RMP Amendment or revision to adopt.

Alternative A - Continuation of Existing Management without the Settlement Agreement

Wilderness Characteristics Management

This alternative would continue to implement the management from the *Lakeview RMP/ROD* (BLM 2003b, as maintained), as amended by the *Oregon Greater Sage-Grouse Approved RMP Amendment* (BLM 2015a, as maintained), but would not include continued compliance with Provisions 18 and 19 of the 2010 Settlement Agreement. Unlike the No Action Alternative, there would be no management for, or emphasis on protecting, wilderness characteristics within the 106 BLM-identified wilderness characteristics units. These areas would be managed in a manner that emphasizes other resources and multiple uses over wilderness characteristics.

Off-Highway Vehicle Use, Travel Management, and Livestock Grazing Management

Under this alternative, OHV use and travel management, and livestock grazing management would be the same as the No Action Alternative except there would be no management for, or emphasis on protecting wilderness characteristics that would limit road maintenance or new range improvements within wilderness characteristics units.

Management Common to Alternatives B-E

Under these alternatives, wilderness characteristics management would include a new land use plan management goal that would replace the existing goal and place each of the 106 BLM-identified

wilderness characteristics units into one of three possible management categories (A, B, or C) described in *Manual 6320 – Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process* (BLM 2021g, page 3). The unit categorization process is described in detail in Appendix 4. While the specific units placed into the three management categories would vary by alternative, the management direction for the three categories would be the same under these alternatives.

Category A Units

On these public lands, the BLM would prioritize the management of other resources and multiple uses over wilderness characteristics. These lands would continue to be managed in accordance with the approved administrative designations, land use allocations, management goals, and management direction contained in the existing land use plan (as maintained and amended; BLM 2003b, 2015b). These units would not be managed to protect their wilderness characteristics.

Category B Units

On these public lands, the BLM would apply a new management objective and management direction to balance the management of wilderness characteristics with other resources and multiple uses.

Category C Units

On these public lands, the BLM would apply a new management objective and management direction to prioritize the protection of wilderness characteristics over the management of other resources and multiple uses.

Alternative B - Emphasize Protection of Wilderness Characteristics

This alternative would emphasize the protection of wilderness characteristics on about 1,655,290 acres (51.6% of the planning area) through a combination of Category C unit management and designation as new wilderness study areas under Section 202 of the FLPMA (Section 202 WSAs).

Wilderness Characteristics Management

A total of 77 units and portions of 2 units (approximately 1,381,142 acres) would be managed to as Category C units to prioritize the protection of wilderness characteristics over other multiple uses (Map W-3, Appendix 1). Category C units would include land use allocations and management direction that only allows uses that are compatible with protecting wilderness characteristics (Tables ES-1 and 2-1; Map W-3, Appendix 1).

New WSAs Established Under Section 202 of FLPMA

A subset of wilderness characteristics units (34 units and portions of 2 units totaling approximately 273,705 acres) would be designated as new Section 202 WSAs (Map W-3, Appendix 1) and would be managed in the same manner as existing WSAs[3] under the non-impairment standard in *BLM Manual*

[3] The planning area includes 14 existing WSAs and 1 existing instant study area (ISA) encompassing 484,953 (see Table 3-54) acres that the BLM identified during the 15-year wilderness review completed in 1991 under Section 603 of FLPMA. During this inventory the BLM identified one entire WSA (Sage Hen Hills) and portions of two others (Basque Hills and Rincon) under Section 202 of FLPMA (see Appendix 3). Collectively, the BLM refers to these WSA/ISAs throughout this document as "existing WSAs" to distinguish them from new WSAs proposed under Section 202 within this plan amendment.

6330—Management of BLM Wilderness Study Areas (BLM 2012h). However, the BLM would retain the discretion to modify them through a subsequent land use plan amendment or revision.

Off-Highway Vehicle Use and Travel Management

All wilderness characteristics units and wilderness study areas (WSAs) would be closed to public motorized vehicle (OHV) use (approximately 2.1 million acres). All interior primitive routes (in WSAs) and primitive routes and trails (in wilderness characteristics units) would be closed to public motorized vehicle use and would no longer be maintained for motorized travel. No public cross-country motorized vehicle or mechanical travel would be allowed in these areas (Map OHV-2, Appendix 1).

Livestock Grazing Management

Under this alternative most of the livestock grazing management direction would be the same as the No Action Alternative initially, including areas available for grazing use, areas closed to, or excluded from grazing use, and unallotted areas. However, in accordance with Provisions 14(d) and 27-31 of the 2010 Settlement Agreement, the following grazing management changes would be applied. The BLM would modify existing grazing management to:

> Remove grazing, either at the allotment or pasture scale, for the duration of the plan amendment when the BLM determines that existing livestock grazing management practices or levels of grazing use are a significant causal factor(s) in failing to achieve rangeland health standards. This would require the BLM to modify or suspend a grazing permit after completing additional site-specific NEPA analysis and issuing a grazing decision.
>
> When the BLM receives a properly executed letter of voluntary relinquishment of a grazing permit or lease (either completely or partially) for areas that overlap: BLM-identified lands with wilderness characteristics, designated wilderness areas, wilderness study areas (WSAs), designated National Wild and Scenic Rivers, designated National Historic Trails, Areas of Critical Environmental Concern (ACECs) and Research Natural Areas (RNAs), or designated critical endangered species habitat, the existing permit or lease would terminate without further notice. Those areas would then be unavailable for livestock grazing use or have the total permitted use reduced (in a common use allotment).

Alternative C - Emphasize Protection of Specific Lands with Wilderness Characteristics while Providing for Limited Levels of Commodity Production and Other Multiple Uses (Preferred Alternative)

Wilderness Characteristics Management

Under this alternative, the BLM used an evaluation matrix process (see Appendix 4) to identify 26 units and portions of four units for Category C management (totaling approximately 411,033 acres) where it would prioritize the protection of wilderness characteristics by changing land use allocation and management direction that only allows uses that are compatible with protecting wilderness characteristics.

The BLM would balance the management of wilderness characteristics with other resources and multiple uses in 71 units and portions of 2 units (Category B units totaling approximately 1,161,199 acres).

The BLM would emphasize the management of other resources and multiple uses over wilderness characteristic protection in 5 units and portions of 3 units (Category A units totaling approximately 74,529 acres; Tables ES-1 and 2-1; Map W-4, Appendix 1).

Off-Highway Vehicle Use and Travel Management

All existing OHV Open area allocations in the planning area would be changed to Limited. No areas would be open to public cross-country OHV use. Existing OHV Closed area designations would remain closed to OHV use. OHV use within all non-WSA areas with BLM-identified wilderness characteristics, would be limited to routes that existed at the time the BLM identified wilderness characteristics to be present, as described in Provision 26(c) of the 2010 Settlement Agreement. OHV and mechanical transport use within WSAs (including the Sand Dunes WSA) would be limited to routes that existed at the time of WSA designation (1991) (Map OHV-3, Appendix 1).

Livestock Grazing Management

Most of the livestock grazing management direction would be the same as the No Action Alternative initially, including areas available for grazing use, areas unavailable for grazing use, areas closed to, or excluded from grazing use, and unallotted areas (Table 3-39; Map G-1, Appendix 1). However, in accordance with Provisions 14(d) and 27-31 of the 2010 Settlement Agreement, the BLM would modify existing grazing management to:

> Temporarily close allotments or pastures to livestock grazing when the BLM determines that existing livestock grazing management practices or levels of grazing use are a significant causal factor(s) in failing to achieve rangeland health standards. This would require the BLM to temporarily modify or suspend the grazing permit after completing an additional site-specific NEPA analysis and issuing a grazing decision. Grazing could resume once the BLM documents, through monitoring and a subsequent assessment, that the pasture or allotment is meeting standards or is making significant progress towards meeting standards, or grazing is no longer a causal factor for failing to meet standards.

> When the BLM receives a properly executed letter of voluntary relinquishment of a grazing permit or lease (either completely or partially) for areas that overlap National Landscape Conservation System lands, which in the Lakeview Field Office only includes WSAs, the existing permit or lease would terminate automatically without further notice. Those areas would have the permitted grazing use reduced for the duration of the plan.

Alternative D - Balance Management of Wilderness Characteristics with Other Multiple Uses

Wilderness Characteristics Management

Under this alternative, the BLM used a modified evaluation matrix process to identify two Category C wilderness characteristics units (totaling about 4,671 acres) where it would prioritize the protection of wilderness characteristics where it would prioritize the protection of wilderness characteristics by changing land use allocation and management direction that only allows uses that are compatible with protecting wilderness characteristics.

The BLM would balance the management of wilderness characteristics with other resources and multiple uses in 41 units and portions of 18 units (Category B units totaling approximately 1,066,919 acres).

The BLM would emphasize the management of other resources and multiple uses over wilderness characteristic protection in 45 units and portions of 18 units (Category A units totaling approximately 582,355 acres (Tables ES-1 and 2-1; Map W-5, Appendix 1).

Off-Highway Vehicle Use and Travel Management

OHV use and mechanical transport within the two Category C units would be limited to existing routes. Existing Closed OHV areas and two other areas (Alkali Lake chemical waste site and Foskett Speckled

Dace habitat) would be closed to OHV use. Forty-four distinct areas (polygons) would remain open to cross-country OHV use across the planning area (Map OHV-4, Appendix 1).

Livestock Grazing Management

Most of the livestock grazing management direction would be the same as the No Action Alternative with the following differences:

> If a rangeland health assessment is completed that indicates one or more standards are not being met due to factors other than grazing that are subject to BLM control, then the authorized officer shall consider taking action to make progress toward rangeland health standards and land use plan objectives, even though livestock grazing is not a significant causal factor for non-attainment of standard(s). Actions available to the authorized officer could include, but would not be limited to, changes in livestock grazing management.
>
> If a Rangeland Health Assessment has not been completed for an allotment or pasture, or if the existing assessment no longer represents current resource conditions, then the BLM would not permit increases to AUMs that could increase negative impacts to other resources over the term of the permit until the Rangeland Health Assessment is completed or revised.
>
> When the BLM receives a properly executed letter of voluntary relinquishment anywhere in the planning area it would continue to follow the permit relinquishment policy in WO IM 2013-184 (or subsequent guidance). This would result in ending the relinquished party's permitted use and preference, but would not, in and of itself, result in that forage allocation becoming unavailable for livestock use. The BLM would review the compatibility of livestock grazing use with other existing resources and multiple uses in the former permit area through site-specific NEPA compliance process. If grazing is found to be compatible with the other resource considerations, the area would remain available to livestock grazing and could become a reserve common allotment or a new grazing permit could be issued to a qualified applicant in accordance with 43 CFR 4100. If grazing is found to be incompatible, the forage allocation would be made to another resource.

Alternative E – Emphasize Protection of Specific Lands with Wilderness Characteristics Based on External Criteria

Wilderness Characteristics Management

The BLM consulted the Southeastern Oregon Resource Advisory Council (RAC) for input on management of lands with wilderness characteristics. While the RAC was unable to officially recommend an alternative design (due to the lack of a quorum), individual members did provide input on the design of an alternative that further refined the output from the matrix evaluation process based on rankings for ecological conditions, other resources present, and a higher weighting of the criterion of connectivity to other lands with wilderness characteristics and WSAs (see Appendix 4). As a result of this process, this alternative would prioritize the protection of wilderness characteristics in 26 units (Category C units totaling approximately 372,218 acres) by changing land use allocation and management direction that only allows uses that are compatible with protecting wilderness characteristics.

The BLM would balance the management of wilderness characteristics with other resources and multiple uses in 68 units (Category B units totaling approximately 1,109,160 acres).

The BLM would emphasize the management of other resources and multiple uses over wilderness characteristic protection in 12 units (Category A units totaling approximately 168,512 acres (Tables ES-1 and 2-1; Map W-6, Appendix 1).

Off-Highway Vehicle Use and Travel Management

Under this alternative, OHV use and mechanical transport within Category C units would be limited to existing routes. OHV use and mechanical transport within the rest of the planning area, including WSAs, would be the same as the No Action Alternative (Map OHV-5, Appendix 1).

Livestock Grazing Management

Under this alternative, the livestock grazing management direction, including how rangeland health issues and permit relinquishments are addressed, would be the same as Alternative A.

Chapter 3 - Affected Environment and Environmental Consequences

This chapter contains a description of the existing resource conditions and uses within the planning area (*Affected Environment*) followed by a discussion of the potential environmental effects to these resources and uses (*Environmental Effects*) that could occur as a result of the six alternative management strategies. There are several general assumptions listed at the beginning of the chapter that apply to all alternatives. There are also analysis assumptions listed at the beginning of the *Environmental Effects* section for each individual resource that are intended to guide the reader through the logic of the BLM's analysis process.

Table ES-1 contains a summary of potential environmental effects for each alternative. The reader should examine Chapter 3 for a more in-depth discussion of environmental effects on resources and uses within the planning area.

Table ES-1. Summary of Potential Environmental Impacts of Alternatives

Resource or Use	No Action Alternative	Alternative A	Alternative B	Alternative C - Preferred Alternative	Alternative D	Alternative E
WILDERNESS CHARACTERISTICS						
Wilderness Character Unit Management	This alternative would protect wilderness characteristics within all 106 recently identified wilderness characteristics units (1,654,103 acres) subject to a 2010 Settlement Agreement. Subject to valid existing rights, the BLM would not implement or authorize any projects that it deems would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. For these reasons, the BLM expects wilderness characteristics within all wilderness characteristic units would be maintained over the long-term.	The 106 wilderness characteristics units (1,654,103 acres) would be managed in a manner that emphasizes other resource values and multiple uses over wilderness characteristics in accordance with the 2003 *Lakeview RMP/ROD*, as maintained and amended. Some of the 106 wilderness characteristics units would likely decrease in size or lose their wilderness characteristics in part or entirely over the long-term as the BLM would not be required to mitigate impacts to wilderness characteristics. Though the management direction would allow human-caused ground-disturbing activities to occur within wilderness characteristics units, such activities would not likely occur within	Wilderness characteristics within 77 units and portions of 2 units (1,381,142 acres) would be managed as Category C (emphasize wilderness characteristics protection). Most human-caused ground-disturbing activities (including all public OHV use) would be eliminated from these units. This alternative would provide the most protections of, and benefits to, wilderness characteristics of all the alternatives and wilderness characteristics in these units would be retained or enhanced over the long-term.	Wilderness characteristics within many of the 26 units and portions of 4 units (411,033 acres) managed as Category C (emphasize wilderness characteristics protection) would benefit from additional protections provided by changes in management. Most human-caused ground-disturbing activities (including public cross-country OHV use) would be eliminated and wilderness characteristics in these units would be retained or enhanced over the long-term in these areas. The application of boundary setbacks would slightly reduce the size of the protected units (about 7,276 acres). Wilderness characteristics within the setbacks could be substantially reduced or	Wilderness characteristics within 2 units (4,761 acres) managed as Category C (emphasize wilderness characteristics protection) would benefit from additional protections provided by changes in management. Most human-caused ground-disturbing activities (including public cross-country OHV use) would be eliminated from these units and wilderness characteristics in these units would be retained or enhanced over the long-term in these areas. The application of boundary setbacks would slightly reduce the size of the 2 protected units. Wilderness characteristics within the setbacks could be substantially reduced or eliminated over the long term. 41 units and portions of 18 units (1,066,919 acres) would be managed as Category B	Wilderness characteristics within many of the 26 units (372,218 acres) managed as Category C (emphasize wilderness characteristics protection) would benefit from additional protections provided by changes in management. Most human-caused ground-disturbing activities (including public cross-country OHV use) would be eliminated from these units and wilderness characteristics in these units would be retained or enhanced over the long-term in these areas. The application of boundary setbacks would slightly reduce the size of the area managed as Category C (about 4,211 acres). Wilderness characteristics within the setbacks could be substantially reduced or eliminated over the long-term. 68 units (1,109,160 acres) would be

Resource or Use	No Action Alternative	Alternative A	Alternative B	Alternative C - Preferred Alternative	Alternative D	Alternative E
		all units over the long-term. Wilderness characteristics would likely be retained in some areas and lost in others.		eliminated over the long-term. 71 units and portions of 2 units (1,161,199 acres) would be managed as Category B (balance wilderness characteristics with other multiple uses). Many potential negative effects of human caused ground disturbance could be reduced by application of BMPs within Category B units. 5 units and portions of 3 units (74,529 acres) would be managed as Category A (for other multiple uses). Some category B and A units would likely decrease in size or entirely lose wilderness characteristics over the long-term.	(balance wilderness characteristics with other multiple uses). Many potential negative effects of human caused ground disturbance could be reduced by application of BMPs within Category B units. 45 units and portions of 18 units (582,355 acres) would be managed as Category A (for other multiple uses). Some category B and A units would likely decrease in size or entirely lose wilderness characteristics over the long-term.	managed as Category B (balance wilderness characteristics with other multiple uses). Many potential negative effects of human caused ground disturbance could be reduced by application of BMPs within Category B units. 12 units (168,512 acres) would be managed as Category A (for other multiple uses). Some category B and A units would likely decrease in size or entirely lose wilderness characteristics over the long-term.
Existing WSAs	Continue to manage 484,953 acres in 14 existing WSAs/1 ISA in Planning Area under *BLM Manual 6330 – Management of Wilderness Study Areas* (BLM 2012h)					
New Section 202 WSAs	Not applicable		Designate and manage 34 new units and portions of 2 new units, along with 7 existing units (totaling approximately 273,705 acres), as new Section 202 WSAs and manage under BLM (2012h)	Not applicable		

Resource or Use	No Action Alternative		Alternative A	Alternative B	Alternative C - Preferred Alternative	Alternative D	Alternative E
Land Tenure	Planning Area	106 WC Units	106 WC Units	WC Units/New 202 WSAs	106 WC Units		
Management Zones Zone 1 - (Retention) Zone 2 - (Exchange) Zone 3 – (Disposal)	Continue to manage land tenure zones according to the following allocations: 2,599,575 acres 600,922 acres 3,158 acres	 1,430,461 acres 223,522 acres 120 acres	Same as No Action Alternative.	The following land tenure zone changes would occur: 1,655,290 acres 0 acres 0 acres	 1,456,471 acres 197,512 acres 120 acres	 1,430,461 acres 223,522 acres 120 acres	 1,431,036 acres 223,947 acres 120 acres
Summary	Managing the majority (87.7%) of the wilderness characteristics units as land tenure zone 1 would retain these lands under BLM administration. In addition, the provisions of the 2010 Settlement Agreement would also prevent the BLM from authorizing land sales or exchanges within land tenure zones 2 or 3 within the remaining 12.3% of these units. This direction would collectively prevent the sale or exchange within wilderness characteristics units. While this management would result in retaining large blocks of public land that are efficient to manage, particularly within units, it would continue to cause some management difficulties or inefficiencies associated with scattered land ownership patterns in portions of the planning area.		BLM would be able to consider the sale or exchange of public lands within land tenure zones 2 and 3 inside units. For this reason, more public requests for land sales or exchanges could be met over the long-term. In addition, there would be slightly more opportunities to block up scattered land ownership patterns and improve management efficiencies in portions of the planning area compared to the No Action Alternative.	Approximately 224,829 additional acres would be placed into land tenure zone 1, which would prevent sale or exchange of lands with wilderness characteristics units. There would be fewer acres available for land sales or exchanges compared to the No Action Alternative or Alternative A. While this would result in retaining large blocks of public land that are efficient to manage, it would not resolve management difficulties or inefficiencies associated with the existing scattered land ownership pattern in portions of the planning area.	Managing Category C units as land tenure zone 1 would result in approximately 26,367 additional acres in zone 1. As a result, slightly more acres would be retained in Federal jurisdiction. Fewer acres would be available for land sale or exchange compared to the No Action Alternative or Alternative A. While this management would retain large blocks of public land that are efficient to manage, it would not resolve management difficulties or inefficiencies associated with the existing scattered land ownership pattern in portions of the planning area.	Managing Category C units as land tenure zone 1 would result in no changes in existing land tenure zone designations under this alternative. For this reason, the impacts of wilderness characteristics management on land sales/exchange opportunities would be the same as Alternative A.	Managing Category C units as land tenure zone 1 would result in approximately 584 additional acres in zone 1. As a result, slightly more acres would be retained in Federal jurisdiction. Overall, slightly fewer acres would be available for land sale or exchange compared to Alternative A.
Land Use Authorizations	Planning Area	106 WC Units	106 WC Units	WC Units/New 202 WSAs	106 WC Units		
Major ROWs	Manage land use authorizations according to the following allocations:			The following changes in land use authorization allocations would occur:			

Resource or Use	No Action Alternative		Alternative A	Alternative B	Alternative C - Preferred Alternative	Alternative D	Alternative E
Open Corridors	74,963 acres	27,366 acres	Same as No Action Alternative.	0 acres	27,366 acres	27,366 acres	27,366 acres
Open Areas	506,167 acres	161,748 acres		0 acres	13,023 acres	43,465 acres	48,466 acres
Avoidance Areas	2,136,467 acres	1,463,810 acres		0 acres	1,077,526 acres	1,578,601 acres	1,026,503 acres
Exclusion Areas	485,995 acres	1,198 acres		1,655,290 acres	411,033 acres	4,671 acres	372,218 acres
Solar/Wind ROWs							
Open Areas	531,227 acres	165,431 acres	Same as No Action Alternative.	0 acres	165,544 acres	165,431 acres	165,431 acres
Avoidance Areas	1,578,927 acres	1,087,517 acres		0 acres	1,077,526 acres	1,087,468 acres	1,087,461 acres
Exclusion Areas	1,093,288 acres	401,155 acres		1,655,290 acres	411,033 acres	401,205 acres	401,210 acres
Minor ROWs							
Open Areas	1,411,295 acres	713,636 acres	Same as No Action Alternative.	0 acres	28,501 acres	168,584 acres	98,581 acres
Avoidance Areas	1,306,327 acres	939,270 acres		1,380,946 acres	1,624,404 acres	1,484,316 acres	1,554,324 acres
Exclusion Areas	485,995 acres	1,198 acres		274,344 acres	1,198 acres	1,198 acres	1,198 acres
Summary	While public lands would continue to be available for major, wind/solar, and minor ROWs in Open and Avoidance areas, Provisions 18 and 19 of the 2010 Settlement Agreement would prevent future ROWs from being issued within wilderness characteristics units. As a result, some public, commercial, and other agency land use authorization needs would not be met.		Public lands would continue to be available for major, wind/solar, and minor ROWs in Open or Avoidance areas similar to the No Action Alternative. However, BLM would also be able to consider new ROWs within wilderness characteristics units. Land use authorizations would be the least restricted of all the alternatives. For this reason, more public, commercial, and other agency land use authorization needs would be met on public lands compared to the No Action Alternative.	Major and wind/solar ROW Exclusion areas and minor ROW Avoidance or Exclusion areas would increase substantially compared to the No Action Alternative and Alternative A. Overall, this alternative would have the highest degree of land use authorization restrictions and the fewest public, commercial, and other agency land use authorization needs would be met compared to all other alternatives.	Major and wind/solar ROW Exclusion areas and minor ROW Avoidance areas would increase compared to the No Action Alternative and Alternative A. Overall, new land use authorizations would be restricted to a higher degree and fewer public, commercial, and other agency land use authorization needs would be met compared to the No Action Alternative or Alternative A.	Major and wind/solar ROW Exclusion areas and minor ROW Avoidance areas would increase slightly compared to the No Action Alternative and Alternative A. Overall, new land use authorizations would be restricted to a slightly higher degree and slightly fewer public, commercial, and other agency land use authorization needs would be met compared to the No Action Alternative or Alternative A.	Major and wind/solar ROW Exclusion areas and minor ROW Avoidance areas would increase compared to the No Action Alternative and Alternative A. Overall, new land use authorizations would be restricted to a slightly higher degree and fewer public, commercial, and other agency land use authorization needs would be met compared to the No Action Alternative or Alternative A.

Resource or Use	No Action Alternative		Alternative A	Alternative B	Alternative C - Preferred Alternative	Alternative D	Alternative E
Energy and Minerals	Planning Area	106 WC Units	106 WC Units	WC Units/New 202 WSAs	106 WC Units		
Locatable Minerals	Locatable mineral exploration and development opportunities would continue to be constrained as follows:						
Withdrawn/Segregated	13,257 acres	600 acres	Impacts to locatable mineral exploration and development opportunities would be the same as those described for the No Action Alternative.	600 acres	Impacts to locatable mineral exploration and development opportunities would be the same as those described for the No Action Alternative.	Impacts to locatable mineral exploration and development opportunities would be the same as those described for the No Action Alternative.	Impacts to locatable mineral exploration and development opportunities would be the same as those described for the No Action Alternative.
Open subject to the non-impairment standard, along with requirement to prepare a plan of operations (POO)	458,585 acres (existing Section 603 WSAs)	Not Applicable		Not Applicable			
Open subject unnecessary and undue degradation standard and either no additional restrictions or CSU, POO, or combination of these	2,818,333 acres (includes existing Section 202 WSAs and ACEC/RNAs).	1,654,690 acres		1,654,690 acres (includes 281,691 acres of existing and new Section 202 WSA requiring preparation of a POO).			
Leasable Energy and Minerals	Leasable energy and mineral exploration and development would continue to be constrained as follows:						
Closed (due to WSA, ACEC/ RNA, or other resource management priorities).	504,284 acres	18,580 acres	The same amount of Federal mineral estate would be closed to, open to, or open with stipulations, to leasable mineral exploration and development as the No Action Alternative. Overall, this alternative would have the fewest constraints on leasable mineral exploration and development opportunities of all the alternatives analyzed.	282,720 acres mostly in new Section 202 WSAs.	The area closed to mineral leasing would be the same as the No Action Alternative.	The area closed to mineral leasing would be the same as the No Action Alternative.	The area closed to mineral leasing would be the same as the No Action Alternative.
Open subject to NSO stipulation	1,279,908 acres	873,306 acres		1,322,311 acres in Category C units. This stipulation could effectively prohibit leasable mineral development within larger Category C units. Overall, this alternative would have the most constraints on leasable mineral exploration and development opportunities of all the alternatives analyzed.	1,061,822 acres in Category C units This stipulation could effectively prohibit leasable mineral development within larger Category C units. After Alternative B, this alternative would be the most constraints on leasable mineral exploration and development opportunities.	873,471 acres in Category C units. Due to small unit size, leasable mineral development within the 2 Category C units could still be feasible. Overall, this alternative would have slightly more acres of leasable mineral exploration and development opportunities constrained	901,357 acres in Category C units. This could effectively prohibit leasable mineral development within larger Category C units. Overall, this alternative would have more acres of leasable mineral exploration and development opportunities constrained
Open subject to other controlled surface use (CSU) stipulations.	1,236,004 acres. These stipulations would increase development costs and could effectively prohibit some leasable mineral and energy development within large geographic areas.						
Open	248,431 acres	84,976 acres. Provisions 18 and 19 of 2010 Settlement Agreement would prevent leasable					

Resource or Use	No Action Alternative		Alternative A	Alternative B	Alternative C - Preferred Alternative	Alternative D	Alternative E
		mineral development in any open areas if it would cause an entire unit to no longer possess wilderness characteristics.				compared to the No Action Alternative.	compared to the No Action Alternative.
	Planning Area	106 WC Units	106 WC Units	WC Units/New 202 WSAs	106 WC Units		
Salable Minerals	Salable mineral exploration and development would continue to be constrained as follows:						
Closed (existing WSA, Sage-Grouse PHMA, special status plant, and cultural resource management priorities) Open with no constraints or subject to CSU stipulations	1,410,233 acres 1,858,389 acres	622,695 acres 982,336 acres. Salable mineral development in these units would be precluded if it caused a unit to no longer possess wilderness characteristics.	This alternative would provide the same amount of Federal mineral estate open to salable mineral exploration and development as the No Action Alternative, but with fewer no constraints for wilderness characteristics. This alternative would provide the highest level of salable mineral development potential of all of the alternatives.	About 1,655,290 acres of Federal mineral estate would be closed to salable mineral exploration and development due to Category C and Section 202 WSA management. Overall, this alternative would have the most constraints on salable mineral exploration and development opportunities of all the alternatives.	About 879,573 acres of Federal mineral estate would be closed to salable mineral development due to Category C unit management. After Alternative B, this alternative would have the most constraints on salable mineral exploration and development opportunities.	Approximately 622,860 acres of Federal mineral estate would be closed to salable mineral development due to Category C unit management. Overall, this alternative would have slightly more constraints on salable mineral exploration and development opportunities than the No Action Alternative.	Approximately 752,853 acres of Federal mineral estate would be closed to salable mineral development due to Category C unit management. Overall, this alternative would have more constraints on salable mineral exploration and development opportunities than the No Action Alternative.
Visual Resources	Planning Area	106 WC Units	106 WC Units	WC Units/New 202 WSAs	106 WC Units		
VRM Classes Class I Class II Class III Class IV	 492,826 acres 160,098 acres 354,906 acres 2,187,594 acres	 7,938 acres 117,055 acres 184,332 acres 1,344,778 acres	Same as No Action Alternative	 280,748 acres 1,374,542 acres 0 acres 0 acres	 7,938 acres 472,110 acres 1,094,123 acres 79,931 acres	 7,938 acres 121,740 acres 1,161,922 acres 362,502 acres	 7,938 acres 427,424 acres 1,069,884 acres 148,857 acres
Summary	This alternative would continue to manage scenic values by assessing impacts of future project/planning decisions through the visual contrast rating system, and where appropriate, mitigating potential adverse effects of future management activities to adhere to appropriate VRM objectives. The Settlement Agreement		Most of the wilderness characteristics units fall within VRM Classes III or IV. Managing scenic values to meet	There would be a substantial increase in the total area managed for VRM Class I and II Objectives.	There would be an increase in the total area managed for VRM Class II Objectives, all within Category C units. Within	There would be a slight increase in the total area managed for VRM Class II Objectives, all of which would occur in Category C units.	There would be an increase in the total area managed for VRM Class II Objectives, all of which would occur in Category C units.

Resource or Use	No Action Alternative	Alternative A	Alternative B	Alternative C - Preferred Alternative	Alternative D	Alternative E
	provisions precluding actions that reduce or diminish unit size or cause an entire unit to no longer possess wilderness characteristics would prevent many ground-disturbing activities that could potentially impact scenic/visual quality. This management would reduce potential visual impacts and maintain scenic character within wilderness characteristics units over the long-term.	these VRM Class objectives would not protect wilderness characteristics within most units. Though BMPs could be applied to reduce/mitigate potential visual resource impacts, naturalness and unit size could be negatively impacted within portions of the other 106 wilderness characteristics units compared to the No Action Alternative.	The BLM would assess potential impacts of future projects/ management actions using the visual contrast rating system, and where appropriate, mitigate potential adverse effects to adhere to VRM Class I and II Objectives. As a result, the existing visual character/scenic quality of the landscape within these areas would be maintained or improved over the long-term. Overall, Alternative B would protect scenic values across a much larger portion of the planning area compared to all of the other alternatives.	Category B units there would be a substantial increase in area managed for VRM Class III objectives, along with some acres continuing to be managed as VRM Class II. The BLM would assess potential impacts of future projects/ management actions in these areas using the visual contrast rating system, and where appropriate, mitigate potential adverse effects to adhere to VRM Class II or III Objectives. Overall, the existing visual/scenic character of the landscape within all Category C units and most (80%) Category B units would be maintained over the long-term.	Within Category B units there would be a substantial increase in area managed for VRM Class III objectives, along with some acres continuing to be managed as VRM Class II. The BLM would assess potential impacts of future projects/management actions in these areas using the visual contrast rating system, and where appropriate, mitigate potential adverse effects to adhere to VRM Class II or III Objectives. Overall, the existing visual/ scenic character of the landscape within all Category C units and most (80%) Category B units would be maintained over the long-term.	Within Category B units there would be a substantial increase in area managed for VRM Class III objectives, along with some acres continuing to be managed as VRM Class II. The BLM would assess potential impacts of future projects/management actions in these areas using the visual contrast rating system, and where appropriate, mitigate potential adverse effects to adhere to VRM Class II or III Objectives. Overall, the existing visual/ scenic character of the landscape within all Category C units and most (80%) Category B units would be maintained over the long-term.
OFF-HIGHWAY VEHICLE (OHV) AND TRAVEL MANAGEMENT						
OHV Area Designations	Retain existing OHV area designations across planning area:		The following changes in OHV area designations would occur:	The following changes in OHV area designations would occur:	The following changes in OHV area designations would occur:	The following changes in OHV area designations would occur:
Open Limited to - Designated Routes - Existing Routes Closed	467,104 acres 384,930 acres 2,339,555 acres 10,809 acres	Same as No Action Alternative	252,569 acres 125,764 acres 681,928 acres 2,140,984 acres	0 acres 384,193 acres 2,807,904 acres 11,285 acres	70,573 acres 384,193 acres 2,737,306 acres 11,285 acres	466,798 acres 384,193 acres 2,341,105 acres 11,285 acres

Resource or Use	No Action Alternative	Alternative A	Alternative B	Alternative C - Preferred Alternative	Alternative D	Alternative E
Concentrated Cross-Country Motorized Vehicle/OHV Use	30,000-93,320 acres concentrated OHV disturbance (63,320 additional acres)	Same as No Action Alternative	30,000-50,460 acres concentrated OHV disturbance (20,460 additional acres)	0 acres concentrated OHV disturbance (30,000-acre reduction)	30,000-70,500 acres concentrated OHV disturbance (40,500 additional acres)	Same as No Action Alternative
BLM Roads/Primitive Roads/Motorized Trails	About 5,529 miles of existing routes would remain open.	Same as No Action Alternative except BLM's road maintenance and construction activities would not be constrained by the Settlement Agreement.	Closure of about 1,665 miles of existing routes.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
Summary	The existing OHV area designations and open route network would continue to provide public and administrative motorized access to most public lands in the planning area for a variety of uses. This alternative would maintain or protect the BLM's investment in road/access development on some of the public lands in the planning area, but would not be able to accommodate any increased OHV demand within wilderness characteristics units. Most management activities under this alternative would continue to provide for motorized vehicle use, public access, and user safety, as well as provide opportunities to meet existing motorized vehicle use demand while minimizing conflicts among various public land users.	This alternative would promote motorized vehicle use, public access, and user safety, as well as provide more opportunities to meet increased motorized vehicle/OHV demand to a higher degree than the No Action Alternative. This alternative could result in increased conflicts with other public land users, but would maintain or protect the BLM's investment in road development/access on the public lands to a higher degree than the No Action Alternative.	This alternative would result in the most substantial reduction or loss of motorized vehicle use and public access (about 60% of the planning area) of all the alternatives over the long-term. This alternative would promote user safety on the remaining open routes and would likely reduce some conflicts between those seeking motorized access to the public lands and those seeking non-motorized experiences. Those desiring to participate in off-road motorized vehicle activities would experience a substantial reduction in these opportunities compared to the No Action Alternative and Alternative A. This alternative would not maintain or protect the BLM's investment in road development/	This alternative would promote motorized vehicle use, public access, and user safety on the existing route network while minimizing conflicts among most public land users. This alternative would maintain or protect the BLM's investment in road development/access on the public lands but would not provide any areas for off-road or cross-country motorized vehicle activities. Those desiring to participate in these types of activities would be precluded from doing so.	This alternative would promote motorized vehicle use, public access, and user safety while minimizing conflicts among most public land users. This alternative would also maintain or protect the BLM's investment in road development/access on the public lands. Those desiring to participate in off-road motorized vehicle activities would experience a reduction in these opportunities compared to the No Action Alternative and Alternative A.	This alternative would promote motorized vehicle use, public access, and user safety while minimizing conflicts among most public land users similar to Alternative A. This alternative would also maintain or protect the BLM's investment in road development/access on the public lands. Slightly fewer areas/acres would be available for cross-country motorized use, but those desiring to participate in off-road motorized vehicle activities would experience similar opportunities as the No Action Alternative and Alternative A.

Resource or Use	No Action Alternative	Alternative A	Alternative B	Alternative C - Preferred Alternative	Alternative D	Alternative E
			access within about 1.65 million acres of public lands.			
LIVESTOCK GRAZING						
Areas Available for Livestock Grazing Use	2,960,285 acres	Same as No Action Alternative	991,785-2,960,285 acres	2,554,035-2,960,285 acres	Same as No Action Alternative	Same as No Action Alternative
Areas Unavailable for Livestock Grazing Use	56,809 acres (including 21,161 acres in WSAs).	Same as No Action Alternative	119,245 acres initially. Up to 1,968,500 additional acres due to permit relinquishments over the long-term.	56,809 acres initially (including 21,161 acres in WSAs). Up to 406,250 additional acres due to permit relinquishments within WSAs over the long-term.	Same as No Action Alternative	Same as No Action Alternative
Areas Closed to, or Excluded from, Livestock Grazing Use	25,097 acres	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative
Unallotted Areas	115,609 acres	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative
Areas with Reductions/ Suspensions in Grazing Use Resulting from Rangeland Health Violations due to Livestock Grazing	0 acres	Same as No Action Alternative	Long-term reductions on up to 126,614 acres	Temporary reductions on up to 126,614 acres	Same as No Action Alternative	Same as No Action Alternative
Forage Allocations	The average authorized forage use level (112,676 AUMs) would likely continue to be utilized annually; however, up to the full active preference (164,495 AUMs) could be authorized in any given year.	Same as No Action Alternative	Estimated 0-139,674 potential AUMs of forage reduction over the long-term depending on the number of rangeland health reductions that occur or the number of grazing permits that are voluntarily relinquished. This alternative could also result in lower	Estimated 0-35,331 potential AUMs of forage reduction over the long-term depending on the number of rangeland health reductions that occur or the number of grazing permits that are voluntarily relinquished.	Same as No Action Alternative	Same as No Action Alternative

Resource or Use	No Action Alternative	Alternative A	Alternative B	Alternative C - Preferred Alternative	Alternative D	Alternative E
			quality livestock forage in Category C units and WSAs.	Livestock forage quality would be maintained over most of the planning area over the long-term.		
Summary	Continuing the existing livestock grazing, vegetation, and OHV management would maintain or increase the quality and/or quantity of available forage across the planning area, but livestock forage allocations would typically not occur as a result.	Compared to all other alternatives, Alternative A would provide the most benefits to the livestock grazing management program, as it would have the fewest management constraints. Permittees and BLM staff would have the greatest level of flexibility to authorize permitted grazing use, access allotments, monitor livestock, construct new range improvements, conduct vegetation management, and maintain associated forage quality/quantity across the planning area.	This alternative would have the greatest potential for reductions or elimination of grazing use on the largest number of acres along with the largest potential negative impact to livestock grazing management and associated permittee operations compared to all other alternatives. Overall, permittees would be more limited in their ability to manage livestock and range improvements in large portions of the planning area, potentially resulting in deteriorated range improvements, livestock distribution problems, and declining vegetation conditions.	Overall, the ability to manage livestock by treating vegetation and fuels, and implementing new range improvements across most of the planning area would be similar to Alternative E, less restrictive than the No Action Alternative or Alternative B, but more restrictive than Alternative A.	Overall, the ability to manage livestock by treating vegetation and fuels, and implementing new range improvements across most of the planning area would be similar to the No Action Alternative and slightly more restrictive than Alternative A, but less restrictive than Alternatives B, C, or E. After Alternative A, this alternative would provide the highest level of livestock management flexibility to the largest number of acres across the planning area.	Overall, the ability to manage livestock by treating vegetation and fuels, and implementing new range improvements across most of the planning area would be similar to Alternative C, less restrictive than the No Action Alternative and Alternative B, and slightly more restrictive than Alternatives A and D. This alternative would only slightly limit access for range improvement maintenance and construction, and livestock administration compared to the No Action Alternative and Alternative A.

Chapter 4 – Consultation and Coordination

Chapter 4 includes a discussion of key events in the consultation and coordination process. It also lists those agencies, organizations, and individuals who were contacted or provided input during the planning process. Finally, it lists the BLM inter-disciplinary specialists who prepared the plan amendment.

Appendices

1 – Maps
2 – Lands with Wilderness Characteristics Inventory
3 – Existing Management Common to All Alternatives
4 – Alternative Development and Comparison Methodology
5 – Livestock Grazing Management
6 – Vegetation Communities
7 – Best Management Practices and Other Protective Measures
8 – Glossary
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Chapter 1 – Introduction

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Introduction

Background and Planning Area

The Bureau of Land Management (BLM) is proposing to amend the *Lakeview Resource Management Plan/Record of Decision* (RMP/ROD; BLM 2003b). The Federal Land Policy and Management Act (FLPMA) of 1976 is the statutory authority that directs the BLM to develop, maintain, amend, and revise land use plans (43 U.S.C. § 202(a)). Further, it provides that the public lands be managed under the principles of multiple use and sustained yield (43 USC § 1702; 43 USC § 1712; and 43 USC § 1732). The BLM refers to its land use plans as resource management plans (RMPs).

A resource management plan (RMP) is a land use plan as described under Section 202 of the FLPMA. It consists of a set of decisions that establish management direction for public land within an administrative area, as prescribed under the planning provisions of FLPMA and developed through the planning process outlined in 43 CFR § 1600. A RMP contains a set of goals and management direction for each resource or use and resolves multiple use conflicts to the extent possible (BLM 2005a, 2005i; see also 43 CFR §1601.0-5(n)). In contrast, a plan or RMP Amendment focuses on changing an existing RMP to address such things as monitoring and evaluation findings, new data, new or revised policy, a change in circumstances or a proposed action that may result in a change in the scope of resource uses or a change in the terms, conditions, and decisions of the approved plan (*see* 43 CFR § 1601.0-5 and *Appendix 8 - Glossary*).

The planning area encompasses approximately 3.2 million acres of public land within the Lakeview Field Office in south central Oregon (Table 1-1)[1]. The planning area is located in Lake and Harney Counties (Figure 1-1). The Modoc National Forest, Sheldon National Antelope Refuge, and Surprise BLM Field Office in Nevada and California border the planning area on the south. The Fremont-Winema and Deschutes National Forests border the planning area on the west. The Prineville and Burns BLM Districts border the planning area on the north and east respectively. Most of the public land in the planning area forms large contiguous blocks. However, some small, scattered parcels of public land occur around Christmas Valley and Lakeview (Map A-1, Appendix 1).

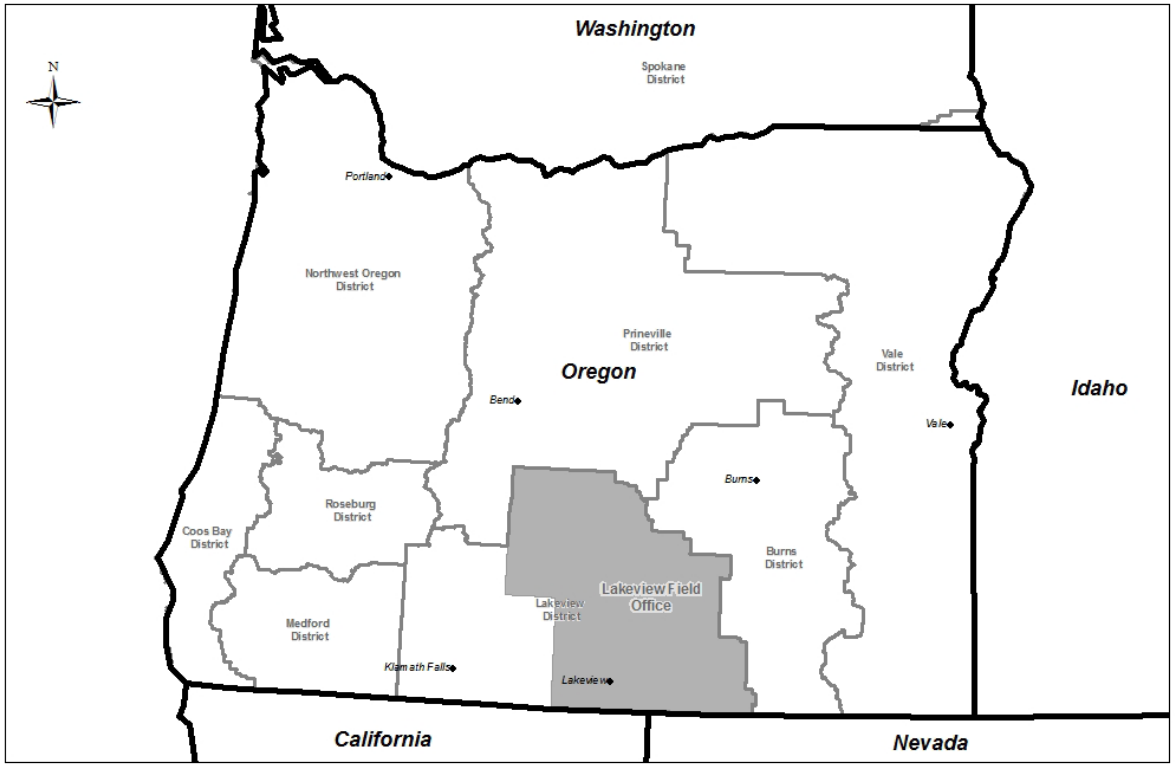
[1] This document may contain geographic feature names that could be declared derogatory through U.S. Department of the Interior Secretarial Orders 3404 and 3405 that have not yet been replaced. The BLM will use official replacement names when they are identified in future iterations of this document. For a list of declared derogatory names and official replacement names, visit: www.usgs.gov/us-board-on-geographic-names.

Table 1-1. Land Status Within Planning Area

Bureau of Land Management[1]	2,416,891	788,480	3,205,372
U.S. Forest Service	1,025,019	0	1,026,124
U.S. Fish and Wildlife Service	278,932	0	278,932
Government Services Administration	2,623	0	2,623
State of Oregon	112,383	32,624	145,007
Private	1,217,994	39,689	1,257,689
Local Government	212	0	212
Other[2]	83,407	0	83,407

[1] Does not include approximately 2,265 acres of BLM-administered lands within the Surprise Field Office (Washoe County, Nevada) where livestock grazing is managed by the Lakeview Field Office through a cooperative agreement.
[2] Other: meander-surveyed lake beds (water) and unknown surface ownership

Figure 1-1. Lakeview Resource Management Plan Amendment Area



2010 Settlement Agreement

After the BLM completed both the *Lakeview* and *Southeastern Oregon RMP/RODs* (2003 and 2002 respectively), several groups filed separate lawsuits in U.S. District Court (District of Oregon) challenging each RMP/ROD. Both RMP/RODs were upheld at the District Court level, but were

subsequently appealed to the Ninth Circuit Court of Appeals. On July 14, 2008, the Ninth Circuit ruled on the Southeastern Oregon RMP/ROD case in *Oregon Natural Desert Association v. Bureau of Land Management*, 531 F.3d 1114 (9th Cir. 2008). Soon thereafter, the BLM filed a petition for panel rehearing of the court's remedy and the matter was stayed during settlement negotiations. The Ninth Circuit also issued a stay on litigation regarding similar challenges to the *Lakeview RMP/ROD* in *Oregon Natural Desert Association v. Gammon*, No. 07-35728 (9th Cir.), pending resolution of the *Southeastern Oregon RMP/ROD* case, and to allow for settlement negotiations between the parties. The parties finalized the Settlement Agreement in June 2010 (hereafter referred to as the "2010 Settlement Agreement"). Pursuant to the terms of the 2010 Settlement Agreement, the Lakeview BLM initiated the RMP Amendment process soon thereafter. Scoping was completed in the fall of 2010 and staff began preparing a *Draft RMP Amendment and Environmental Impact Statement* (EIS) addressing the 2010 Settlement Agreement provisions.

As noted in the *Purpose and Need* section below, the 2010 Settlement Agreement requires the BLM to conduct an update of its wilderness characteristics inventory of public lands within the planning area outside of wilderness study areas (WSAs) and use this updated inventory information in the affected environment, alternatives, and analysis sections of an RMP Amendment. The results of this inventory update are described in Appendix 2. The 2010 Settlement Agreement also requires that this RMP Amendment address a range of OHV and livestock grazing management alternatives (see *Purpose and Need* section and Chapter 2). In compliance with Provision 25 of the 2010 Settlement Agreement, the management direction adopted upon completion of the *Lakeview RMP Amendment* will apply to Corridor 7-24, established through BLM's *West Wide Energy Corridor Approved Resource Plan Amendments/Record of Decision for Designation of Energy Corridors on Bureau of Land Management Administered Lands in the 11 Western States* (BLM 2009c). The entirety of the 2010 Settlement Agreement is available for review on BLM's ePlanning website at EplanningUi (blm.gov).

Relationship to the Oregon Greater Sage-grouse Approved Resource Management Plan Amendments

In the fall of 2012, the Oregon State Director issued instruction memorandum (IM) OR-2013-009 (BLM 2013ac), which put the *Lakeview RMP Amendment* on hold pending completion of the *Oregon Greater Sage-Grouse Resource Management Plan Amendment* (ARMPA). The *Record of Decision* (ROD) for the ARMPA was signed in September 2015 (BLM 2015a). It amended all existing RMPs in eastern Oregon, including the *Lakeview RMP/ROD*, and provided new management direction for Greater Sage-grouse and its habitat. This updated management direction is reflected in this RMP Amendment.

The 2015 *Oregon Greater Sage-grouse ARMPA/ROD* designated four "Key" Research Natural Areas (RNAs) in the Lakeview planning area as unavailable to livestock grazing (BLM 2015a, p. 2-18, Table 2-6). In March 2019, the BLM amended the 2015 *Oregon Greater Sage-grouse ARMPA/ROD*, issuing an additional ROD (BLM 2019f). The 2019 ARMPA/ROD retained the 2015 ARMPA/ROD allocations, objectives, and management direction, with the exception of making the key RNAs available to livestock grazing use and updating language related to compensatory mitigation.

The 2019 ARMPA/ROD was challenged (*Western Watersheds Project v. Schneider, Case No. 1:16-cv-00083-BLW* [D. Id. Oct. 16, 2019]) and in October 2019, the District Court of Idaho issued a preliminary injunction suspending implementation all of BLM's 2019 Sage-grouse ARMPAs (1:16-CV-00083-BLW). During this injunction, the 2015 ARMPA/ROD remains in effect. In February 2020, the BLM released a Draft Supplemental Environmental Impact Statement (EIS) addressing four issues identified in the preliminary injunction. The Final Supplemental EIS was released on November 19, 2020, and the ROD

was released on January 11, 2021 (BLM 2021e). In late 2021, BLM began a new planning process to consider updates to the 2015 and 2019 ARMPAs.

Since the 2015 *Oregon Greater Sage-grouse ARMPA/ROD* (BLM 2015a) made all or portions of Key RNAs in the Lakeview Field Office unavailable to livestock grazing use, the BLM has begun the process required to effectuate this direction within 3 of the Key RNAs[2] and has included the fencing that may be needed to create grazing exclosures as a "Reasonably Foreseeable Future Action" (RFFA) [3] that is considered in appropriate cumulative effects sections in Chapter 3 (see Table 3-1).

Purpose and Need

The Purpose and Need for this RMP Amendment is to comply with the provisions of the 2010 Settlement Agreement, which requires the BLM to undertake a RMP Amendment to:

- Address wilderness characteristics[4] by considering information from the wilderness characteristics inventory updates in the affected environment, alternatives, and analysis sections of the NEPA document supporting amendment of the plan (Provision 14).
- Address off-highway vehicle[5] (OHV) use by developing a full range of allocation alternatives with respect to off-highway vehicle use, travel, and transportation that includes both effects on, and protection of, wilderness characteristics (Provisions 14 and 26).
- Consider a full range of alternatives that varies amounts of areas falling within all OHV allocations (Open, Limited, and Closed) based on a balancing of resource uses and values (Provisions 14 and 26(b)).
- Follow current BLM national guidance with respect to designating Open, Limited, and Closed areas, pursuant to 43 CFR § 8342.1 and 8342.2(a) (Provisions 26(c)).
- Consider an alternative designating existing Wilderness Study Areas (WSAs) and non-WSA areas with BLM-identified wilderness characteristics as limited to roads and trails[6] existing either at the time the area became a WSA or when non-WSA lands were recognized as possessing wilderness characteristics (Provision 26(c)).
- Consider an alternative that would designate WSAs and non-WSA areas with BLM-identified wilderness characteristics as Closed to off-highway vehicle use (Provision 26(c)).
- Consider an alternative that would close allotments or pastures either for the duration of the plan or temporarily where existing grazing management practices or levels of grazing use on public

[2] The majority of a fourth area, Guano Creek Key RNA, was previously made unavailable for livestock grazing use via Congressional legislation in 1998 and remains unavailable to grazing use.
[3] The grazing closure for the westside of the Foley Lake Key RNA has been analyzed and a site-specific decision adopted (BLM 2019o, 2023e). An analysis of the site-specific effects of grazing closures in the Fish Creek Rim, Rahilly-Gravelly, and east side of Foley Lake Key RNAs is currently underway (BLM in prep. b).
[4] The 2010 Settlement Agreement interchanges the terms "wilderness character" and "wilderness characteristics." Wilderness characteristics is used throughout this EIS and refers to areas where the BLM has completed an updated inventory of this resource in accordance with *BLM Manual 6310 - Conducting Wilderness Characteristics Inventory* (BLM 2012g) and determined the area to possess the characteristics of size, naturalness, and either one or both outstanding opportunities for solitude or primitive recreation (see also Glossary – Appendix 8).
[4] To be consistent with BLM Manuals, the BLM currently uses the term off-highway vehicle, or OHV, hereafter (notwithstanding the fact that the 2010 Settlement Agreement uses the terms "off-road vehicle" or "ORV").
[6] The 2010 Settlement Agreement references to "roads and trails" refer to motorized routes. Current BLM guidance (*BLM Manual 1626 - Travel and Transportation Management;* BLM 2016b) defines three types of motorized routes: roads, primitive roads, and primitive routes. "Trails" as used in this RMP Amendment, may refer to either motorized and non-motorized routes. Refer to *Appendix 8 - Glossary* for the definitions of these terms.

lands are significant factors in the allotment or pasture failing to achieve the Standards for Rangeland Health (Provisions 14(d) and 27).

- Analyze, through at least two alternatives, a process that allows for and describes conditions under which, for the duration of the plan, the BLM would no longer authorize livestock grazing within a grazing allotment, or portions thereof, and ensure an end to livestock grazing for the duration of the plan when either a grazing permit or lease is voluntarily relinquished (Provisions 14(d) and 29).
- Include at least two alternatives that require the BLM to accept the voluntary relinquishment of any valid existing permit or lease authorizing livestock grazing on public land. In particular, the alternatives analysis shall consider the voluntary relinquishment of permits or leases (or portions thereof) located on or within public lands within the:
- National Landscape Conservation System (NLCS)[7] alone, and
- NLCS areas in combination with public lands within Areas of Critical Environmental Concern (ACECs)[8], Research Natural Areas (RNAs)[9], non-WSA areas that the BLM has determined to have wilderness characteristics, and areas with designated critical habitat for a species listed under the Endangered Species Act (Provisions 14(d) and 29).

Issues

The *Land Use Planning Handbook* defines planning issues as disputes or controversies about existing and potential land and resource allocations, levels of resource use, production, or related management practices (BLM 2005a, p. 19). While many potential issues may be raised during scoping, the analysis of an issue is only warranted if it is necessary to make a reasoned choice between alternatives, or represents a significant issue (one with a significant effect or where analysis is necessary to determine the significance of impacts) (BLM 2008g, p. 41; 40 CFR § 1500.4(e), 1500.4(i), 1500.5(f), 1501.9(a), 1501.9(e), and 1502.1(b)[10]).

Issues to be Addressed

The 2010 Settlement Agreement established specific requirements or issues which must be addressed in this RMP Amendment. A number of other potential issues were identified during public scoping and tribal consultation efforts in 2012. The BLM ID Team reviewed and categorized all substantive comments and potential issues raised during scoping in the *Lakeview Resource Area Resource Management Plan Amendment Scoping Report* (BLM 2012a). This report included a preliminary list of issues to be considered in the RMP Amendment, and a discussion of comments and issues that would not be addressed, along with supporting rationale. Following completion of the *Oregon Greater Sage-grouse*

[7] NLCS lands include BLM-administered national monuments, national conservation areas and similar designations, designated wild and scenic rivers, designated wilderness areas, and wilderness study areas (WSAs). Only WSAs are actually present within the Lakeview planning area.
[8] As the term is defined by the FLPMA (1976).
[9] As the term is defined in *Manual 1613 – Areas of Critical Environmental Concern* (BLM 1988a) and *Land Use Planning Handbook H-1601-1* (Appendix C, III.B.4) (BLM 2005a).
[10] All references to the 40 CFR regulations in this RMP Amendment/EIS refer to the CEQ NEPA regulations in effect prior to September 14, 2020, because this document was initiated in 2012 prior to the effective date of the 2020 NEPA regulations. In accordance with 40 CFR 1506.13 (effective September 14, 2020), on-going activities and environmental documents begun before September 14, 2020, may continue under the previous regulations.

ARMPA and ROD in 2015 (which fully addressed sage-grouse habitat management issues), the BLM ID Team reviewed and refined the list of issues to be addressed in this RMP Amendment:

- How would applying different levels of protection to lands with wilderness characteristics affect other resources or multiple uses[11]?
- How would other resources or multiple uses be affected if all WSAs and lands with wilderness characteristics were closed to off-highway vehicle (OHV) use?
- How would other resources or multiple uses be affected if OHV use in WSAs and lands with wilderness characteristics were limited to roads and trails that existed at the time the area became a WSA or when the BLM first recognized the area possessed wilderness characteristics?
- How would other resources or multiple uses be affected by closing pastures or allotments to livestock grazing, either temporarily or for the duration of the RMP Amendment, where BLM determines that existing grazing management practices or levels of grazing use are a significant factor in an allotment or pasture failing to achieve standards for rangeland health?
- How would other resources or multiple uses be affected if NLCS lands (WSAs) were no longer available for livestock grazing use following voluntarily relinquishment of a grazing permit?
- How would other resources or multiple uses be affected if NLCS lands (WSAs), ACECs/RNAs, areas with BLM-identified wilderness characteristics, or designated critical habitats for species listed under the ESA were no longer available for livestock grazing use following voluntarily relinquishment of a grazing permit?

Issues that Will not be Addressed

Some of the comments provided during and after scoping suggested that the BLM should address additional alternatives within the RMP Amendment. These comments are addressed within the *Alternatives Considered but Eliminated from Detailed Study* section at the end of Chapter 2.

In accordance with 40 CFR § 1500.4(e), 1500.4(i), 1500.5(f), 1501.9(a), 1501.9(e), and 1502.1(b), the BLM ID Team determined that the following issues did not warrant analysis in this RMP Amendment because they were outside the scope of analysis or did not represent a "significant issue". A brief rationale is also provided. These issues have been retained in the administrative record (BLM 2012a) and may be considered during future resource management planning efforts, where appropriate.

Air Quality: The *Lakeview RMP/ROD* identified the Air Quality Management Goal for the planning area as, "Meet the national ambient air quality standards… and follow the direction and requirements of the Southcentral Oregon Fire Management Partnership" (BLM 2003b, p. 80). That air quality analysis focused primarily on the impacts from wildfire and prescribed fire (BLM 2003a, 4-120 to 4-121). This RMP Amendment does not propose any modification of this existing management goal or any changes in air quality management. Given the fact that there would be a relatively small amount of difference in motorized OHV activity across the planning area under all alternatives, this RMP Amendment does not

[11] Other resources or multiple uses in the planning area include lands, realty and cadastral survey, minerals and energy, visual resources, vegetation, fire and fuels, facilities, off-highway vehicle use, livestock grazing, soils, watershed and water quality, fish and aquatic wildlife, wildlife and wildlife habitat, recreation, wild horses, WSAs, ACECs, RNAs, wild and scenic rivers, cultural and paleontological resources, and social and economic values.

propose any actions in the range of alternatives that would have any measurable differences in effects on air quality.

Groundwater: The *Lakeview RMP/ROD* contains two Water Resources/Watershed Health Management Goals that call for "protecting or restoring processes which determine the appropriate rates of precipitation capture, storage, and release, as well as ensure that … groundwater influenced by BLM activities comply with, or are making significant progress toward, achieving State of Oregon water quality standards…" (BLM 2003b, p. 39-41). This RMP Amendment does not propose any modification of these existing management goals or any changes in groundwater management. This RMP Amendment does not propose any actions in the range of alternatives that would have any anticipated measurable differences in effects on groundwater capture, storage, release, or quality.

Hazardous Materials: The *Lakeview RMP/ROD* states that "all hazardous material incidents or contaminant releases on public lands will be cleaned up and administered in compliance with all state and Federal laws and regulations" (BLM 2003b, p. 99). None of the proposed alternatives would change these requirements nor would the potential risk of hazardous material release into the environment vary across the alternatives.

National Back Country and National Scenic Byways: The *Lakeview RMP/ROD* states that existing byway designations will be maintained, and new proposals will be considered in the future, if consistent with surrounding OHV designations and other resource concerns are adequately addressed (BLM 2003b, p. 84). This RMP Amendment does not propose any modification of existing byway designations, nor does it propose new designations as these actions fall outside the scope of the Purpose and Need. In addition, none of the alternatives would impact any existing byway designations.

Significant Caves and Karst Resources: The *Lakeview RMP/ROD* identified a number of Significant Caves in the planning area. It also noted a need to conduct further inventory and evaluation of additional cave/karst resources and prepare management plans based on this information (BLM 2003b, p. 74). While additional inventory/evaluation information has been collected over the years, the formal designation of additional Significant Caves falls outside the scope of the Purpose and Need. In addition, none of the alternatives would alter existing cave management policy or otherwise impact this resource.

Planning Process

The main steps in the planning process are listed in Table 1-2. Steps 1 through 4 have been completed as of the publication date of this Draft RMP Amendment/EIS, though tribal consultation will continue throughout the planning process.

Relationship to Laws, Regulations, Policies, and Plans

The BLM's land use planning process is driven by a number of laws, regulations, executive orders, and both Department of Interior (DOI) and BLM policies. These all play a role in defining what resources to manage, what uses to allow, what restrictions or protections to implement, and what procedures to follow when developing a resource management plan (RMP) or RMP Amendment. A complete list and summary of governing laws and regulations are contained in Appendix B of the Draft Lakeview RMP/EIS (BLM

Table 1-2. Steps in the BLM RMP Amendment Process

Planning Step
1) Tribal consultation and public scoping
2) Analyze scoping comments and publish a summary of scoping comments
3) Inventory and data collection
4) Prepare Draft RMP Amendment/EIS
5) Public review of Draft RMP Amendment/EIS (90 days)
6) Respond to comments and revise the RMP Amendment/EIS
7) Publish Proposed RMP Amendment/Final EIS. Provide 30-day review/protest period and 60-day Governor consistency review period
8) Resolve protests
9) Publish approved RMP Amendment/ROD
10) Monitor and periodically evaluate the RMP Amendment

2001a). That summary is hereby incorporated by reference in its entirety. Through consideration of existing laws, policies, existing land use plans, resource programs, and planning criteria, the BLM has considered a range of reasonable alternatives (Chapter 2) and analyzed the potential environmental effects of these alternatives in detail (Chapter 3). The alternatives analyzed in this RMP Amendment all meet the objectives of multiple use and sustained yield mandates of Section 103(c) of 30 FLPMA (43 USC § 1702(c)), but do so in different ways. Through this analysis the BLM has identified a Preferred Alternative (40 CFR § 1502.14(d)) that it believes contains a combination of management decisions that best meets the multiple use and sustained yield mandate.

Decision Factors

Planning criteria are the standards, rules, or other factors developed by managers and interdisciplinary teams for their use in forming judgments about decision-making, analysis, and data collection during the planning process (BLM 2005, Glossary, page 5). The following criteria from the FLPMA and the associated 43 CFR § 1600 regulations will be used to guide the decision-making process:

- Utilize a systematic interdisciplinary approach (FLPMA § 202(a)(2), 43 CFR § 1610.1-1(b));
- Rely, to the extent it is available, on the existing inventory of the public lands, their resources, and other values (FLPMA § 201 and 202(a)(4), 43 CFR § 1610.1-1(c) and 1610.4);
- Follow Director and State Director guidance (43 CFR § 1610.4-7);
- Consider present and potential uses of public lands (FLPMA § 202 (a)(5);
- Consider how proposed management affects other resources and uses (43 CFR § 1610.4-6);
- Weigh the long-term and short-term benefits and impacts (FLPMA § 202 (a)(7));
- Utilize the principles of multiple-use and sustained yield (FLPMA § 103(c) and (h), and 202(c)(1); 43 CFR § 1601.2, 1601.5, and 1610.1-1(b));
- Consider how well an alternative addresses the issues and provides for a multiple-use management strategy that is both sustainable and provides an appropriate balance of resource uses and protections (FLPMA § 102 (7, 8, and 12), 103 (c) and (h); 43 CFR § 1601.0-2, 1601.0-5(f), 1601.0-5(k), and 1610.2(b). This would include consideration of whether existing land use plan designations, allocations, and/or management decisions provide adequate protection of lands with wilderness characteristics;

- Consider the relative scarcity of values and availability of alternative means and sites for recognizing those values (FLPMA § 202(a)(6));
- Comply with federal and state environmental laws (FLPMA § 202(a)(8), 43 CFR § 1610.3-2 and 1610.4(a)(3));
- Consider and comply with Federal, and State, tribal, and local plans, to the extent consistent with law (FLPMA § 202 (a)(9); 43 CFR § 1610.3-3 and 1610.4(a)(1)(iv)).

Decisions to be Made

The BLM has prepared this RMP Amendment to determine where and how it will manage lands with wilderness characteristics, livestock grazing, and off-highway vehicle (OHV) use within the planning area. Proposed planning decisions may be protested to the BLM Director under 43 CFR § 1610.6-2.

Chapter 2 – Alternatives

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List of Tables

Introduction

Under the FLPMA, wilderness characteristics identification and management are a component of the BLM's multiple use mandate (Sections 102(2), 102(8), 103(c), and 201). Section 202 of the FLPMA requires the BLM rely on its inventory of the public lands, their resources, and other values during the development or revision of land use plans. Current policy requires BLM to identify lands outside of existing wilderness study areas (WSAs) or designated wilderness areas which contain wilderness characteristics. While only Congress can designate wilderness, as part of its multiple-use mission, the BLM has discretion, through the land use planning process to decide how to manage lands it has identified as having wilderness characteristics. Under *BLM Manual 6320 – Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process* (BLM 2021g), the BLM may consider an array of alternatives for managing lands with wilderness characteristics during the land use planning process, including a spectrum between protecting wilderness characteristics and managing for other multiple uses while not protecting wilderness characteristics. This array of alternatives may include designating lands with wilderness characteristics as WSAs under Section 202 of the FLPMA (referred to as a "202 WSAs" or "Section 202 WSAs") and managing them under the non-impairment standard consistent with *BLM Manual 6330 – Management of BLM Wilderness Study Areas* (BLM 2012h).

The development of management alternatives analyzed in this EIS was guided by existing legal authorities (see Appendix 3), applicable planning criteria (Chapter 1), and the terms of the 2010 Settlement Agreement. The range of alternatives in any NEPA analysis is determined by the purpose and need statement (40 CFR 1502.13) defined by the Federal agency having the authority to carry out the action. An agency must analyze a range of reasonable alternatives within the context of meeting the purpose and need (40 CFR 1502.14, 43 CFR 46.420). While each alternative addresses requirements contained within the 2010 Settlement Agreement, they differ in how much emphasis is placed on protecting wilderness characteristics, the way in which the off-highway vehicle (OHV) and travel management allocations of open, limited, and closed are applied, and the way in which livestock grazing is addressed when a permit is voluntarily relinquished or when Standards for Rangeland Health are not met.

This chapter includes a detailed description of six management alternatives, which represent different approaches to managing lands with wilderness characteristics, off-highway vehicle use, and livestock grazing. All other existing, previously approved resource management goals, objectives, and management direction from the *Lakeview RMP/ROD* (as maintained and amended; BLM 2003b, 2015a) that are not specifically addressed by the alternatives would continue to apply and are included in Appendix 3 for reference purposes.

Additional management alternatives were considered but eliminated from detailed analysis. These are briefly described at the end of this chapter, along with BLM's rationale for eliminating them from detailed analysis.

No Action Alternative - Continuation of Existing Management under 2010 Settlement Agreement

Overview

The Council on Environmental Quality (CEQ 1981, p. 18027) has defined the No Action Alternative for land use planning purposes as a continuation of current management. This alternative represents the BLM's current wilderness character, OHV and travel management, and livestock grazing management direction for the planning area from the current land use plan (which consists of the *Lakeview RMP/ROD* (BLM 2003b, as maintained), as amended by the *Oregon Greater Sage-Grouse Approved RMP Amendment* (BLM 2015a, as maintained)), as modified by the provisions of the 2010 Settlement Agreement. The purpose of this alternative is to serve as a benchmark or baseline to compare the

magnitude of the environmental effects of the action alternatives and is required by the NEPA (BLM 2008g, p. 51-52).

Under this alternative, the BLM would continue to comply with the 2010 Settlement Agreement, including the management direction described in Provisions 18 and 19 (even after this RMP Amendment process is completed). These provisions would preclude the BLM from taking or authorizing actions within BLM-identified lands with wilderness characteristics where the BLM determines the action would:

- Diminish the BLM inventory unit size, or
- Cause the entire BLM inventory unit to no longer meet the criteria for wilderness character (Provisions 18 and 19).

The No Action Alternative would also meet other requirements from the 2010 Settlement Agreement by analyzing an alternative within this RMP Amendment that:

- Continues to manage under the direction of the *Lakeview RMP/ROD*, except for the project limitations described in the 2010 Settlement Agreement (Provision 15).
- Addresses wilderness characteristics, OHV[1] use, and grazing management in a RMP Amendment for the Lakeview planning area (Provisions 13 and 14).
- Represents one component of considering a full range of OHV area allocations that vary the amounts of areas falling within the 3 OHV allocations (open, limited, and closed), and addresses effects on and protection of wilderness characteristics (Provision 14), and is consistent with the guidance specified in Provision 26(c) of the 2010 Settlement Agreement.
- Addresses a grazing management alternative that provides for voluntary grazing permit/lease relinquishment, identification of areas no longer available for grazing use (Provision 14(d)), and current methods for addressing rangeland health issues (Provision 27) in the Lakeview planning area.

Wilderness Characteristics Management

Existing Management

Under this alternative, the existing, approved administrative designations (*e.g.* ACEC/RNA, WSA, and suitable WSR), land use allocations (for land tenure zones, right-of-way avoidance/exclusion areas, leasable/salable minerals, areas available or unavailable for livestock grazing, SFA/PHMA/GHMA, VRM class, and OHV area designations), and management goals and direction (see Appendix 3) from the *Lakeview RMP/ROD* (BLM 2003b, as maintained), as amended by the *Oregon Greater Sage-Grouse Approved RMP Amendment* (BLM 2015a), would continue (see Table A2-3 of Appendix 2 and Maps L-1, L-6, L-7, L-12, L-17, M-2, M-3, M-8, M-10, OHV-1, TM-1, TM-2, TM-3, TM-4, G-1, and VRM-1 of Appendix 1) within all of the 106 inventory units where the BLM recently found wilderness characteristics[2] to be present (see Appendix 2). However, the provisions from the 2010 Settlement Agreement would continue to constrain discretionary management actions (vegetation, fish and wildlife habitat management, fire and fuels management methods, energy and mineral development, recreation, and facility management) within these units, as described in the following section.

[1] The term ORV or off-road vehicle has been replaced by OHV or off-highway vehicle in BLM's current travel management terminology.

[2] Hereafter referred to as wilderness characteristics units.

2010 Settlement Agreement Provisions

Under this alternative, the BLM would continue to comply with the 2010 Settlement Agreement, including applying the management direction described in Provisions 18 and 19 in all 106 units (totaling approximately 1,654,103 acres; see Map W-1, Appendix 1).

Provision 18(a)[3] of the 2010 Settlement Agreement states:

"Subject to valid existing rights, until it completes the RMP amendment(s), the BLM shall not implement any projects in the respective RMP planning area(s) that fall within… an inventory unit determined by BLM to possess wilderness character, where such action would be deemed by BLM to diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness character...".

Provision 19 of the 2010 Settlement Agreement states:

"Until the BLM has completed an RMP Amendment if a project is proposed or scheduled for implementation… and would be in an area that BLM has found to possess wilderness character, the BLM will analyze the effects on wilderness character through each project's NEPA process. Such an analysis shall include an alternative that analyzes both mitigation and protection of any BLM-identified wilderness character that exists within the project area. Consistent with paragraph 18, until the BLM has completed an RMP Amendment, the BLM shall not implement any project if its analysis determines that the effects of the project would cause an area with BLM-identified wilderness character to no longer meet the minimum wilderness character criteria."

When a management action or project is proposed within a wilderness characteristics unit, the BLM would continue to address whether it could be implemented and comply with Provisions 18 and 19 of the 2010 Settlement Agreement within a subsequent site-specific NEPA analysis (even after this RMP Amendment is completed).

Lands, Realty, and Cadastral Survey

While the Settlement Agreement provisions do not change existing land tenure zone designations (Zones 1, 2, and 3; see *Glossary* - Appendix 8 for definitions) (Table A2-3 of Appendix 2 and Map L-1, Appendix 1), public land sales or exchanges within lands with wilderness characteristics units would only be approved if they would not diminish the size of the inventory unit or cause the inventory unit to no longer meet the criteria for wilderness character.

While the Settlement Agreement provisions do not change existing ROW area designations (open, avoid, and exclude; see *Glossary* – Appendix 8 for definitions) for all types of ROWs (major, corridors, wind/solar, and minor; Table A2-3 of Appendix 2 and Maps L-7, L-12, and L-17, Appendix 1), new ROW applications within lands with wilderness characteristics units would only be approved if they would not diminish the size of the inventory unit or cause the inventory unit to no longer meet the criteria for wilderness character.

Energy and Minerals

While the Settlement Agreement provisions do not change the existing leasable and salable mineral allocations (open, closed, subject to stipulations; Table A2-3 of Appendix 2 and Maps M-5 and M-10, Appendix 1), approval of new leasable or salable mining proposals within wilderness characteristics inventory units would only occur if the development would not diminish the size of the inventory unit or cause the inventory unit to no longer meet the criteria for wilderness character.

[3] Provision 18(b) was fully addressed when BLM completed its wilderness characteristics inventory update in 2020.

Visual Resources

All BLM-administered lands within lands with wilderness characteristics units, would continue to be managed in accordance with existing VRM class designations (I, II, III, and IV) and associated objectives (see *Glossary*; Appendix 8 for definitions) (Table A2-3 of Appendix 2 and Map VRM-1, Appendix 1). All surface-disturbing projects would be designed to meet the corresponding VRM management class objectives which allow for differing degrees of modification in the basic elements of landscape features (form, line, color, and texture) while mitigating the adverse effect of management activities on scenic values (BLM 1984c and 1986c).

Vegetation, Wildland Fire, and Fuels Management

Vegetation and fuel treatment methods approved in the *Lakeview RMP/ROD* (as maintained and amended; BLM 2003b, 2015b) (Refer to Appendix 3) would continue to be utilized provided they would not diminish the size of a wilderness characteristics unit or cause the unit to no longer meet the criteria for wilderness characteristics. These include such things as:

- Using prescribed and wildland fire, mechanical (*e.g.*, chainsaws, mowing), chemical, and biological treatment methods within wilderness characteristics units to maintain or restore vegetation communities, wildlife habitats, or other natural resources to meet desired future conditions, and to protect other adjacent Federal, State, and private land.
- Combinations of one or more treatment methods could be used. Mechanical treatments would be preferred when trying to preserve shrubs, aspen/willow, and old-growth juniper components important to wildlife.
- Using manual (*e.g.* pulling, grubbing), mechanical, biological control (usually insects), targeted grazing, prescribed fire, planting and seeding, and approved herbicides for weed/invasive species treatments (BLM 2003b, 2007c, 2015a, 2015e, 2015f, 2016a). Additional herbicides (such as Aminopyralid, Fluroxypyr, and Rimsulfuron) could be approved for use in the planning area in the future based on the completion of additional environmental analyses and associated decisions (BLM 2016l, 2016m, In prep.).
- Using appropriate mixes of native and non-native perennial and annual plant species for vegetation rehabilitation/restoration activities (see Appendix L of BLM 2003b, as maintained).

Wildland fire suppression and emergency wildland fire rehabilitation management methods (including the use of heavy equipment) approved in the *Lakeview RMP/ROD* (as maintained and amended; BLM 2003b, 2015b) (Refer to Appendix 3) could continue to be utilized within wilderness characteristics units.

Existing fuel breaks would be maintained by mechanical methods, as needed, around the perimeter of lands with wilderness characteristics to reduce the risk of large-scale wildfire. However, new mechanical fuel breaks within wilderness characteristics units would be precluded by the provisions of the Settlement Agreement.

Recreation

Recreational access needs within inventory units would be addressed as described in the *Off-Highway Vehicle and Travel Management* section. The existing road network would be retained and managed to provide general public and recreational motorized access to the public lands (Maps OHV-1, TM-1 to TM-4, Appendix 1).

Special recreation permits (SRPs) would continue to be issued on a case-by-case basis within inventory units, to manage visitor use, protect natural and cultural resources, provide for the health and safety of visitors, and provide a mechanism to accommodate commercial recreational uses (see Appendix 3).

SRPs may also be subject to appropriate BMPs to reduce potential impacts to wilderness characteristics (see Appendix 7).

Facilities

Existing facilities (recreation sites, administrative facilities, range improvements, etc.) within wilderness characteristics units would continue to be managed and maintained for public (including commodity) use, safety, and access. Such activities could include but would not be limited to routine maintenance of existing water control structures, check dams, recreation facilities, trails, reservoirs, waterholes, wells, pipelines, troughs, fences, cattle guards, fish and wildlife structures, signs, interpretive kiosks, and other similar facilities.

New facilities could be implemented within wilderness characteristics units where needed to meet other resource management objectives provided, they would not diminish the size of the unit or cause the unit to no longer meet the criteria for wilderness character. Construction of new range improvements would follow existing guidance and standards (*e.g.* BLM 1985a, 1990m, BLM and FS 1988).

Off-Highway Vehicle Use and Travel Management

All BLM-administered lands must be designated as open, limited, or closed to off-highway vehicle (OHV) use (see 43 CFR 8340 and *Glossary* in Appendix 8). OHV area designations are established through the land use planning process and provide the broad-scale management direction for motorized vehicle use within defined areas of public land in a manner that meets the public demand for motorized activities, protects natural resources, ensures public safety, and minimizes conflicts among users.

Under this alternative, existing OHV area designations from the existing land use plan (as maintained and amended, BLM 2003b, 2015b), would be retained throughout the planning area, including within all wilderness characteristics units, to protect other existing resource values (*e.g.* WSA, ACEC/RNA, suitable WSR, PHMA/GHMA, special status plants, mule deer winter range, etc.). Of particular note, OHV/motorized vehicle use in existing WSAs and the Lost Forest Instant Study Area (ISA) would continue to be limited to a combination of existing or designated routes, with the exception of the Sand Dunes WSA (western portion is closed; eastern portion is open) and the northwest portion of the planning area would continue to be seasonally closed to OHV use within deer winter range (Table A2-3 of Appendix 2 and Map OHV-1, Appendix 1).

In accordance with the OHV definitions in 43 CFR 8340.0-5 and the *Lakeview RMP/ROD* (BLM 2003b, p. 86, as maintained), the following OHV definition and use exceptions would continue to apply.

An off-road or off-highway vehicle (OHV) is defined as *any motorized vehicle* designed for, or capable of, travel on or immediately over land, water, or other natural terrain, *excluding*:

1. Any non-amphibious registered motorboat.
2. Any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes.
3. Any vehicle in official use.
4. Any combat or combat support vehicle when used in times of national defense emergencies; and
5. Any vehicle whose use is expressly authorized by the authorized officer or is otherwise officially approved.

The exceptions described in cases 1-4 above would automatically apply to off-road motorized vehicle use in OHV limited and closed areas without further BLM authorization.

Under exception 5, individuals authorized to use public lands under a license, lease, permit, contract, or other authorization may be allowed to use an OHV anywhere in a closed area or off-road in a limited use area on a case-by-case basis. However, this use is discretionary and would have to be approved in writing by the authorized officer as part of the appropriate authorization (*e.g.* permit) process. Approval would take into consideration the type of vehicle, frequency of trips, season of use, purpose, and existing

resource values requiring protection (soils, vegetation, wildlife, cultural, paleontological, WSA, etc.). The requester would have to demonstrate that the use was necessary to carry out the primary purpose(s) of the license, lease, permit, contract, or other authorization and no other practicable alternatives were available. The vehicle would have to be the least impacting type capable of performing the required task. Travel would be limited to frozen or dry soil conditions to minimize potential impacts to soil and avoid other protected resource values. The frequency of trips would be limited to the minimum necessary to complete the required task and would be controlled to prevent the development of new trails on the landscape (BLM 2003b, p. 86, as maintained).

The existing Transportation Plan would remain in effect until such time as it is replaced by a more comprehensive Travel Management Plan (TMP)[4]. All existing open BLM routes (roads, primitive roads, and trails) in the planning area, including those within WSAs and lands with wilderness characteristics, would remain open (or seasonally open) and available for both public and administrative motorized vehicle and mechanical transport use in accordance with the OHV (Open or Limited) area designations (Maps TM-1 to TM-4, Appendix 1; see Tables 3-36, 3-37).

In general existing, open BLM roads, primitive roads, and trails that are currently in the Transportation Plan could be mechanically maintained in accordance with the existing maintenance management objective (maintenance level) specified in the existing Transportation Plan (see Appendix 9), However, primitive routes/ways within the interior of WSAs would not be maintained for recreational motorized vehicle or mechanical transport use unless it meets the non-impairment standard or one of the exceptions to this standard (BLM 2012h, p. 1-27). In addition, mechanical road maintenance (including associated ditches, culverts, and signs) would generally be precluded on interior primitive routes within wilderness characteristics units by the compliance with the 2010 Settlement Agreement Provisions 18 and 19. Other BLM routes in the planning area outside of wilderness characteristics units could be mechanically maintained on as needed basis. All route maintenance activities would incorporate appropriate best management practices (BMPs) or required design features (RDFs) (see Appendix 7) to minimize potential effects. The amount of route maintenance that would occur in any given year would be based on management priorities and available funding.

Existing routes in the planning area could also be upgraded, widened, resurfaced, or realigned where needed to address increased use or promote public safety in a specific area. Such work would typically fall outside the scope of "routine maintenance" and would require preparation of additional site-specific NEPA prior to approval. BLM would not allow the upgrade of any primitive road within 4 miles of a lek that would result in a change in the road's maintenance level (except for public safety, administrative use, or valid existing right) and would avoid authorizing the upgrade of existing roads that are found to contribute to Greater Sage-grouse mortality or lek abandonment see (MD TTM 3 and MD TTM 8, BLM 2015a). Route upgrade work would utilize appropriate BMPs or RDFs (see Appendix 7) to reduce potential effects to other resources. Route upgrade activities would generally be precluded on interior primitive routes within wilderness characteristics units by compliance with the 2010 Settlement Agreement Provisions 18 and 19. Primitive routes/ways within the interior of WSAs could not be improved for recreational motorized vehicle or mechanical transport use unless it meets the non-impairment standard or one of the exceptions to this standard (BLM 2012h, p. 1-27).

New temporary or permanent roads, primitive roads, and motorized or non-motorized trails could be authorized in open and limited areas on a case-by-case basis after completing a site-specific NEPA analysis. New road construction would utilize appropriate BMPs (see Appendix 7) to reduce potential

[4] A Transportation Plan differs from a comprehensive Travel Management Plan in that not all existing BLM-managed routes are currently included in this plan. In addition, non-motorized access needs (ie. hiking trails) are typically addressed in a TMP. See Appendix 9 for a definition of a TMP and travel management planning.

effects. New roads could also be allowed for external proposals such as new rights-of-way and mineral development when the BLM authorizes such projects. The BLM could construct new roads around other ownerships to provide access to public land when easement acquisition is not feasible. The BLM would avoid authorizing new roads that are found to contribute to Greater Sage-grouse mortality or lek abandonment (MD TTM 3, BLM 2015a). However, construction of new roads would be precluded within the interior of all wilderness characteristics units by compliance with the 2010 Settlement Agreement. In addition, no new motor vehicle or mechanical transport routes would be allowed within WSAs (BLM 2012h, p. 1-27).

Future emergency area or route closures would be handled as described in Appendix 9.

Livestock Grazing Management

Under this alternative, livestock grazing would continue to be managed in accordance with the existing land use plan (as maintained and amended, BLM 2003b, 2015a). Most of the public land in the planning area would remain open to, or available for, livestock grazing use (Table A2-3 of Appendix 2 and Map G-1, Appendix 1).

Public lands which were not suitable for livestock grazing[5] or contained resource values which could not be adequately protected from livestock impacts through other mitigating measures were not allocated (made available) for livestock grazing use in the *Lakeview RMP/ROD* (BLM 2003b, p. 53 as maintained), including all or portions of three ACECs and/or WSAs (Table 3-39). In addition, portions of three key RNAs were made unavailable to livestock grazing use by the *Oregon Greater Sage-Grouse ARMPA/ROD* (Objective LG-2, MD LG-1, BLM 2015b; see also *Relationship to the Oregon Greater Sage-grouse Approved Resource Management Plan Amendments* section in Chapter 1). These areas would continue to be unavailable to livestock grazing use under this alternative (Map G-1, Appendix 1).

In addition, no grazing use would be permitted within areas where the BLM has determined that livestock grazing was not compatible with other resources or multiple uses. These areas have typically been identified in previous grazing or project level exclosure decisions or agreements (see Table 3-39, Chapter 3; Map G-1, Appendix 1). Additional livestock exclosures could be implemented based on the findings of future rangeland health assessments, allotment management plans (AMPs), ACEC management plans, or other more site-specific implementation plans (BLM 2003b, p. 53, as maintained).

Unallotted areas would typically not be subject to authorized livestock grazing use (see Table 3-39, Chapter 3; Map G-1, Appendix 1). However, grazing of unallotted parcels could still occur through agreement on a temporary basis.

Permitted Livestock Grazing Use

An initial forage level (expressed as animal unit months or AUMs) was identified for each allotment available for grazing use in the planning area within the *Lakeview RMP/ROD* (see Table 5 of BLM 2003b). The livestock active preference for a specific allotment would continue to be adjusted based on analysis within future assessments such as rangeland health assessments, allotment evaluations, AMPs, watershed analyses, biological opinions, or NEPA analyses. Active preference for some allotments has

[5] The language "not suitable for livestock grazing" as used in this EIS, comes from the existing management direction in the *Lakeview RMP/ROD* (BLM 2003b, p. 53, as maintained). It does not refer to making a determination of whether or not public lands are "chiefly valuable for livestock grazing and raising forage crops", which was made when livestock grazing districts were established following passage of the Taylor Grazing Act of 1934. 43 U.S.C. 315 et seq. A "chiefly valuable for livestock grazing and raising forage crops" determination can only be modified by the Secretary of the Interior. None of the alternatives in this RMP Amendment propose changing existing grazing district boundaries or reclassifying public lands as this is a Secretarial level decision and is outside the limited scope of the *Purpose and Need*.

been adjusted since 2003 based on such assessments during the grazing permit renewal process. These adjustments would continue to be reported to the public through publication of allotment specific NEPA analyses, grazing decisions, and/or periodic plan maintenance actions (e.g. BLM 2006m, 2014h, 2014i, 2014j, 2015c, 2015d, 2015w, 2016q). The current livestock active preference for each allotment is listed in Table A5-2 of Appendix 5.

Rangeland Health Management Changes

In areas where, based on completion of a rangeland health assessment, the BLM finds that livestock grazing management practices or levels of grazing use are a significant causal factor(s) in failing to achieve rangeland health standards (BLM 1997a; see Appendix 3), the BLM would take appropriate livestock grazing management actions in accordance with 43 CFR 4180.2(c). These actions could include changes to seasons and/or intensities of livestock use, rangeland project construction, temporary livestock exclusion, or long-term cancellation of grazing to control intensity, duration, and timing of grazing and/or provide for periodic deferment or rest to meet the physiological requirements of key plant species or other resource objectives. Administrative solutions (i.e., season of use revision, stocking level adjustment, and pasture exclusion) would continue to be the preferred solution to meet rangeland health/resource management objectives, as problems pertaining to livestock grazing identified in the past have generally not been due to existing forage allocation levels but related to a need to change season of use or livestock distribution (BLM 2003b).

Voluntary Permit/Lease Relinquishment

When the BLM receives a properly executed letter of voluntary relinquishment anywhere in the planning area, the existing grazing permit or lease and associated permitted use (both active preference and suspended non-use) would terminate automatically without further notice, in accordance with current National policy (*e.g*. BLM 1984d, WO IM 2013-184). However, these public lands would remain available for (or open to) grazing use and the BLM could receive an application(s) for livestock grazing from another qualified applicant and issue a new permit in accordance with 43 CFR 4110 and 4130[6]

The BLM could also consider designating the allotment as a Reserve Common Allotment (see MD LG-15, BLM 2015a) or allocating the forage for a different purpose or other resource uses. However, these actions would require the preparation of a separate RMP Amendment or revision to adopt.

Management Common to No Action and Alternatives A, C, D, and E

Wilderness Characteristics Management

The *Lakeview RMP/ROD* (as maintained, BLM 2003b) identified protective management for seven small wilderness characteristics units totaling about 1,187 acres (Abert Rim Parcel 1, Billy Burr Parcel, Lynch's Rim Parcels B, C, and D, and Shirk Ranch Parcels 1 and 2; see Table A2-2, Appendix 2) adjacent to Abert Rim, Fish Creek Rim, and Guano Creek WSAs (Map W-1, Appendix 1). These lands were acquired by the BLM after the original wilderness inventory was completed in 1991. The BLM found wilderness characteristics to be present in these seven units in 2001 (BLM 2001a) and again during its most recent inventory update (see Appendix 2). The following existing management goal and management direction from the land use plan is carried forward for these seven units under the No Action Alternative and Alternatives A, C, D, and E.

[6] Grazing preference transfers are not permit relinquishments and would continue to be handled in accordance with 43 CFR 4110.2-3.

Special Management Areas - Wilderness Characteristics Management Goal *– BLM-administered lands acquired since the wilderness inventory and determined to have wilderness characteristics will be managed to protect those characteristics.*

Management Direction

The acquired lands within the seven units would be managed to protect their wilderness characteristics using land tenure zone 1, ROW exclusion, VRM Class I, and energy and mineral development limitations (BLM 2003b, pp. 58, 70-72, as maintained). Five of the seven units were also designated as part of larger ACEC designations and were provided with additional protective management under the specific ACEC management direction associated with the Abert Rim, Fish Creek Rim, and Guano Creek-Sink Lakes ACECs (BLM 2003b, pp. 57-62, 65-66, as maintained).

Alternative A – Continuation of Existing Management without 2010 Settlement Agreement

Overview

This alternative would continue to implement the management from the *Lakeview RMP/ROD* (BLM 2003b, as maintained), as amended by the *Oregon Greater Sage-Grouse Approved RMP Amendment* (BLM 2015a, as maintained), but would not include continued compliance with Provisions 18 and 19 of the 2010 Settlement Agreement. Unlike the No Action Alternative, there would be no management for, or emphasis on protecting, wilderness characteristics within the 106 BLM-identified wilderness characteristics units. These areas would be managed in a manner that emphasizes other resources and multiple uses over wilderness characteristics.

Alternative A meets the 2010 Settlement Agreement requirements by analyzing an alternative within this RMP Amendment that:

- Addresses wilderness character, OHV use, and grazing management in a RMP Amendment for the Lakeview planning area (Provisions 13 and 14). In particular, this alternative addresses the potential impacts of not managing BLM-identified lands with wilderness characteristics to protect those values and is useful for the comparison of effects with other action alternatives that provide varying levels of protection for lands with wilderness characteristics.
- Represents one component of considering a full range of OHV area allocations that vary the amounts of areas falling within the three OHV allocations (open, limited, and closed), addresses the potential effects of OHV management on wilderness characteristics (Provisions 14), and is consistent with the guidance specified in Provision 26(c) of the 2010 Settlement Agreement.
- Considers a grazing management alternative that provides for voluntary grazing permit/lease relinquishment and identification of areas that would not be available for grazing use (Provision 14).

Wilderness Characteristics Management

All BLM-identified lands with wilderness characteristics (106 units totaling approximately 1,654,103 acres) would be managed in accordance with the existing, approved administrative designations (e.g. ACEC/RNA, WSA, suitable WSR, etc.), land use allocations (e.g. land tenure zones, right-of-way avoidance/exclusion areas, areas available/unavailable for livestock grazing, SFA/PHMA/GHMA, VRM class, and OHV designations), management goals and management direction (leasable/salable mineral restrictions, vegetation, fish and wildlife habitat, fire and fuels, recreation, and facility management) contained in the existing land use plan (as maintained and amended; BLM 2003b, 2015b) (see *No Action Alternative* section above and Appendix 3, Table A2-3 of Appendix 2, and Maps L-1, L-6, L-7, L-12, L-17, M-2, M-3, M-8, M-10, OHV-1, TM-1, TM-2, TM-3, TM-4, G-1, and VRM-1 of Appendix 1). This

alternative would emphasize the management of other resources and multiple uses over the protection of wilderness characteristics within the wilderness characteristics units (Category A unit management; Table 2-1).

Off-Highway Vehicle Use and Travel Management

Under this alternative, OHV and travel management would be the same as the No Action Alternative except there would be no management for, or emphasis on protecting wilderness characteristics that would limit road maintenance, upgrade, or new road construction activities in the 106 wilderness characteristics units (Table A2-3, Appendix 2, and Map OHV-1, Appendix 1).

Livestock Grazing Management

Under this alternative, livestock management would be the same as the No Action Alternative except there would be no management for, or emphasis on protecting wilderness characteristics that would limit new range improvements within wilderness characteristics units (see *Livestock Grazing* section; Table A2-3, Appendix 2, and Map G-1, Appendix 1).

Management Common to Alternatives B-E

Wilderness Characteristics Management

Under these alternatives, wilderness characteristics management would include a new land use plan management goal that replaces the existing goal statement in the *Management Common to No Action Alternative and Alternatives A, C, D, and E* section above. This new goal would place and manage the BLM-identified wilderness characteristics units into one of three possible management categories (A, B, or C). The management categories are described in *BLM Manual 6320 – Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process* (BLM 2021g, p. 3). This categorization process is described in more detail in Appendix 4. While the specific number of units and acres placed into these management categories would vary by alternative (Table 2-1), the management direction for each category would be the same under these alternatives and is defined in the following section.

Lands with Wilderness Characteristics Management Goal *– Manage BLM-identified lands with wilderness characteristics in accordance with the following management categories:*

Category A Units

Management Direction

On these public lands, the BLM would prioritize the management of other resources and multiple uses over wilderness characteristics. These lands would continue to be managed in accordance with the approved administrative designations (*e.g.* ACEC/RNA, WSA, suitable WSR, etc.), land use allocations (*e.g.* land tenure zones, right-of-way avoidance/exclusion areas, areas available or unavailable for livestock grazing, SFA/PHMA/GHMA, VRM class, OHV designations), and the management goals and management direction (energy and minerals restrictions, vegetation (including special forest products), wildlife habitat, fire and fuels, recreation, and roads and facility management) contained in the existing land use plan (as maintained and amended; BLM 2003b, 2015b) (see *No Action Alternative* section above and Appendix 3). These units would not be managed to protect their wilderness characteristics.

Table 2-1. Management of Wilderness Characteristics Units by Alternative

Unit Name	Unit ID No.	Acres	Management Category					
			No Action	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Abert Rim Parcel 1	OR-015-101	162	RMP**	RMP	202 WSA	RMP	RMP	RMP
Alkali Buttes	OR-015-035B	6464	SA	A	C	B	B	A
Bald Mountain	OR-015-144	13568	SA	A	C	C	B	C
Basque Hills Northwest	OR-026-084F	370	SA	A	202 WSA	C	B	B
Basque Hills Southeast	OR-026-084G	1374	SA	A	202 WSA	C	B	C
Beatys Butte	OR-015-136	8459	SA	A	C	A	A	B
Benjamin Lake - East Butte[a]	OR-015-010	25059	SA	A	C	B	A	C
Bill Burr Parcel	OR-015-132C	510	RMP	RMP	202 WSA	RMP	RMP	RMP
Binkie Lake*	OR-015-102	19836	SA	A	202 WSA	B	A	C
Black Hills	OR-015-041	28265	SA	A	C	B	A	B
Buckaroo Pass****	OR-015-138	807/ 12313***	SA	A	202 WSA	A/C***	A/B***	C
Burma Rim	OR-015-048	1320/ 37412***	SA	A	C	C	A/B***	B
Catlow Valley[a]/ ******	OR-015-159	17074	SA	A	C	B	B	B
Coglan Buttes North***	OR-015-096B	22054	SA	A	C	C	B	B
Coglan Buttes South	OR-015-098	18232	SA	A	C	B	B	A
Coleman Rim[a]	OR-015-126	17475	SA	A	C	B	A	A
Collins Rim - Deep Creek	OR-015-118	23095	SA	A	C	C	A	B
Colvin Lake*	OR-015-104	13462	SA	A	C	B	A	B
Connley Hills	OR-015-019	5379	SA	A	C	B	A	B
Cougar Mountain*	OR-015-220	917	SA	A	202 WSA	B	B	B
Cox Butte	OR-015-038A	17843	SA	A	C	B	B	B
Coyote Hills	OR-015-110	20644	SA	A	C	B	A	A
Diablo South*	OR-015-095	18658	SA	A	202 WSA	B	B	B
Diablo West*	OR-015-206	2522	SA	A	202 WSA	B	A	B
Doughnut Mountain	OR-015-051	10723	SA	A	C	B	B	A
Drake Creek	OR-015-0210	5448	SA	A	C	B	A	B
Dry Valley Rim	OR-015-052	38520	SA	A	C	C	B	B
Duncan Creek	OR-015-208	7844	SA	A	C	B	A	B
East Coyote	OR-015-111	15563	SA	A	C	B	A	A
Egli Rim	OR-015-040	6193	SA	A	C	B	A	B
Elk Mountain	OR-015-013	5474/15857 /45632***	SA	A	C	A/B/C ***	A/B***	C
Fandango	OR-015-046	14238	SA	A	C	B	A	B
Fish Creek North*	OR-015-117D	2207	SA	A	202 WSA	C	A	C
Fish Creek Parcel E*	OR-015-117E	40	SA	A	202 WSA	C	A	B
Fish Lake	OR-015-123	7330	SA	A	C	B	A	B
Fisher Canyon	OR-015-124	17619	SA	A	C	B	A	C
Flint Hills	OR-015-106	32043	SA	A	C	B	B	A

Unit Name	Unit ID No.	Acres	Management Category					
			No Action	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Frederick Butte	OR-056-048	57	SA	A	C	A	A	A
Grays Butte	OR-015-071	26234	SA	A	C	B	B	B
Greaser Ridge	OR-015-125	8840	SA	A	C	B	A	C
Guano Rim	OR-015-158	4787	SA	A	202 WSA	C	C	B
Hawk Mountain North Addition*	OR-015-146C	57	SA	A	202 WSA	B	C	C
Hawk Mountain Northeast Addition*	OR-015-146D	2836	SA	A	202 WSA	C	B	C
Hayes Butte	OR-015-020	27/5449***	SA	A	C	B	A/B***	B
Horse Mountain	OR-015-049	15345	SA	A	C	B	B	A
Horsehead Mountain	OR-015-221	5482	SA	A	C	B	B	B
Horseshoe Rim	OR-015-087	15017	SA	A	C	B	B	B
Jack Lake****	OR-015-129	11191	SA	A	C	B	B	C
Juniper Canyon****	OR-015-077	13573	SA	A	202 WSA	B	B	B
Juniper Island (North subunit) ****	OR-015-025	7203-11999***	SA	A	202 WSA***	C	A***	B
Juniper Island (South subunit) ****	OR-015-025	14863-19852***	SA	A	C	C	B***	B
Juniper Mountain	OR-015-072	10441	SA	A	C	B	A	C
Kilgore Butte	OR-015-004A	9093/ 19116***	SA	A	C	B	A/B***	B
Kit Canyon	OR-015-075	6107	SA	A	C	C	B	B
Lake Abert	OR-015-099	40773	SA	A	C	C	A	C
Little Juniper Mountain	OR-015-130	582/22835	SA	A	C	B	A/B***	B
Little Steamboat	OR-015-090	5541	SA	A	C	B	B	B
Lone Grave Butte	OR-015-134B	2107/ 17310***	SA	A	C	A/C***	A/B***	B
Long Lake	OR-015-128	7545	SA	A	C	C	B	C
Lynch Rim Parcel B	OR-015-117B	40	RMP	RMP	202 WSA	RMP	RMP	RMP
Lynch Rim Parcel C	OR-015-117C	364	RMP	RMP	202 WSA	RMP	RMP	RMP
Lynch Rim Parcel D	OR-015-117D	8	RMP	RMP	202 WSA	RMP	RMP	RMP
Mahogany Mountain	OR-015-137	1022/ 6533***	SA	A	C	B	A/B***	C
Monument Flat****	OR-015-117A	20076	SA	A	C	B	A	C
Monument Rock	OR-015-210	5722	SA	A	C	B	A	B
Murphy Waterholes - Guano Slough[a]	OR-015-115	5596/ 51947***	SA	A	C	C	A/B***	B
Oatman	OR-015-205	11515	SA	A	C	B	A	B

Unit Name	Unit ID No.	Acres	Management Category					
			No Action	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Packsaddle Draw	OR-015-073A	6838	SA	A	C	B	B	A
Painter Ranch	OR-015-007	5519	SA	A	C	B	A	B
Peters Butte****	OR-015-006	28565/ 16880***	SA	A	C	C	A/B***	B
Poker Jim Contiguous A*	OR-015-114A	141	SA	A	202 WSA	C	A	B
Poker Jim Contiguous B*	OR-015-114B	89	SA	A	202 WSA	C	A	B
Poker Jim Contiguous C*	OR-015-114C	37	SA	A	202 WSA	C	A	B
Poker Jim Contiguous D*	OR-015-114D	23	SA	A	202 WSA	C	A	B
Poker Jim Contiguous E*	OR-015-114E	243	SA	A	202 WSA	C	A	B
Poker Jim Flat****	OR-015-094	13047	SA	A	202 WSA	B	B	B
Post Lake	OR-015-044	10830	SA	A	C	B	A	B
Rabbit Hills	OR-015-108F	13546	SA	A	C	B	B	A
Rams Butte[a]	OR-015-017	11694	SA	A	C	B	B	A
Rehart Canyon	OR-015-037	36086	SA	A	C	C	B	B
Rincon Southwest Addition*	OR-015-082P	2367	SA	A	202 WSA	C	B	C
Robinson Lake[a]/****	OR-015-057B	23098	SA	A	202 WSA	B	B	C
Ryegrass****	OR-015-143B	31804	SA	A	202 WSA	B	B	C
Saddle Butte North	OR-015-226	454/ 7581***	SA	A	C	B	A/B***	B
Saddle Butte South	OR-015-005	2366/ 11593***	SA	A	C	B	A/B***	C
Saunders Rim	OR-015-065	41483/ 17945***	SA	A	C	B	A/B***	B
Sheep Rock****	OR-015-047	52078	SA	A	C	C	B	B
Sheeplick Draw****	OR-015-043C	19631	SA	A	C	B	A	B
Sheldon Rim	OR-015-190	475	SA	A	202 WSA	C	A	C
Shirk Ranch Parcel 1	OR-015-132A	63	RMP	RMP	202 WSA	RMP	RMP	RMP
Shirk Ranch Parcel 2	OR-015-132B	41	RMP	RMP	202 WSA	RMP	RMP	RMP
Shirk Rim****	OR-015-133	334/ 13483***	SA	A	C	B	A/B***	C
Snyder Creek 1*	OR-015-101A	26	SA	A	202 WSA	A	A	C
Snyder Creek 2*	OR-015-101B	828	SA	A	202 WSA	A	A	B
South Sand Dunes*	OR-015-209	4499	SA	A	202 WSA	B	A	B
South Warner Rim	OR-015-119	10813	SA	A	C	B	A	B
Steamboat Point	OR-015-076	29948	SA	A	C	B	B	B
Stevens Butte****	OR-015-004B	3725/ 2513***	SA	A	C	B	A/B***	B
Sucker Creek	OR-015-120A	7118	SA	A	C	B	A	B

Unit Name	Unit ID No.	Acres	Management Category					
			No Action	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Sunstone Mine North	OR-015-088	30982	SA	A	C	B	B	B
Three Story Rim	OR-015-089	5478	SA	A	C	B	B	B
Tired Horse Butte[a]	OR-025-023E	14430	SA	A	C	B	B	B
Tucker Hill	OR-015-116	8314	SA	A	C	B	A	B
Twelvemile - Horse Creek[a]	OR-015-157	10378	SA	A	C	B	A	B
Twelvemile - Rock Creek[a]	OR-015-164	1545	SA	A	C	B	A	B
Venator Butte	OR-015-070	8967	SA	A	C	B	B	B
Warner Lakes	OR-015-114	35672	SA	A	C	B	A	B
Waterhole A2[a]	OR-054-007-A2	42/4530***	SA	A	C	B	A/B***	B
Waterhole B1[a]	OR-054-007-B1	1764	SA	A	C	B	B	B
West Warm Springs - Buzzard Lake[a]	ORB05-03208	5601	SA	A	C	B	B	C
West Warm Springs - Lake[a]	ORB05-03209	8623	SA	A	C	A	A	B
West Warm Springs – Deadhorse[a]/ ****	ORB05-03201	33,813/ 40,840***	SA	A	C/202 WSA***	B	B	B
Whiskey Lake*	OR-015-062	48365/ 13730***	SA	A	202 WSA	B/C***	B	B
Wilson Spring	OR-015-142	2701/ 13753***	SA	A	C	B	A/B***	C

SA – Wilderness characteristics units managed in compliance with the 2010 Settlement Agreement, including Provisions 18 and 19 under No Action Alternative.
[a] Wilderness characteristics unit is shared with another BLM District; acres listed in this table are for the Lakeview District portion only.
* Wilderness characteristics unit is contiguous with a WSA.
** Wilderness characteristics unit contiguous to Abert Rim, Fish Creek Rim, or Guano Creek WSAs identified in BLM (2001) that were identified and are managed for wilderness characteristics in the *Lakeview RMP/ROD* (BLM 2003b)
*** Wilderness characteristics unit was divided into 2 parts under the alternatives. Separate management categories and acreages were assigned to each portion or subunit.
**** Wilderness characteristics unit determined by BLM to be adjacent to an existing WSA.

Mitigation

During the site-specific NEPA analysis for future proposed projects or multiple use management actions within Category A units, the BLM would assess the potential impacts on wilderness characteristics only if it is identified as an issue requiring analysis (BLM 2008a, p. 41) and would consider applying appropriate best management practices (BMPs) or mitigation measures for other resources (see Appendix 7), but would not mitigate potential impacts to wilderness characteristics.

Category B Units

Management Objective *- Balance the management of wilderness characteristics with other resources and multiple uses.*

Management Direction

On these public lands, the BLM would balance the management of wilderness characteristics with other resources and multiple uses. These lands would be subject to a moderate level of limitations on certain management actions (described below) to reduce potential impacts to wilderness characteristics. However, approved administrative designations (*e.g*. ACEC/RNA, WSA, suitable WSR, etc.), existing land tenure, energy and minerals, and SFA/PHMA/GHMA land use allocations, and management goals approved in the existing land use plan (as maintained and amended; BLM 2003b, 2015a) would be retained (see also Appendix 3). Management allocations and direction within Category B units would be modified as follows:

Lands, Realty, and Cadastral Survey

Category B units would be designated as ROW avoidance areas for all types (minor, major, wind/solar) of ROWs (unless currently designated as a ROW exclusion area).

Visual Resources

Category B units would be managed as VRM Class III, unless the area already has a higher VRM classification. However, cherry-stem routes within these units would retain their existing VRM classification.

Vegetation and Wildlife Habitat

A combination of natural processes and active vegetation management methods would be allowed to maintain, restore, or rehabilitate native vegetation communities/wildlife habitat, and meet management objectives. All existing vegetation/habitat treatment (including special forest products harvest) and restoration methods approved in the existing land use plan (as maintained and amended; BLM 2003b, 2015a) would be allowed.

Wildland Fire and Fuels

Most of the wildland fire and fuel management direction would be the same as that approved in the existing land use plan (as maintained and amended; BLM 2003b, 2015a). However, new fuel breaks requiring the use of heavy equipment could be developed on the perimeter or within the interior of Category B units if needed to meet other management objectives.

Recreation

Recreational access needs within Category B units would be addressed as described in the *Off-Highway Vehicle and Travel Management* section.

Special recreation permits (SRPs) within Category B units would be issued on a case-by-case basis, to manage visitor use, protect natural and cultural resources, provide for the health and safety of visitors, and provide a mechanism to accommodate commercial recreational uses (see Appendix 3). Group size would be determined during the SRP review/approval process. SRPs could also be subject to appropriate BMPs to reduce potential impacts to wilderness characteristics (see Appendix 7).

Facilities

Existing facilities and structures (including range improvements, recreation sites, and boundary roads) within Category B units would be managed and maintained for public use, access, and safety. New structures or facilities would be allowed if they meet VRM Class III objectives.

Mitigation

During the site-specific NEPA analysis for future proposed projects or multiple use management actions within Category B units, the BLM would assess the potential impacts to wilderness characteristics and consider the application of appropriate BMPs (see Appendix 7) to reduce potential impacts to wilderness characteristics and meet VRM Class III objectives (unless a higher VRM Class applies) but would not be required to mitigate potential impacts to wilderness characteristics.

Category C Units

Management Objective *- Prioritize the protection of wilderness characteristics over the management of other resources and multiple uses.*

Management Direction

On these public lands the BLM would prioritize the protection of wilderness characteristics over the management of other resources and multiple uses. Existing approved administrative designations (*e.g.* ACEC/RNA, WSA, suitable WSR, etc.), SFA/PHMA/GHMA land use allocations, and management goals approved in the existing land use plan (as maintained and amended; BLM 2003b, 2015a) would be retained (see also Appendix 3). Management allocations and direction within Category C units would be modified as follows:

Lands, Realty, and Cadastral Survey

All Category C units would be placed into land tenure Zone 1 and retained in the public domain. In-holdings within these units would also be a high priority for future acquisition from a willing seller.

All Category C units would be designated as ROW exclusion areas for all major ROWs and wind/solar energy ROWs. All units would be designated as ROW avoidance areas for minor ROWs. New minor ROWs would be allowed in these areas to provide reasonable legal access to inholdings or support use of private inholdings but would be subject to appropriate BMPs (see Appendix 7) to protect or enhance wilderness characteristics. Military training uses or other temporary land use authorizations involving the use of motorized vehicles/OHVs would not be authorized.

Energy and Minerals

All Category C units would be open to leasable mineral exploration and development subject to a no surface occupancy stipulation.

All Category C units would be closed to salable mineral development and disposal.

Visual Resources

All Category C units would be managed as VRM Class II, unless already in VRM Class I. However, cherry-stem routes within these units and Category C unit setbacks (Alternatives C-E) would retain their existing VRM classification.

Vegetation and Wildlife Habitat

Most of the vegetation and wildlife habitat management direction would be the same as that approved in the existing land use plan (as maintained and amended; BLM 2003b, 2015a). However, the allowable methods would differ slightly. Management would still use a combination of natural processes and active management methods to maintain, restore, or rehabilitate native vegetation communities and meet management objectives, but treatments would be subject to meeting VRM Class II objectives and applying appropriate BMPs (see Appendix 7).

Allowable restoration treatment methods could include but would not be limited to: hand cut/thin, pile, and burn; cut, lop, and scatter; and broadcast burning. While mechanical treatment methods could be used

(provided they meet VRM Class II objectives), the use of heavy equipment would be prohibited unless it is determined through a subsequent NEPA analysis that it would be the only effective tool for reclamation, rehabilitation, or restoration efforts. Aerial ignition broadcast burning, and wildland fire could also be used to treat vegetation/fuels.

No special forest products or personal/commercial biomass harvest would be permitted.

All methods of approved weed/invasive species treatments (prevention, manual, mechanical, biological, fire, and chemical) could be used to maintain or restore native vegetation communities. In addition, aerial application of approved herbicides could occur within the interior of these units for weed/invasive species treatment, habitat restoration, or wildfire rehabilitation purposes.

Aerial, broadcast, or hand seeding or replanting methods could be used for restoration or wildfire rehabilitation purposes where there is no reasonable expectation of natural revegetation. Drill seeding would be prohibited unless it is determined through a subsequent NEPA analysis to be the only viable method to reestablish the vegetative community in the area. The use of native seed or seedlings from local, wild sources or sources adapted to the area would be emphasized, but appropriate non-native species (see Appendix L of BLM 2003b) could also be used. An ID team would determine which seeding method would have the highest likelihood of success when planning rehabilitation projects on a site-specific basis.

Wildland Fire and Fuels

Most of the wildland fire and fuel management direction would be the same as that approved in the existing land use plan (as maintained and amended; BLM 2003b, 2015a). However, the following limits on wildland fire suppression measures would apply:

- Retardant could be used in these areas during initial attack. Retardant use in these areas during extended attack would be considered as a part of the WFDSS, after weighing the resource values at risk with public and fire-fighter safety.
- The use of heavy equipment in these areas would be avoided where possible, but if used, would require agency administrator approval, and would be restricted to existing routes.
- Wildland fires in these areas that are not threatening human life or other property would be monitored and utilize the minimum amount of time and effort on wildfire suppression.

Existing fuel breaks along boundary roads around the perimeter of Category C units could be maintained by mechanical or hand methods, as needed, to reduce the risk of large-scale wildfire. (These existing fuel breaks typically fall within the management setbacks described for Alternatives C-E). New fuel breaks would be prohibited within the interior of Category C units.

Recreation

Recreational access needs within Category C units would be addressed as described in the *Off-Highway Vehicle and Travel Management* section.

Special recreation permits (SRPs) within Category C units would be issued on a case-by-case basis, to manage visitor use, protect natural and cultural resources, provide for the health and safety of visitors, and provide a mechanism to accommodate commercial recreational uses (see Appendix 3). Group size would be determined during the SRP review/approval process. SRPs would also be subject to appropriate BMPs to reduce potential impacts to wilderness characteristics (see Appendix 7).

Facilities

Existing facilities or structures (including range improvements and recreation sites) within Category C units and unit boundary roads would be managed and maintained for public use, access, and safety. New structures or facilities within Category C units would be allowed only if they are temporary or, if

permanent, the potential effects can be effectively mitigated (see Appendix 7) to meet VRM class II objectives, and BLM determines them to be "substantially unnoticeable" (BLM 2012e, pp. 6-7). New roads within the interior of these units would not be allowed unless specifically required by law.

Mitigation

During the site-specific NEPA analysis for future proposed projects or multiple use management actions the BLM would assess the potential impacts on wilderness characteristics within Category C units and would adopt appropriate BMPs (see Appendix 7) to protect wilderness characteristics. The BLM would only authorize future management actions where the analysis determines that wilderness characteristics would be protected or enhanced.

Wilderness Characteristics Units Contiguous to Wilderness Study Areas

There is a relationship between the existing WSAs and the 31 contiguous units that were found to contain wilderness characteristics during the inventory process. Twenty-six of these units were smaller than 5,000 acres and only met the size criteria because they were contiguous to an existing WSA (Table A2-2, Appendix 2). Should Congress choose to release one or more WSAs from wilderness study over the life of the RMP Amendment, any small contiguous unit(s) would no longer contain wilderness characteristics and would be managed for other multiple uses associated with the surrounding public lands. BLM would need to re-evaluate the five contiguous units larger than 5,000 acres to determine if they retain wilderness characteristics standing on their own merit.

Alternative B - Emphasize Protection of Wilderness Characteristics

Overview

This alternative would emphasize the protection of wilderness characteristics on about 1,655,290 acres (51.6% of the planning area) through a combination of Category C unit management and designation as new wilderness study areas (WSAs) under Section 202 of the FLPMA. In addition, the current OHV and transportation, and livestock grazing management from the *Lakeview RMP/ROD* (BLM 2003b, as maintained), as amended by the *Oregon Greater Sage-Grouse Approved RMP Amendment* (BLM 2015a, as maintained) would be amended within a large portion (about 2.1 million acres) of the planning area.

Alternative B meets the 2010 Settlement Agreement requirements by analyzing an alternative within this RMP Amendment with the following provisions:

- Addresses wilderness character, OHV use, and grazing management in a RMP Amendment for the Lakeview planning area (Provisions 13 and 14).
- Represents one component of considering a full range of OHV allocation alternatives that vary the amounts of areas falling within the three OHV allocations (open, limited, and closed), and address effects on and protection of wilderness characteristics, and is consistent with the guidance specified in Provision 26(c) of the 2010 Settlement Agreement. More specifically, this alternative would designate WSAs and non-WSA areas with BLM-identified wilderness characteristics as closed to OHV use (Provisions 14 and 26).
- Permanently closes allotments or pastures to livestock grazing use for the duration of the plan where the BLM has determined that existing grazing management practices or levels of grazing use on the public lands are significant factors in the allotment or pasture failing to achieve the rangeland health standards (Provisions 14 and 27).
- Requires the BLM to accept the voluntary relinquishment of any valid existing grazing permit/lease (or portion thereof) authorizing livestock grazing on or within public land within the National Landscape Conservation System (NLCS), ACECs, designated RNAs, BLM-identified lands with wilderness characteristics, and designated critical endangered species habitat (see

Provisions 14d and 28, 29(2), and 30) and make these areas unavailable for livestock grazing for the duration of the plan.

Wilderness Characteristics Management

New WSAs Established Under Section 202 of FLPMA

Under Alternative B, all BLM-identified wilderness characteristics inventory units in the planning area (including 7 existing RMP units) were further evaluated for potential designation and management as new WSAs under Section 202 of the FLPMA (Section 202 WSAs). The criteria used to identify units for 202 WSA management are described in Appendix 4. As a result of this process, a subset of wilderness characteristics units (34 units and portions of 2 units totaling approximately 273,705 acres) would be designated as new Section 202 WSAs (Table 2-1; Map W-3, Appendix 1). New Section 202 WSAs would be managed in the same manner as existing WSAs[7], except the BLM would retain the discretion to modify them through a subsequent land use plan amendment or revision. All new Section 202 WSAs would be managed under the non-impairment standard in *BLM Manual 6330—Management of BLM Wilderness Study Areas* (BLM 2012h).

The BLM would manage new Section 202 WSAs as land tenure zone 1, major, minor, and solar/wind ROW exclusion areas and VRM Class I. The proposed lands and realty management changes are displayed on Maps L-8, L-13, and L-18. The proposed VRM Class changes are displayed on Map VRM-2 (Appendix 1).

The new Section 202 WSAs would be closed to salable and leasable mineral development. The proposed mineral management changes are displayed on Maps M-4 and M-9. Locatable mineral exploration and development would be allowable within the new Section 202 WSAs subject to the unnecessary and undue degradation standard rather than the non-impairment standard (BLM 2012h, p. 1-24).

The BLM would only authorize new uses or facilities within new Section 202 WSAs if such uses are both temporary (i.e., needed for a defined time period to respond to a temporary need) and would not create new surface disturbance, or meet one of the exceptions to the non-impairment standard.

Category C Units

Under this alternative, the remainder of the BLM-identified lands with wilderness characteristics (77 units and portions of 2 units totaling approximately 1,381,142 acres) would be managed to as Category C units to prioritize the protection of wilderness characteristics over other multiple uses (Table 2-1; Map W-3, Appendix 1).

The proposed lands and realty management changes are displayed on Maps L-8, L-13, and L-18. The proposed mineral management changes are displayed on Maps M-4, M-9, and M-13. The proposed VRM Class changes are displayed on Map VRM-2 (Appendix 1).

[7] The planning area includes 14 existing WSAs and 1 existing instant study area (ISA) encompassing 484,953 (see Table 3-54) acres that the BLM identified during the 15-year wilderness review completed in 1991 under Section 603 of FLPMA. During this inventory the BLM identified one entire WSA (Sage Hen Hills) and portions of two others (Basque Hills and Rincon) under Section 202 of FLPMA (see Appendix 3). Collectively, the BLM refers to these WSA/ISAs throughout this document as "existing WSAs" to distinguish them from new WSAs proposed under Section 202 within this plan amendment.

Off-Highway Vehicle Use and Travel Management

In accordance with Provision 26(c) of the 2010 Settlement Agreement, all lands with wilderness characteristics and all WSAs would be closed to OHV use under this alternative[8]. Existing OHV area allocations (Open, Limited, or Closed) within the remainder of the planning area, including the mule deer winter range seasonal closure in the northwest portion of the planning area, would be retained (Maps OHV-2 and W-3, Appendix 1).

While all WSA and BLM-identified lands with wilderness characteristics perimeter and cherry-stem boundary roads would remain open to OHV use, all interior primitive routes and trails would be closed to public motorized use and would no longer be maintained for motorized travel. No public cross-country motorized vehicle or mechanical travel would be allowed in these areas (Map OHV-2, Appendix 1). Any additional future emergency area or route closures elsewhere in the planning area would be handled as described in Appendix 9.

Other routes in the planning area (roads, primitive roads, and trails outside of lands with wilderness characteristics and WSAs) would remain open or seasonally open and available for both public and administrative motorized use in accordance with the surrounding OHV area designations. All five OHV use exceptions described in 43 CFR 8340.0-5 (see definitions under the No Action Alternative) would apply to Limited and Closed OHV area designations, as well as closed routes to allow BLM staff or contract crews to use motorized vehicles to conduct needed management (*e.g.* fire suppression or vegetation treatment) via closed routes or off-road in OHV Limited or Closed areas.

Existing WSA and lands with wilderness characteristics boundary roads (including cherry-stem roads) and all routes (roads, primitive roads, and trails) outside of these areas could be maintained in accordance with individual route management objectives (*e.g.* maintenance level) or on an as-needed basis (Table A9-1, Appendix 9). Route maintenance work would utilize appropriate BMPs or RDFs (see Appendix 7) to reduce potential effects to other resources. Existing routes outside of WSAs and lands with wilderness characteristics units could also be upgraded, widened, resurfaced, or realigned where needed.

No new road construction would be allowed within Category C units unless specifically required by law. New motor vehicle or mechanical transport routes would be precluded within WSAs (BLM 2012h, p. 1-27). New temporary or permanent roads, primitive roads, and motorized or non-motorized trails would be allowed in open or limited areas within the rest of the planning area on a case-by-case basis, after completing a site-specific NEPA analysis and applying appropriate BMPs or RDFs (see Appendix 7).

Routes closed to motorized vehicle use within lands with wilderness characteristics units and WSAs could be a considered for designation/management as non-motorized trails or mechanical transport routes during a future TMP.

Livestock Grazing Management

Under this alternative most of the livestock grazing management direction would be the same as the No Action Alternative initially, including areas available for grazing use, areas closed to, or excluded from grazing use, and unallotted areas. However, portions of several WSAs (Diablo Mountain and Devils Garden) and ACECs (Table Rock and Warner Wetlands) which currently have no existing grazing permits in effect, would immediately become unavailable for livestock grazing use (Map G-2, Appendix 1; Table 3-40) because these areas represent allotments where livestock grazing permits have been voluntarily relinquished at some point in the past.

[8] This OHV management direction would not apply to any portions of the public lands with valid existing rights that include authorized motorized access (*e.g.* existing mining claims, rights-of-ways, grazing permits). Refer also to OHV use exceptions described in 43 CFR 8340.0-5.

In addition, in accordance with Provisions 14(d) and 27-31 of the 2010 Settlement Agreement, the following grazing management changes would be applied. (The implementation of these changes over time would be documented through plan maintenance in accordance with 43 CFR 1610.6-5).

Rangeland Health Management Changes

Under this alternative, the BLM would remove grazing, either at the allotment or at pasture scale, for the duration of the plan when it determines that existing livestock grazing management practices or levels of grazing use are a significant factor in the allotment or pasture failing to achieve rangeland health standards. This would require the BLM to modify or suspend a grazing permit (see 43 CFR 4130.3-3) after completing additional site-specific NEPA analysis and issuing a grazing decision. Adversely affected parties would have the opportunity to protest and appeal the site-specific grazing decision, as outlined in 43 CFR 4160. Following resolution of any protest/appeals, the AUMs associated with the area(s) not meeting standards would be suspended or cancelled, in whole or in part, for the duration of the plan (see Provision 27 of the 2010 Settlement Agreement and 43 CFR 4170.1-1).

Voluntary Permit/Lease Relinquishment

When the BLM receives a properly executed letter of voluntary relinquishment of a grazing permit or lease (either completely or partially) for areas that overlap the land use allocations listed in Table 2-2, the existing permit or lease and associated permitted use (both active preference and suspended non-use) would terminate automatically without further notice.

Table 2-2. Land Use Allocations Subject to Voluntary Grazing Permit Relinquishment under Alternative B

Allocation	Acres in Planning Area	Percent of Planning Area
BLM-Identified Lands with Wilderness Characteristics[1]	1,381,142	43.1
WSAs[2]	758,658	23.7
Designated Wilderness Areas	0	0
Designated National Wild and Scenic Rivers[3]	0	0
Designated National Historic Trails	0	0
ACEC/RNAs[4]	314,918	9.8
Designated Critical Endangered Species Habitat[5]	328	0.001
TOTAL[4]	**2,455,046**	**76.6**

[1] Acreage includes those wilderness characteristics units that would be managed as Category C units under this alternative. Several of these units are currently closed to grazing use.
[2]WSAs are the only NLCS lands described in Provision 29(1) and 29(2) of the 2010 Settlement Agreement that are present in the planning area. Acreage includes the Lost Forest ISA but does not include the eastern portions of 2 Lakeview-administered WSAs that fall within, and are shared with the Burns District. Total includes both existing WSAs and new Section 202 WSAs proposed under this alternative. One of these (Guano Creek) is currently closed to grazing use.
[3] There are currently no designated National Wild and Scenic Rivers in the planning area. While there is one BLM recommended suitable wild and scenic river (Twelvemile Creek), it has not been designated by either Congress or the Secretary of Interior as of this date and, therefore does not currently fall under the NLCS umbrella.
[4] RNAs are a subset of ACECs; therefore, the acreage for the two designations cannot be separated and are summed together to avoid double counting. Acreage also includes about 112,230 acres of overlap with WSAs which has been subtracted from the ACEC/RNA total to avoid duplicate counting.
[5] Warner sucker is the only federally listed species with designated critical habitat in the planning area. Most of this habitat is currently closed to livestock grazing through existing exclosures, agreements, or biological opinion management direction (see Table 3-35).

Those areas would either be unavailable for livestock grazing use or have the total permitted use reduced (in a common use allotment) as follows (see Provision 29(2) of the 2010 Settlement Agreement):

- In the case where only one grazing permit has been issued for one allotment or pasture, that area would be made unavailable for grazing use for the duration of the plan.

- In the case of a partial relinquishment, the total permitted use for the allotment or pasture would be reduced by the total number of AUMs identified in the relinquished portion of the permit or lease (both active preference and suspended non-use) for the duration of the plan.

- In the case of a common use allotment or pasture, the total permitted use associated with the allotment or pasture would be reduced by the number of relinquished AUMs (both active preference and suspended non-use) for the duration of the plan.

- In all cases, the relinquished AUMs would not be available for livestock grazing use by other permittees and would be allocated to the resources/land use allocations listed in Table 2-2 for the duration of the plan.

Grazing permit relinquishment on all remaining public lands in the planning area that fall outside of the allocations listed in Table 2-2 would continue to be processed in accordance with existing IMs, handbooks, and manual guidance (*e.g.* BLM 1984d, 2013b) as described in the No Action Alternative.

Alternative C - Emphasize Protection of Specific Lands with Wilderness Characteristics while Providing Limited Levels of Commodity Production and Other Multiple Uses (Preferred Alternative)

Overview

Alternative C meets the 2010 Settlement Agreement requirements by addressing the following provisions in this RMP Amendment:

- Addresses wilderness character, OHV use, and grazing management in a RMP Amendment for the Lakeview planning area (Provisions 13 and 14).

- Represents one component of considering a full range of OHV allocation alternatives that vary the amounts of areas falling within the three OHV allocations (open, limited, and closed), and address effects on and protection of wilderness characteristics, balances resource uses and values, and is consistent with the guidance specified in Provision 26(c) of the 2010 Settlement Agreement. More specifically, this alternative would designate WSAs and non-WSA areas with BLM-identified wilderness characteristics as limited to roads and trails that existed either at the time when the area became a WSA or when non-WSA lands were recognized by the BLM as possessing wilderness characteristics (Provisions 14 and 26).

- Closes allotments or pastures to livestock grazing use temporarily where the BLM has determined that existing grazing management practices or levels of grazing use on the public lands are significant factors in the allotment or pasture failing to achieve the rangeland health standards (Provisions 14 and 27).

- Requires the BLM to accept the voluntary relinquishment of any valid existing grazing permit/lease (or portion thereof) authorizing livestock grazing on or within public land within the National Landscape Conservation Lands System (NLCS) and make these areas unavailable for livestock grazing for the duration of the plan (Provisions 14d, 28, 29(1), and 30).

Wilderness Characteristics Management

Management Direction - Evaluation Matrix

During alternative development, the ID Team identified a broad set of resource protection and use criteria to use to evaluate each unit for the purpose of evaluating wilderness characteristic protections with other existing resources and equally valid multiple uses. These criteria were input into an evaluation matrix to

assist in identifying management opportunities and conflicts. The ID Team also incorporated requirements of *Manual 6320 - Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process* (BLM 2021g) into the evaluation matrix. The primary criteria used in the evaluation matrix included ecological conditions, resources present, ongoing multiple uses, and manageability. Relative ranking or weighting values for each unit were assigned for each criterion. A more detailed description of the criteria, process, rankings, and management categories is provided in Appendix 4. Based on the output from this process, the BLM placed each unit into one of three management categories, as described under the *Management Common to Alternatives B-E* section (see also Appendix 4).

Category C Units

Under this alternative, the BLM would prioritize the protection of wilderness characteristics in 26 units and portions of 4 units (totaling approximately 411,033 acres) over other multiple uses (Table 2-1; Map W-4, Appendix 1).

Management Boundary Setbacks in Category C Units

This alternative would establish unit boundary setbacks where roads[9] form a Category C unit boundary. The boundary setbacks would be 300 feet inward from the centerline of paved/gravel roads (Federal/State highways and County roads) and BLM main roads, and 100 feet inward from the centerline of natural surface boundary roads. The intent of the setbacks would be to provide the BLM with the management flexibility needed to adapt to other resource needs, threats, and opportunities along the unit boundaries, including protecting the wilderness characteristics within the interior of the unit.

While management within these setbacks would emphasize other resources and multiple uses over wilderness characteristics, large-scale commodity production/uses such as major rights-of-way, commercial renewable energy projects, or similar structural projects that would have highly visible, pervasive, and long-term negative impacts on the adjacent wilderness characteristics would be prohibited.

Other existing resource management direction would continue within the setbacks as described in the existing land use plan (as maintained and amended, BLM 2003b, 2015a). Actions including, but not limited to the following would be allowed within the setbacks:

- Boundary road maintenance to retain access, and minor road realignments or improvements for public safety.
- Active restoration activities including vegetation treatments to improve wildlife habitat, treat invasive species, or meet other resource objectives.
- Protection measures to reduce or limit potential undesirable landscape-level events (*e.g.* large-scale wildfire) and promote fire-fighter safety, including development and maintenance of fuel breaks.
- Issuing SFP permits to remove woody biomass to aid in the development or maintenance of fuel breaks or meet other resource objectives.
- Minor rights-of-way (*e.g.* small-scale utilities, roads).
- Small-scale infrastructure development and maintenance (*e.g.* drainage ditches, fences, interpretive signs, water developments).

[9] The setback applies only to existing Category C unit boundary roads that meet the Wilderness Characteristics Road definition in BLM (2102h).

- Recreation/public access activities via motorized vehicles (*e.g.* roadside parking, dispersed camping, or game retrieval), provided it does not cause significant, undue damage to, or disturbance of other resource values as defined in 43 CFR Part 8341.1(f)(4).

Category B Units

The BLM would balance the management of wilderness characteristics with other resources and multiple uses in 71 units and portions of 2 additional units totaling approximately 1,161,199 acres (Table 2-1; Map W-4, Appendix 1).

Category A Units

The BLM would emphasize the management of other resources and multiple uses over wilderness characteristic protection in 5 units and portions of 3 additional units totaling approximately 74,529 acres (Table 2-1; Map W-4, Appendix 1).

Management Changes

Proposed lands and realty management changes are displayed on Maps L-3, L-9, L-14, and L-19. Proposed mineral management changes are displayed on Maps M-4, M-7, and M-12. Proposed VRM changes are displayed on Map VRM-3 (see Appendix 1).

Off-Highway Vehicle Use and Travel Management

Under this alternative, all existing OHV Open area allocations in the planning area would be changed to Limited. No areas would be open to public cross-country OHV use in the planning area. Existing OHV Closed area designations would remain closed to OHV use (Map OHV-3, Appendix 1). OHV use within all non-WSA areas with BLM-identified wilderness characteristics, would be limited to routes that existed at the time the BLM identified wilderness characteristics to be present, as described in Provision 26(c) of the 2010 Settlement Agreement. OHV and mechanical transport use within WSAs (including the Sand Dunes WSA) would be limited to routes that existed at the time of WSA designation (1991) (Map OHV-3, Appendix 1). The northwest portion of the planning area would also be seasonally closed to OHV use within mule deer winter range.

All five OHV use exceptions described in 43 CFR 8340.0-5 (see definitions under the No Action Alternative) would apply to Limited and Closed OHV area designations to allow BLM staff or contract crews to use motorized vehicles to conduct needed management (*e.g.* fire suppression or vegetation treatment) in these areas. Future emergency area or route closures would be handled as described in Appendix 9.

Primitive routes within the interior of Category C units could receive minimal spot maintenance by non-mechanical means, where needed to maintain official, emergency, or administrative use. In Category B units, interior routes could receive mechanical spot maintenance where needed to retain the current level of public or administrative access. Primitive routes/ways within the interior of WSAs would not be maintained for recreational motorized vehicle or mechanical transport use unless it meets the non-impairment standard or one of the exceptions to this standard (BLM 2012h, p. 1-27). All other routes (roads, primitive roads, and trails) outside of these areas, including all WSA boundary roads (including cherry-stems), all wilderness characteristics unit boundary roads, and all routes inside Category A units, could be maintained by mechanical means in accordance with individual route management objectives or on an as-needed basis (see Table A9-3, Appendix 9). Existing routes outside of Category C units and WSAs could also be upgraded, widened, resurfaced, or realigned where needed, subject to appropriate BMPs and RDFs (see Appendix 7) to minimize potential effects.

No new road construction would be allowed within Category C units unless specifically required by law. In addition, new motorized vehicle or mechanical transport routes would continue to be precluded within WSAs (BLM 2012h, p. 1-27). New temporary or permanent roads, primitive roads, and motorized or non-motorized trails would be allowed in open or limited areas within the rest of the planning area on a

case-by-case basis, after completing a site-specific NEPA analysis and applying appropriate BMPs or RDFs (see Appendix 7).

Livestock Grazing Management

Most of the livestock grazing management direction would be the same as the No Action Alternative initially, including areas available for grazing use, areas unavailable for grazing use, areas closed to, or excluded from grazing use, and unallotted areas (Table 3-39; Map G-1, Appendix 1). However, in accordance with Provisions 14(d) and 27-31 of the 2010 Settlement Agreement, the following changes in grazing management direction would be applied. (The implementation of these changes over time would be documented through plan maintenance in accordance with 43 CFR 1610.6-5).

Rangeland Health Management Changes

Under this alternative, the BLM would temporarily close allotments or pastures to livestock grazing when it determines that existing livestock grazing management practices or levels of grazing use are a significant factor(s) in the allotment or pasture failing to achieve rangeland health standards, in accordance with Provision 27. This would require the BLM to temporarily modify or suspend the grazing permit after completing an additional site-specific NEPA analysis and issuing a grazing decision. Adversely affected parties would have the opportunity to protest and appeal the grazing decision as outlined in 43 CFR 4160. Following resolution of protest/appeal, the AUMs associated with the area(s) not meeting standards would be suspended or cancelled, in whole or in part (see 43 CFR 4170.1-1), until such time as the BLM documents, through monitoring and a subsequent assessment, that the pasture or allotment is meeting standards or is making significant progress towards meeting standards, or grazing is no longer a causal factor for failing to meet standards.

Voluntary Permit/Lease Relinquishment

When the BLM receives a properly executed letter of voluntary relinquishment for pastures or allotments that overlap NLCS lands (WSAs) the existing permit or lease and associated permitted use (both active preference and suspended non-use) would terminate automatically without further notice. Those areas would have the permitted grazing use (both active preference and suspended non-use) reduced for the duration of the plan (see Provision 29(1) of the 2010 Settlement Agreement) as follows:

- In the case where there is only one grazing permit issued for one allotment or pasture, the WSA portion would be designated as unavailable to grazing use for the duration of the plan. However, since WSA boundaries typically do not align with allotment or pasture boundaries additional management actions (*e.g.* fencing, defining existing topographic barrier features, herding, and cadastral survey) would be required to ensure grazing does not occur within the WSA in the future. Carrying capacity analysis may be required to ensure that appropriate AUMs would be assigned for those portions of the pasture/allotment outside of the WSA where grazing use could be reauthorized.
- In the case of a partial relinquishment, permitted use for the allotment or pasture would be reduced by the total number of AUMs identified in the relinquished portion of the permit (both active preference and suspended non-use). The relinquished AUMs would be unavailable for grazing use for the duration of the plan.
- In the case of a common use allotment or pasture, the permitted use associated with the allotment or pasture would be reduced by the number of relinquished AUMs (both active preference and suspended non-use) for the duration of the plan.
- In all cases, the relinquished AUMs would not be available for livestock grazing use by other permittees and would be allocated to WSA values for the duration of the plan.

Grazing permit relinquishments on all other public lands in the planning area that fall outside of WSAs would continue to be processed in accordance with existing IMs, handbooks, and/or manual guidance (*e.g.* BLM 1984b, 2013b), as described in the No Action Alternative.

Alternative D - Balance Management of Wilderness Characteristics with Other Multiple Uses

Overview

Alternative D meets the 2010 Settlement Agreement requirements by analyzing an alternative within this RMP Amendment that:

- Addresses wilderness character, OHV use, and grazing management in a RMP Amendment for the Lakeview planning area (Provisions 13 and 14).
- Represents one component of considering a full range of OHV allocation alternatives that vary the amounts of areas falling within the three OHV allocations (open, limited, and closed), and address effects on and protection of wilderness characteristics, balances resource uses and values, and is consistent with the guidance specified in Provision 14c and 26(b and c) of the 2010 Settlement Agreement.

Wilderness Characteristics Management

Under this alternative, the same evaluation matrix criteria and boundary setbacks described in Alternative C were utilized to evaluate wilderness characteristic protections with other existing resources and multiple uses. However, BLM weighted on-going and future potential multiple use management conflicts higher in the categorization process for this alternative. Based on the output from this process, the BLM placed each unit into one of three management categories, as described under the *Management Common to Alternatives B-E* section. For further details on this process, refer to Appendix 4.

Category C Units

The BLM would prioritize the protection of wilderness characteristics over other multiple uses in 2 units (totaling approximately 4,671 acres) (Table 2-1; Map W-5, Appendix 1). Boundary setbacks and allowable and prohibited uses within the boundary setbacks would be the same as those described for Alternative C.

Category B Units

The BLM would balance the management of wilderness characteristics with other resources and multiple uses in 41 units and portions of 18 additional units totaling approximately 1,066,919 acres (Table 2-1; Map W-5, Appendix 1).

Category A Units

The BLM would emphasize the management of other resources and multiple uses over wilderness characteristic protection in 45 units and portions of 18 additional units totaling approximately 582,355 acres (Table 2-1; Map W-5, Appendix 1).

Management Changes

The proposed lands and realty management changes are displayed on Maps L-4, L-10, L-15, and L-17 (Appendix 1). In addition, the BLM would encourage future utility line proposals to co-locate adjacent to existing utility lines or within designated ROW corridors. The proposed mineral management

changes are displayed on Maps M-2, M-8, and M-13 (Appendix 1). The proposed VRM changes are displayed on Map VRM-4 (Appendix 1).

Off-Highway Vehicle Use and Travel Management

Under this alternative, OHV use and mechanical transport within Category C units would be limited to existing routes. OHV use and mechanical transport within WSAs would be the same as the No Action Alternative (most WSAs would be limited to existing or designated routes; a portion of the Sand Dunes WSA would remain open). Existing Closed OHV areas and two other areas (Alkali Lake chemical waste site and Foskett Speckled Dace habitat) would be closed to OHV use. The northwest portion of the planning area would continue to be seasonally closed to OHV use within mule deer winter range. Forty-four distinct areas (polygons) would remain open to cross-country OHV use scattered across the planning area (Map OHV-4, Appendix 1). The rationale for applying these OHV area designations to each distinct area is provided in Table A9-2 of Appendix 9.

No cross-country, OHV travel would be allowed in any OHV Limited or Closed areas, other than the five OHV use exceptions described in 43 CFR 8340.0-5 (see definitions under the No Action Alternative) which would allow BLM staff or contract crews to use motorized vehicles to conduct needed management such as fire suppression or vegetation treatment in these areas. Future emergency area or route closures would be handled as described in Appendix 9.

Primitive routes within the interior of Category C units could receive minimal spot maintenance by non-mechanical means, where needed to maintain official, emergency, or administrative use. In Category B units, interior routes could receive mechanical spot maintenance where needed to retain the current level of public or administrative access. Primitive routes/ways within the interior of WSAs would not be maintained for recreational motorized vehicle or mechanical transport use unless it meets the non-impairment standard or one of the exceptions to this standard (BLM 2012h, p. 1-27). All other routes (roads, primitive roads, and trails) outside of these areas, including all WSA boundary roads (including cherry-stems), all wilderness characteristics unit boundary roads, and all routes inside Category A units, could be maintained by mechanical means in accordance with individual route management objectives (maintenance level) or on an as-needed basis (see Table A9-1, Appendix 9). Existing routes outside of Category C units and WSAs could also be upgraded, widened, resurfaced, or realigned where needed. These activities would incorporate appropriate BMPs and RDFs (Appendix 7) to minimize potential effects.

No new route construction would be allowed within Category C units unless specifically required by law. New motorized vehicle or mechanical transport routes would continue to be precluded within WSAs (BLM 2012h, p. 1-27). New temporary or permanent roads, primitive roads, and motorized or non-motorized trails would be allowed in open or limited areas within the rest of the planning area on a case-by-case basis, after completing a site-specific NEPA analysis and applying appropriate BMPs or RDFs (Appendix 7).

Livestock Grazing Management

Most of the livestock grazing management direction would be the same as the No Action Alternative and Alternative A with the following differences.

Rangeland Health Management Changes

In areas where, based on completion of a rangeland health assessment, the BLM finds that livestock grazing management practices or levels of grazing use in an allotment or pasture are a significant causal factor(s) in failing to achieve rangeland health standards (BLM 1997a; see Appendix 3), the BLM would take appropriate livestock grazing management actions in accordance with 43 CFR 4180.2(c), similar to the No Action and Alternative A.

However, if a rangeland health assessment is completed that indicates one or more standards are not being met due to factors other than grazing that are subject to BLM control, then the authorized officer shall consider taking action to make progress toward rangeland health standards and land use plan objectives, even though livestock grazing is not a significant causal factor for non-attainment of standard(s). Actions available to the authorized officer could include, but would not be limited to, changes in livestock grazing management.

If a Rangeland Health Assessment has not been completed for an allotment or pasture, or if the existing assessment no longer represents current resource conditions, then the BLM would not permit increases to AUMs that could increase negative impacts to other resources over the term of the permit until the Rangeland Health Assessment is completed or revised. The resources to be considered are those identified in the *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* (BLM 1997a), *Lakeview RMP/ROD* (BLM 2003b, as maintained), and *Oregon Greater Sage-Grouse ARMPA* (BLM 2015a, as maintained).

Voluntary Permit/Lease Relinquishment

When the BLM receives a properly executed letter of voluntary relinquishment anywhere in the planning area it would continue to follow the permit relinquishment policy in WO IM 2013-184 (or subsequent guidance). Under this guidance, the BLM would continue to accept all voluntary relinquishments of grazing permits. This would result in ending the relinquished party's permitted use and preference, but would not, in and of itself, result in that forage allocation becoming unavailable for livestock use.

The BLM would then review the compatibility of livestock grazing use with other existing resources and multiple uses in the former permit area[10]. The resource considerations, and the degree to which grazing is compatible or in conflict with these resources, would be evaluated through site-specific NEPA compliance process. Based on the competing resources or other opportunities present in the area, the BLM could wholly or partially designate the area as unavailable to livestock grazing, create a reserve common allotment, and/or only allow livestock (*e.g.* targeted or prescriptive) grazing to meet vegetation or fuel management objectives. If grazing is found to be compatible with the other resource considerations, the area would remain available to livestock grazing and could become a reserve common allotment or a new grazing permit could be issued to a qualified applicant in accordance with 43 CFR 4100. If grazing is found to be incompatible, the forage allocation would be made to another resource. The BLM would provide the rationale for how these considerations were addressed in the allocation decision. This decision would establish the allocation of forage resources for the life of the plan, but additional land use planning level analysis would not be required.

Other Range Management

Temporary authorization of livestock use (targeted or prescriptive) could occur within exclosures or unallotted areas to reduce fuels, manage weeds/invasive species, or meet specific vegetation/wildlife habitat objectives.

New range improvements within Category B and C units would be handled as described in the *Facilities* portions of the *Management Common to Alternatives B-E* section.

[10] Known resource values and potential conflicts for each grazing allotment are identified in Appendix E1 of the *Lakeview RMP/ROD* (BLM 2003b, as maintained).

Alternative E - Emphasize Protection of Specific Lands with Wilderness Characteristics Based on External Criteria

Overview

Alternative E represents a refinement of the criteria used in the development of Alternative C. It meets the 2010 Settlement Agreement requirements by analyzing an alternative within this RMP Amendment that:

- Addresses wilderness character, OHV use, and grazing management in a RMP Amendment for the Lakeview planning area (Provisions 13 and 14).
- Represents one component of considering a full range of OHV allocation alternatives that vary the amounts of areas falling within the three OHV allocations (open, limited, and closed), addresses effects on and protection of wilderness characteristics (Provision 14), and is consistent with the guidance specified in Provision 26(c) of the 2010 Settlement Agreement.

Wilderness Characteristics Management

The BLM consulted the Southeastern Oregon Resource Advisory Council (RAC) for input on management on lands with wilderness characteristics. While the RAC was unable to officially recommend an alternative design (due to the lack of a quorum), individual members did provide input on the design of an alternative that further refined the output from the matrix evaluation process based on rankings for ecological conditions, other resources present, and a higher weighting of the criterion of connectivity to other lands with wilderness characteristics and WSAs (see Appendix 4). As a result of this process the BLM placed units into one of three management categories described under the *Management Common to Alternatives B-E* section.

Category C Units

The BLM would prioritize the protection of wilderness characteristics over other multiple uses in 26 units totaling approximately 372,218 acres (Table 2-1; Map W-6, Appendix 1). Allowable and prohibited uses within the boundary setbacks would be the same as those described for Alternative C.

Category B Units

The BLM would balance the management of wilderness characteristics with other resources and multiple uses in 68 units totaling approximately 1,109,160 acres (Table 2-1; Map W-6, Appendix 1).

Category A Units

The BLM would emphasize the management of other resources and multiple uses over wilderness characteristic protection in 12 units totaling approximately 168,512 acres (Table 2-1; Map W-6, Appendix 1).

Management Changes

Associated proposed lands and realty management changes are displayed on Maps L-5, L-11, L-16, and L-21. Proposed mineral management changes are displayed on Maps M-2, M-9, and M-14. Proposed VRM changes are displayed on Map VRM-5 (Appendix 1).

Off-Highway Vehicle Use and Travel Management

Under this alternative, OHV use and mechanical transport within Category C units would be limited to existing routes. OHV use and mechanical transport within the rest of the planning area, including WSAs, would be the same as the No Action Alternative (Map OHV-5, Appendix 1).

Cross-country OHV travel would not be allowed in OHV Limited or Closed areas, other than for the five OHV use exceptions described in 43 CFR 8340.0-5 (see definitions under the No Action Alternative) which would allow BLM staff or contract crews to use motorized vehicles to conduct needed management such as fire suppression or vegetation treatment in these areas. Future emergency area or route closures would be handled as described in Appendix 9.

Primitive routes within the interior of Category C units could receive minimal spot maintenance by non-mechanical means, where needed to maintain official, emergency, or administrative use. In Category B units, interior routes could receive mechanical spot maintenance where needed to retain the current level of public or administrative access. Primitive routes/ways within the interior of WSAs would not be maintained for recreational motorized or mechanical transport use unless it meets the non-impairment standard or one of the exceptions to this standard (BLM 2012h, p. 1-27). All other routes (roads, primitive roads, and trails) outside of these areas, including all WSA boundary roads (including cherry-stems), all wilderness characteristics unit boundary roads, and all routes inside Category A units, could be maintained by mechanical means in accordance with individual route management objectives (maintenance level) or on an as-needed basis (Table A9-3, Appendix 9).

Existing routes outside of Category C units and WSAs could also be upgraded, widened, resurfaced, or realigned where needed (Appendix 9). These activities would incorporate appropriate BMPs and RDFs (Appendix 7) to minimize potential effects.

No new route construction would be allowed within Category C units unless specifically required by law. In addition, new motorized vehicle or mechanical transport routes would continue to be precluded within WSAs (BLM 2012h, p. 1-27). New temporary or permanent roads, primitive roads, and motorized or non-motorized trails would be allowed in open or limited areas within the rest of the planning area on a case-by-case basis, after completing a site-specific NEPA analysis and applying appropriate BMPs or RDFs (Appendix 7).

Livestock Grazing Management

Most of the livestock grazing management direction (including how rangeland health issues and permit relinquishments are addressed) would be the same as Alternative A. However, range improvements within Category B and C units would be handled as described in the *Facilities* portion of the *Management Common to Alternatives B-E* section.

Alternatives Considered but Eliminated from Detailed Analysis

The following is a discussion of alternatives that were considered but eliminated from detailed analysis for various reasons. Some of these alternatives are substantially similar to alternatives that have been considered or analyzed in detail in other land use planning EISs. Some of these actions would require Congressional action to implement or are otherwise beyond the scope of the planning process. Some of these alternatives were determined not to be reasonable because they would not address the *Purpose and Need* described in Chapter 1.

Sage-Grouse Habitat Protection and Restoration Alternatives

Early in the RMP Amendment process, members of the public suggested two alternatives that would emphasize the maintenance of sagebrush/Greater Sage-grouse habitats that are of a high quality and in functioning condition, along with some active restoration of natural systems that are in a degraded condition. Commenters suggested management actions within Greater Sage-grouse core and low-density habitat should follow ODFW's (2011) *Greater Sage-grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat* and/or BLM's (2011f) recommendations in *A Report on National Greater Sage-grouse Conservation Measures*. The BLM considered these alternatives but eliminated them from further analysis because they were previously analyzed in detail (as Alternatives B and E) in the *Oregon Greater Sage-grouse Proposed RMP*

Amendment/Final EIS (BLM 2015a), are beyond the limited scope of this RMP Amendment, and do not address the *Purpose and Need* described in Chapter 1.

Commodity Emphasis Alternative

The BLM considered an alternative that would emphasize production of commodities and public goods and services (mining, grazing, commercial recreation, commercial wood products, etc.). Under such an alternative, the constraints placed on commodity production/uses to protect other resources would be the least restrictive possible within the limits defined by law, regulation, and BLM policy. While this alternative would emphasize commodity uses, it could also include provisions to maintain the existing environmental and resource conditions or mitigate adverse impacts to the extent practical. This alternative was previously analyzed in detail (as Alternative B) in the *Lakeview Proposed RMP/Final EIS* (BLM 2003a) and would not address the limited scope of the *Purpose and Need* for the RMP Amendment described Chapter 1. More specifically, this alternative would not address potential impacts to lands with wilderness characteristics. For these reasons, this alternative was eliminated from detailed analysis.

Exclusion of All Commodity Uses Alternative

The BLM considered an alternative that would exclude all authorized or permitted discretionary multiple uses of the public lands (livestock grazing, mineral sale or leasing, lands and realty actions including commercial rights-of-way, commercial and public special forest products harvest, commercial recreation uses requiring permits, etc.). Under such an alternative, the BLM would petition the Department of the Interior to withdraw the entire planning area from the public land and mining laws. This alternative would allow no commodity production and would include only those management actions necessary to maintain or enhance natural values and protect life and property. Management would utilize primarily passive methods. This alternative was previously analyzed in detail as Alternative E in the *Lakeview Proposed RMP/Final EIS* (BLM 2003a). Implementation of some components of the alternative would be remote or speculative because of legal constraints, including a failure to manage the public lands "in a manner …that will provide food and habitat for … domestic animals" or "in a manner which recognizes the Nation's need for domestic sources of minerals, food, timber, and fiber from the public lands" (Sect. 102(a)(8) and (12) of the Federal Land Management and Policy Act). For these reasons, this alternative was eliminated from detailed analysis.

Wilderness Study Area/Wilderness Alternatives

BLM received several comments during public scoping regarding the removal of all existing WSAs from wilderness study or designating all existing WSAs as wilderness. The BLM considered these alternatives but determined that these proposals require Congressional action and are outside the limited scope of the *Purpose and Need* for the RMP Amendment (see Chapter 1). For these reasons, these alternatives were eliminated from detailed analysis.

Sand Dunes

One comment suggested removing the Sand Dunes WSA designation and instead designating the area as a national recreation area focused on promoting motorized, off-road recreation opportunities. The BLM considered this alternative, but this proposal would require Congressional action and is, therefore, outside the limited scope of the *Purpose and Need* for the RMP Amendment (see Chapter 1). For these reasons, this alternative was eliminated from detailed analysis.

Fossil Lake

Other comments suggested re-opening closed portions of the Fossil Lake area to OHV use. One proposal included a map with four alternatives for re-opening portions of this OHV Closed area. The current Fossil Lake OHV closure area boundary was established in the *Lakeview RMP/ROD* (BLM 2003b) to protect paleontological and cultural resources near the surface that were at risk of damage by OHVs. The BLM considered these alternatives but determined that re-opening this area to OHV use could cause irreparable

damage to these resources. These alternatives are beyond the scope of the current planning process or would not specifically address the limited *Purpose and Need* for the RMP Amendment (see Chapter 1). For these reasons, these alternatives were eliminated from detailed analysis.

Area of Critical Environmental Concern (ACEC) Alternatives

Manage All Lands with Wilderness Characteristics as ACECs

Some public comments suggested the BLM manage all lands with wilderness characteristics as ACECs. ACECs are areas within BLM-administered lands where special management attention is required … to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards (43 CFR 1601.0-5(a)). At least one of these values must meet the importance criterion by having "substantial significance and value". Natural hazards must represent "a significant threat to human life or property" (43 CFR 1610.7-2).

The BLM previously addressed ACEC designation and management across the entire planning area during the development of the *Lakeview RMP/ROD*. That planning effort resulted in retaining four existing ACECs and designating an additional 14 ACECs totaling 314,918 acres. Special management direction was also approved for these areas (BLM 2003b, p. 57-70, Table 8, Maps SMA-4 to SMA-21, as maintained). The BLM also addressed ACEC designation and management across much of eastern Oregon in the *Oregon Greater Sage-grouse ARMPA* (BLM 2015a).

The criteria for ACEC designation and management (discussed above) are much different from those for wilderness characteristics (roadless area greater than 5,000 acres, predominantly in a natural condition, and having either an outstanding opportunity for solitude or primitive/unconfined recreation (see *Introduction* section of this chapter and BLM 2012e and 2021f). The BLM considered this alternative but determined that under BLM regulations and policy it would be inappropriate to apply ACEC criteria to identify and manage lands with wilderness characteristics. In addition, ACEC designation is beyond the scope of the current planning process or would not specifically address the limited *Purpose and Need* for the RMP Amendment (see Chapter 1). For these reasons, this alternative was eliminated from detailed analysis.

Pronghorn ACEC Alternative

One public comment received (letter dated March 3, 2021) suggested that the BLM should reconsider the commenter's 1998 Pronghorn ACEC proposal (ONDA 1998) as they felt the area deserved further consideration. This proposal covers approximately 1.1 million acres of public lands administered by the BLM Lakeview and Burns Districts in Oregon, the Winemmucca Field Office in Nevada, and the Surprise Field Office in California, between and surrounding the Hart Mountain and Sheldon National Wildlife Refuges. The commenter suggested that the area had developed additional significance since the U.S. Fish and Wildlife Service recognized the larger Greater Hart-Sheldon region as one of six "sagebrush strongholds" in 2014 containing native habitats necessary to support the long-term survival of the Greater Sage-grouse, in addition to the previously suggested values as habitat for pronghorn, and 46 "at-risk" plant, animal, and natural communities. The commenter also suggested that the area was subject to an "inconsistent management framework" and is threatened by "changing climate… livestock grazing and associated infrastructure, extensive road and transportation networks, off-road vehicle use and unauthorized routes, aggressive non-native species, and the potential for mining and poorly sited transmission and energy development".

While this proposal was untimely, the BLM nevertheless considered it and determined it is outside the scope of the *Purpose and Need* (see Chapter 1) for this RMP Amendment.

In addition, the 1998 Pronghorn ACEC proposal was previously evaluated by an inter-agency team of biologists and other resource specialists from Oregon Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and the four BLM offices. The evaluation found that:

- The relevance criteria were met for most resource values described in the proposal.
- The importance criteria were met for some resource values in specific, discrete areas or locations within the proposal area; and
- There was little need for additional special management throughout most of the proposal area, as existing plans provided adequate direction for the protection of the relevant/important resource values identified (BLM 1999b, p. 1-2).

The area as a whole did not meet the ACEC criteria though smaller portions of the area within the BLM Lakeview District and Winnemucca Field Office did meet the criteria (BLM 1999b, p. 41; 2000a). The BLM Lakeview District addressed those portions of the Pronghorn ACEC proposal within its administrative jurisdiction in the *Lakeview Proposed RMP/Final EIS* (BLM 2003a, p. 3-6). In addition, those portions of the area that the BLM determined met the ACEC criteria were further addressed and subsequently designated as ACECs in the *Lakeview RMP/ROD* (BLM 2003b, p. 57-59, 66-67, and Maps SMA-4, SMA-15, SMA-16, and SMA-20, as maintained).

The importance of the area as Greater Sage-grouse habitat was further recognized and addressed through BLM's designation and protective management of much of the proposal area as Priority Habitat Management Areas (PHMA) and/or Sagebrush Focal Areas (SFA) in the Oregon, Nevada, and Northeastern California *Greater Sage-Grouse Approved Resource Management Plan Amendments* (BLM 2015a, Figure 1-2, and Appendix A, Figure 2-1; BLM 2015y, Appendix A, Figure 2-1). The potential effects of the designation and management of these important sage-grouse habitats as ACECs in Oregon was also analyzed in detail in an EIS during this RMP Amendment process under Alternatives C and F (BLM 2015b, p. 2-65, 2-77 to 2-78, and Chapter 4). The potential effects of the designation and management of the Pronghorn proposal as an ACEC would be substantially similar to these two alternatives which have already been addressed in detail in an existing EIS and were ultimately not adopted as the agency's final decision (BLM 2015a).

In addition, the identification of a potential ACEC does not, of itself, change or prevent change of the management of use of the public lands (43 CFR 1601.0-5(a)). The proponent did not demonstrate that additional special management for sage-grouse, which presumably would be provided by ACEC designation, is needed to protect sage-grouse habitat above that which has already been provided by the PHMA/SFA designation and management direction in the 2015 ARMPAs (BLM 2015a, 2015y). In fact, many of the potential threats to sage-grouse identified in the proponent's letter have already been directly addressed by the BLM within the majority of the proposed ACEC through PHMA/SFA protective management direction (right-of-way exclusion or avoidance area designations, land tenure zone 1 (retention) designations, restrictions on leasable and salable mining, and OHV area limited designations (BLM 2015a, Appendix A, Figures 2-4, 2-6, 2-7, 2-8, 2-9, 2-11a, 2-11b, 2-12, and 2-13, as maintained; BLM 2015y, Appendix A, Figures 2-4, 2-6, 2-7, 2-8, 2-9, 2-11a, 2-11b, 2-12, and 2-13, as maintained). The sagebrush habitat protections provided by these existing RMP Amendments would also protect or promote habitat for other important sagebrush obligate species, including pronghorn.

The proponent's claim that the area is threatened by "extensive road and transportation networks" is factually inaccurate as much of the proposal area has been identified as large roadless areas (greater than 5,000 acres in size) currently being managed as WSA (see *Wilderness Study Areas* section of Chapter 3) or have more recently been identified by either the proponent or the BLM as roadless areas possessing wilderness characteristics (see *Lands with Wilderness Characteristics* section of Chapter 3, Appendix 2, Map WCI-1 in Appendix 1; ONDA 2005, 2015).

Further, designation of the entire proposal area as an ACEC is not feasible or practicable because the BLM Lakeview District cannot make management decisions within other BLM jurisdictions.

For all of these reasons, this alternative was considered, but eliminated from detailed analysis.

Backcountry Conservation Area Alternative

After the conclusion of scoping, the Theodore Roosevelt Conservation Partnership (TRCP) presented the BLM with a proposal to designate lands with wilderness characteristics as backcountry conservation areas (BCAs). The TRCP defines BCAs as "identifiable areas of public lands that are generally intact and undeveloped, contain important fish and wildlife habitat, and provide dispersed outdoor recreation opportunities". The TRCP states the purpose of the "BCA allocation is to conserve, maintain, restore and enhance the generally intact and undeveloped appearing condition and important habitat values of identifiable areas of public lands for the benefit of fish and wildlife populations, public land users and the greater public… and to allow for many traditional and customary land uses while providing for dispersed sustainable recreation activities such as hunting, fishing, camping, hiking and other backcountry recreation" (TRCP 2014).

The TRCP further suggested that BCAs would represent a multiple-use conservation approach to conserve, restore, and enhance fish and wildlife habitat and the characteristics of backcountry lands and recommended the following management actions within BCAs:

- Dispersed non-motorized recreation opportunities (such as hunting, fishing, horse packing, backpacking and backcountry camping) would be promoted on large undeveloped landscapes.
- Existing public access would be maintained. Improved roads, two-track roads, and trails that are important for the public would remain open, but new roads would not be developed under most circumstances. Cross-country motorized use would not be allowed.
- Energy development and transmission corridors, including wind, solar, geothermal, oil, and gas development and associated rights-of-ways would not be allowed.
- Unfragmented fish and wildlife habitat would be conserved and prioritized for restoration. Active management would be focused on habitat restoration, enhancement, and the restoration of native forests and rangelands, including treatments to control noxious weeds, the restoration of fire-adapted systems that have become over-grown from fire suppression, and activities that reduce the risk of wildfire. This allocation would also allow the active restoration of areas impacted by fires.
- Valid existing rights (*e.g.* mining, grazing) would be allowed to continue.
- New water developments that benefit wildlife would be allowed and ranchers would be allowed to maintain existing range improvements.

The TRCP supplemented and refined their proposal multiple times between 2014 and 2018, primarily to adjust its proposed BCA boundaries to be consistent with boundaries for lands that the BLM identified as having wilderness characteristics.

While the FLPMA does not specifically require consideration of new administrative designations such as BCAs, the BLM did develop a national policy in 2017 that provides its offices with the discretion to consider management for backcountry conservation during land use planning efforts (BLM 2017a). This policy directs the BLM to consider such proposals as a type of special recreation management area (SRMA). The TRCP has stated that they believe BCA designation and management represents a reasonable alternative management strategy for lands with wilderness characteristics. However, BLM's current BCA policy establishes criteria for identifying potential BCAs that differ from those used to identify lands with wilderness characteristics. Further, this policy directs the BLM to develop fish, wildlife, and recreation management objectives for proposed BCAs rather than objectives that protect wilderness characteristics.

The BLM considered this alternative, but new special management designations or SRMA allocations fall outside the limited scope of, or would be ineffective in meeting, the *Purpose and Need* described in

Chapter 1. In addition, some of the management actions that the TCRP proposed within BCAs are substantially similar to management actions that have been addressed within the range of alternatives that are analyzed in detail. An agency does not need to analyze an alternative that is substantially similar in design or would have substantially similar effects as an alternative that is analyzed in detail. For these reasons, this alternative was eliminated from detailed analysis.

Chapter 3 - Affected Environment and Environmental Consequences

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Introduction

This section includes a statement of the issues (see Chapter 1), a discussion of the existing conditions of resources and uses (*Affected Environment*), followed by a description of the potential impacts (*Environmental Effects*) that would occur to these values under the six alternatives.

Analysis Assumptions

Many assumptions were used to guide the analysis of potential environmental effects and are listed in this section. Additional assumptions specific to a particular resource or resource use are presented under that section later in this chapter.

Geographic Scale of the Analysis Area

For this land use planning effort, the BLM determined that the geographic area that would potentially experience environmental impacts from the range of alternatives analyzed herein, would vary somewhat from the collective boundaries of the wilderness characteristics units within BLM-administered lands in the planning area (for wilderness characteristics management actions) to all BLM-administered lands within the planning area (for OHV and grazing management actions). The BLM anticipates that no environmental effects would extend beyond the boundary of these geographic areas under any alternative analyzed.

Analysis Timeframes

The environmental and social effects of resource management or uses can extend across various timeframes. For purposes of this analysis, the BLM defined long-term impacts as those that would last 5-20 years and temporary/short-term impacts as those that would last less than 5 years.

In determining how far into the future to analyze potential cumulative effects, an agency should first consider the timeframe of the specific analysis (CEQ 1997, page 16). The agency must determine how far ahead to look and provide sound reasoning for the timeframe (*Selkirk Conservation Alliance v. Forsgren* 2003). Based on this direction, the BLM has defined the analysis timeframe for all potential effects (including cumulative effects) as the same 20-year expected life of this plan amendment.

Lands with Wilderness Characteristics

- Applying appropriate BMPs to future management activities (see Appendix 7) would mitigate many potential impacts to wilderness characteristics.

Off-Highway Vehicle Use

- For analysis purposes, the potential impacts to public motorized vehicle users, public access, and user safety on BLM-administered lands within the planning area would be characterized by comparing acres of OHV area designations and miles of open routes as impact indicators.
- Based on statewide trends, the demand for motorized vehicle/OHV access to BLM-administered lands in the planning area would increase over the long-term.

- Based on professional experience and trends in OHV use observed within the planning area, the BLM assumes for analytical purposes that up to 20% of any open OHV area designations would result in high, concentrated motorized vehicle use resulting in bare ground over the long-term, including the development of new user-created routes (see Appendix 2).
- Adequate recreation and law enforcement funding/staffing would be available to sign and enforce OHV/motorized vehicle area designation decisions, regardless of the alternative.
- Individual route designations for existing routes within OHV Limited areas will be evaluated during a future Comprehensive Travel Management Planning process and will not be addressed further in this plan amendment.
- Based on past road maintenance budgets, staffing levels, and annual accomplishments, up to 100 miles of roads could be maintained each year (BLM 2003b) under each alternative though the specific routes could differ by alternative. Not all BLM-administered roads in the planning area would be maintained.
- Based on past access needs by the BLM, other Federal, State, and County agencies, and public, an estimated 15-20 miles total of new roads (BLM 2003b) could be identified over the long-term.

Livestock Grazing

- Based on the results of past rangeland health assessments (RHAs) completed between 1998 and present day (which resulted in portions of 12 allotments totaling about 126,614 acres/7% of BLM-administered lands in the planning area failing to meet standards due to livestock grazing), the BLM assumes that a similar number of additional pastures and/or acres could fail to meet one or more rangeland health standards due to livestock grazing following completion of rangeland health assessment updates over the long-term.
- Removal or reduction of livestock grazing use would likely result in the expedited attainment of rangeland health standards at the pasture or allotment scale compared to other livestock management options available under 43 CFR § 4180. However, removing or reducing grazing would not address all potential impact-causing activities on public lands. For this reason, rangeland health standards may not be met in some areas due to the removal or reduction of grazing alone, regardless of the alternative. Some areas may need additional active restoration management (juniper removal, weed treatment, etc.) to make progress towards meeting standards or desired future conditions over the long-term.
- For analysis purposes, the BLM assumes that for Alternative B, up to 100% of the land use allocations listed in Table 2-2 could have grazing permits voluntarily relinquished and those areas made unavailable for grazing use over the long-term.
- For analysis purposes, the BLM assumes that for Alternative C grazing permits could be voluntarily relinquished and those areas made unavailable for grazing use on up to 403,190 additional acres within WSAs over the long-term.

Other Multiple Uses

Due to increasing populations in Oregon, the rest of the United States, and worldwide, the BLM expects the demand for many other multiple uses such as rights-of-way (ROWs), permits, locatable and salable minerals, special forest products, motorized and non-motorized recreation, livestock/beef production, and facilities on BLM-administered lands in the planning area would be stable or increase over the long-term.

Analysis Methodology

Cumulative Impacts

The Council on Environmental Quality (CEQ) defines cumulative effects as the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (40 CFR § 1508.7, in effect prior to September 14, 2020).

Past Actions

CEQ's (2005) cumulative impact guidance states that the "environmental analysis required under NEPA is forward-looking." CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Review of past actions is required only "to the extent that this review informs agency decision-making regarding the proposed action." "[G]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." This is because a description of the current state of the environment (*i.e.* affected environment section) inherently includes the effects of past actions. Further, the "CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions." Information on the current environmental condition is more comprehensive and more accurate for establishing a useful starting point for a cumulative effects analysis than attempting to establish such a starting point by adding up the described effects of individual past actions to some environmental baseline condition in the past that, unlike current conditions, can no longer be verified by direct examination. The Department of the Interior issued additional guidance related to past actions that reinforced the use of the CEQ (2005) guidance or any superseding guidance (43 CFR § 46.115).

Reasonably Foreseeable Future Actions in the Planning Area

The CEQ did not define the term "reasonably foreseeable future action," but explains that agencies are not expected to speculate about future actions. The Department of the Interior defined reasonably foreseeable future actions as *"*those federal and non-federal activities not yet undertaken, but sufficiently likely to occur, that a Responsible Official of ordinary prudence would take such activities into account in reaching a decision. These federal and non-federal activities that must be considered in the analysis of cumulative impact include, but are not limited to, activities for which there are existing decisions, funding, or proposals identified by the bureau. Reasonably foreseeable future actions do not include those actions that are highly speculative or indefinite" (43 CFR § 46.30). The BLM has defined reasonably foreseeable future actions as "those for which there are existing decisions, funding, formal proposals, or which are highly probable, based on known opportunities or trends" (BLM 2008g, page 59).

The BLM has identified those reasonably foreseeable future actions on BLM-administered lands within the planning area for which there are existing proposals, decisions, dedicated funding, or represent highly probable actions based on known trends in Table 3-1. The potential effects of these actions are addressed later in this chapter within those sections where there is a potential to affect a specific resource or use.

The BLM is not aware of any reasonably foreseeable actions that may occur on other ownerships in the planning area that would have the potential to affect any of the resources being analyzed. Therefore, only reasonably foreseeable BLM actions are listed in Table 3-1.

Table 3-1. Summary of Reasonably Foreseeable Future Actions and Trends

Management Action	Planned or Expected Based on Past Trend
Lands, Realty, and Cadastral Survey	Based on ROW application trends between 2017 and 2020, the BLM anticipates 14-20 applications annually; 13-16 of these have typically been minor ROW renewals.
Major ROWs	
- Solar Energy	Few solar energy ROWs are anticipated due to access, infrastructure, and market limitations. However, 1 proposal in north Lake County is currently in the preliminary study phase.
- Wind Energy	Though there have been several wind energy testing ROWs issued in the last 15 years, no wind energy proposals have moved forward to development to date. There is currently 1 preliminary proposal for a wind energy testing ROW in north Lake County.
- Major Utility Lines	The demand for major regional or interstate transmission lines is expected to increase as regional population and urban areas grow, and as new energy facilities such as solar and wind are developed elsewhere in Oregon. While the BLM anticipates 1 new major utility line could be proposed over the long-term, no such proposal is currently before the BLM.
Minor ROWs	The demand for new small/minor distribution facilities to extend or upgrade utility services, such as communication and computer technology infrastructure, fiber optic, electricity, other utilities, and associated access roads, would increase across the planning area as rural development occurs on dispersed private parcels (in-holdings).
- Road/Access - Minor Utility Lines - Communication Sites	1-3 per year (typically on existing routes). 1 currently under construction (BLM 2022c); 1-3 per year typical. 1-4 total
BLM Easements	1-2 per year (typically on existing routes).
Energy and Minerals	Based on recent trends, the demand for salable and locatable mineral exploration and development in the planning area is expected to increase over the long-term.
Salable Minerals	5-7 new pits (BLM 2023a)
Locatable Minerals	
- Sunstone - Notices - Sunstone – POOs - Gold – Notices - Perlite – POO Amendment	1-3 per year (BLM 2018k) 1-3 per year (BLM 2018k) 1-2 total 1 total (BLM 2020a); 0 additional expected
Vegetation	Vegetation/habitat treatments would continue to occur throughout the planning area.
Weeds/Invasive Species	8,000-32,000 acres treated per year (BLM 2015e, 2015f, 2016a)
Juniper/Shrub Cut/Thin in Sagebrush Steppe	7,000-10,000 acres treated per year (BLM 2022b, 2022d, In prep. a)
Juniper Cut/Pile/Burn in Sagebrush Steppe	1,000-5,000 acres treated per year (BLM 2022b, 2022d, In prep. a)
Sagebrush Steppe Restoration Seedings/Plantings	5,000-15,000 acres per year (BLM In prep. a)
Forest Restoration	200-500 acres per year (BLM In prep. a)
Riparian/Wetland Restoration	Riparian Area: 100-200 acres per year Buffer Area: 500-1,500 acres per year (BLM In prep. a)
Wetland Habitat Maintenance	Prescribed fire: 2,000–3,500 acres per year (BLM 2016k) Targeted grazing: 500-750 acres per year (BLM 1990c, 1990d, 2018b, 2018c, 2020g, 2020h, 2021a, 2021b, In prep. a)
Special Forest Products	Special forest product (SFP) permits for firewood, boughs, poles, posts, and other vegetative products. An average of 17 SFP permits issued per year (based 138 permits issued between 2012-2019).
Fire and Fuels	
Wildland Fire	Based on past fire history, up to 50 wildland fires per year on average. The majority of these fires would be less than 10 acres in size (Wildland Fire Management Information 2019). However, fire frequency and intensity could change over time due to a warmer climate. Total estimated acres burned annually would range from 10,000-25,000 acres per year.
Emergency Wildland Fire Rehabilitation / Seeding	Based on past wildland fire rehabilitation trends, about 40-45% of wildland fire areas would require rehabilitation annually.
Fuel breaks	Creation and/or maintenance of 1,300 to 2,550 miles of fuel breaks using a variety of techniques (BLM 2020g, 2020i, In prep. a)

Management Action	Planned or Expected Based on Past Trend
Facilities	Based on past facility maintenance budgets and annual accomplishments, an estimated 20-30 existing facilities would be maintained annually by various parties. Not all existing BLM-administered facilities in the planning area would be maintained over the long-term.
Livestock Grazing	
Fencing	12.5 new miles associated with Key RNAs (BLM 2015a); 11 new miles of pasture division and trailing in South Rabbit Hills and Coyote-Colvin Allotments (BLM 2019o); 1-5 new miles per year estimated in out-years based on past range management needs/trends.
Water Developments	1-5 new developments per year based on past range management needs/trends.

Relationship Between Past Management Activities and Current Resource Conditions

The current condition of the resources in the planning area is a result of a multitude of natural processes and human actions that have taken place over many decades. The description of the *Affected Environment* in various sections of this chapter accounts for the effects of past actions in its discussion of current conditions and serves as an accurate and useful starting point (baseline) for an environmental effects analysis. CEQ (2005) has stated that agencies are not required to list or analyze the effects of individual past actions unless such information is necessary to describe the cumulative effects of all past actions combined. Agencies retain substantial discretion as to the extent of such inquiry and the appropriate level of explanation. Generally, agencies can conduct an adequate cumulative effects analysis be focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions.

Disturbances or changes in environmental conditions have occurred within the planning area due to past management activities. Based on a GIS analysis, the following types of management actions have or are currently occurring in the planning area: livestock grazing, facility maintenance and construction (including range improvements, roads, trails, recreation sites, and other structures), land use authorizations (including utility and road rights-of-ways and permits), mining, motorized vehicle (OHV) use and access, recreational use, wildfire suppression and rehabilitation, fuels treatments, vegetation and wildlife habitat management, (including weed and invasive species treatments), special status species management, wild horse management, cultural and paleontological resource management, and special area (WSA, ACEC/RNA, and suitable WSR) management. Some of these management activities have temporary or short-term effects and disturbed areas recover within 5 years. Other activities can take longer to recover or result in long-term or permanent effects. All of these management activities have affected the condition of, or otherwise shaped the landscape within the planning area into what it is today. These conditions are discussed in more detail throughout the *Affected Environment* sections of this chapter.

Implementation

This plan amendment will be in effect for an estimated 20-year timeframe. While the land use planning decisions (goals, land use allocations, and management direction) will be effective immediately upon signing of a record of decision (ROD), many management actions (*e.g.* changing grazing use, development of a comprehensive travel management plan, etc.) may require subsequent site-specific NEPA analyses and associated decisions before implementation can occur or subsequent on-the-ground work (*e.g.* OHV area signing) to fully implement. During such analyses, appropriate BMPs, RDFs, or stipulations (see Appendix 7) would be considered to reduce or eliminate potential impacts based upon

the specific types of resource impacts expected. The specific measures adopted would be documented in future project-level decisions.

The BLM assumes annual funding levels for plan implementation would be the same across all alternatives. The actual rate of implementation of the plan would depend upon future budget, staffing, and other BLM regional or national priorities. Based upon funding levels from the last 10 years, BLM's local budget is expected to remain flat or decline slightly in future years. The BLM assumes that the annual funding and qualified staffing for implementation actions such as vegetation, fire, and fuels treatments would be sufficient to meet annual target acres under all alternatives.

Monitoring would be a component of the implementation of all alternatives, as described in the *Lakeview RMP/ROD* (BLM 2003b, as maintained). However, the amount or intensity of monitoring could vary by alternative and annual funding constraints.

Irreversible and Irretrievable Commitment of Resources

The Council on Environmental Quality's regulations for implementing NEPA require that an EIS discussion of environmental consequences include "any adverse environmental effects which cannot be avoided should the proposal be implemented, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented" (40 CFR 1502.16, in effect prior to September 15, 2020). Irreversible or irretrievable commitments of resources are those that cannot be reversed or that are lost for a long period. Examples include the extraction of minerals or the commitment of land to permanent roads. Although not specifically labeled, the relationship between short-term uses and long-term productivity, and the irreversible and irretrievable commitment of resources are described, by resource, throughout the discussion of environmental consequences in this chapter.

Lands with Wilderness Characteristics

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect lands with wilderness characteristics in the planning area?*

Affected Environment

The planning area includes both existing wilderness study areas (WSAs) and lands that the BLM has more recently identified as having wilderness characteristics outside of existing WSAs. In order for an area to be identified as having wilderness characteristics, whether under the process that initially identified WSAs or under the BLM's current wilderness characteristics policy, it must be 1) a roadless area that is a minimum of 5,000 acres in size (or meet one of the exceptions to the size requirement), 2) possess naturalness (appear to be affected by the forces of nature with the evidence of man substantially unnoticeable), and 3) provide outstanding opportunities for solitude or primitive and unconfined recreation. The BLM originally identified WSAs during the wilderness inventory required under Section 603 of the Federal Land Policy and Management Act (FLPMA) of 1976. Refer to the WSA section of this document for further details on this process, which was completed during the 15 years following the passage of FLPMA. Subsequent to the FLPMA Section 603 process, the BLM has also identified lands with wilderness characteristics outside of WSAs under the authority of Sections 201 and 202 of FLPMA,

which instruct the BLM to maintain on a continuing basis an inventory of all public lands and their resources and values.

During the development of the existing *Lakeview RMP*, the BLM inventoried over 3,000 acres of lands acquired subsequent to the completion of the FLPMA Section 603 inventory and identified approximately 1,187 acres of wilderness characteristics present in seven small parcels adjacent to the Abert Rim, Fish Creek Rim, and Guano Creek WSAs (BLM 2001a). Under the existing *Lakeview RMP/ROD* these seven small units are managed to protect their wilderness characteristics (BLM 2003b, pages 70 and 72, as maintained). These areas are managed as land tenure class zone 1, VRM Class 1, and OHV limited to existing routes.

In accordance with Provisions 9, 12, 17, 22-24, and 26a of the 2010 Settlement Agreement, the BLM completed an update of its wilderness characteristics inventory for all lands in the planning area outside of WSAs in 2018. Additional citizen inventory information was received in the fall of 2018 and the BLM considered this information and made the appropriate revisions to the inventories. The BLM published these inventory updates on its webpage at https://www.blm.gov/programs/planning-and-nepa/plans-in-development/oregon-washington/lakeview-wci. See Appendix 2 for more detailed information on the BLM's inventory process and findings. Additional inventory documentation, including photos, boundary road determinations, wilderness characteristics inventory forms, and public input are contained in the BLM's wilderness characteristics inventory files. Pursuant to 40 CFR § 1502.21, the BLM hereby incorporates by reference the entirety of its wilderness characteristics inventory update documentation, including all of its inventory files and its inventory findings published on its inventory webpage into this analysis.

During the inventory update, the BLM identified 826 distinct inventory units totaling about 3,179,423 acres. A number of these units were shared with the Deschutes, Central Oregon, Three Rivers, Andrews, and Surprise Field Offices. About 50 sub-units or parcels were removed from inventory unit boundaries due to the presence of high concentrations of unnatural features. A total of 668 inventory units (totaling approximately 713,096 acres) failed to meet any of the size criteria (BLM 2012e and 2021f) and were eliminated from further consideration (Map WCI-1, Appendix 1).

The BLM found a total of 156 units that met one of the size criteria (5,000 acres or an exception) and were evaluated further. Of these, the BLM found 130 units were larger than 5,000 acres. Nineteen of these units are shared with adjacent BLM Field Offices. The BLM found 87 of these units contained wilderness characteristics. The BLM also found 26 units that were less than 5,000 acres in size, but still met the size and naturalness criteria and had outstanding opportunities for solitude and/or primitive and unconfined recreation due to being contiguous with an existing WSA.

Overall, the BLM found 113 units (approximately 1,655,290 acres) outside of existing WSAs that contained wilderness characteristics within the planning area. Seven of these units (totaling about 1,187 acres) were previously identified during the development of the *Lakeview RMP/ROD* (BLM 2001a, 2003b) and are not addressed further except under Alternative B (see Chapter 2). In total, the BLM found 106 new wilderness characteristics units totaling approximately 1,654,103 acres located within the Lakeview planning area (Tables A2-1 and A2-2; Map WCI-1, Appendix 1).

Based upon a GIS comparison analysis, the BLM found wilderness characteristics to be present in about 67 percent of the geographic areas within the planning area where some members of the public (ONDA 2005, 2012, 2015) identified wilderness characteristics.

The 106 wilderness characteristics units include a variety of minor, human-made developments that the BLM determined were not substantially noticeable during its inventory update and thus did not remove apparent naturalness from all or part of a unit. These include, but are not limited to, primitive routes, fences, ditches, reservoirs, waterholes, wells, pipelines, water tanks, troughs, and wildlife guzzlers.

Since the BLM completed its inventory update, it has conducted several treatments or projects within wilderness characteristics units. These include the Poker, Brattain, and Cougar Peak wildfire emergency stabilization and rehabilitation treatments within portions of Catlow Valley, Monument Rock, and Tucker Hill wilderness characteristics units. These treatments had minor, temporary impacts to wilderness characteristics but were not deemed by BLM to diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. These rehabilitation activities have assisted in speeding the recovery of vegetation within the burned areas and are expected to lead to improvement in naturalness over the long-term (BLM 2019m, 2021c, 2022a).

The BLM is also in the process of implementing Greater Sage-Grouse and mule deer habitat restoration or enhancement plans for the Monument Rock and Picture Rock areas, which includes portions of the Tucker Hill, Black Hills, Sheeplick Draw, Monument Rock, and Egli Rim inventory units. These plans are focused on removing phase I and II western juniper from sagebrush/sage-grouse habitats. Though temporary impacts to naturalness would occur during treatments and there would be long-term reductions in vegetative screening, the BLM did not deem these effects to diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics (BLM 2022b, 2022d). The BLM has completed mule deer habitat restoration and enhancement in the Clover Flat area, which had similar short- and long-term effects (BLM 2017e). The BLM did not deem any of these recent management activities to diminish the size or cause an entire BLM inventory unit to no longer meet the criteria for wilderness characteristics.

While managing under the Settlement Agreement, the BLM has only allowed new facilities or other developments, including range improvements, where it deemed they would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. The BLM has recently constructed two new pasture division fences, totaling approximately 8 miles, within the O'Keeffe Individual Allotment, which includes portions of Fisher Canyon, Jack Lake, and Little Juniper Mountain inventory units. The BLM determined that these fences would slightly reduce the naturalness over the long-term but would not diminish the size or cause an entire BLM inventory unit to no longer meet the criteria for wilderness characteristics (BLM 2021d).

In all or portions of the 113 wilderness characteristics units, including all 7 units protected under the existing RMP (see Appendix 3), OHVs are limited to existing primitive routes. This includes the great majority of acres within these units (1,448,631 acres or 88 percent). Within these units there are currently about 1,452 miles of existing primitive routes. An additional 205,434 acres with wilderness characteristics, including all of 1 unit and portions of 2 units, are currently open to cross-country OHV use. Primitive motorized routes within these open areas have likely increased over time. While the presence of routes has a negative effect on apparent naturalness, the BLM determined during its inventory that these existing routes are not substantially noticeable, and that apparent naturalness exists throughout these units despite their presence. Use on these routes is highly variable during the year. Users typically include BLM staff, permittees, miners, right-of-way holders, and various public. Use on many routes is often highest during the fall hunting season. Though the presence of visitors and the noise associated with vehicle use on internal routes impacts opportunities for solitude and/or primitive recreation, the BLM found these effects were generally not extensive enough that these opportunities were not outstanding. The remaining 1,225 acres with wilderness characteristics, including portions of two units,

are closed to OHV use and do not have negative impacts to naturalness from motorized routes or to solitude and primitive and unconfined recreation from motorized vehicle use.

When conducting its inventory update, the BLM used existing rights-of-way (ROW) as inventory unit boundaries. Under the Settlement Agreement, the BLM has not authorized any new ROWs within wilderness characteristics units.

Environmental Effects

Analysis Assumptions

- Applying appropriate BMPs to future management activities (see Appendix 7) would mitigate many potential impacts to wilderness characteristics.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Under the No Action Alternative, the BLM would continue to manage all 106 recently identified wilderness characteristics units (1,654,103 acres) under Provisions 18 and 19 of the 2010 Settlement Agreement (Table 3-2), preventing implementation or authorization of projects that would be deemed by BLM to diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. Within these wilderness characteristics units, these overarching provisions of

Table 3-2. Wilderness Characteristics Allocations by Alternative

Management Objective	No Action	Alternative A	Alternative B**	Alternative C	Alternative D	Alternative E
Units managed under the Settlement Agreement	106 units (1,654,103 acres)	0	0	0	0	0
Units managed as new 202 WSAs*	0	0	34 units and portions of 2 units (273,705 acres)	0	0	0
Units managed under new objective to protect wilderness characteristics (Category C)	0	0	77 units & portions of 2 (1,381,142 acres)	26 units & parts of 4 (411,033 acres)	2 units (4,671 acres)	26 units (372,218 acres)
Units managed under new objective to balance wilderness characteristics with other multiple uses (Category B)	0	0	0	71 units & parts of 2 (1,161,199 acres)	41 units & parts of 18 (1,066,919 acres)	68 units (1,109,160 acres)
No new objective for wilderness characteristics (Category A)	0	0	0	5 units & parts of 3 (74,529 acres)	45 units & parts of 18 (582,355 acres)	12 units (168,512 acres)
Category C setbacks***	0	0	0	7,276 acres	166 acres	4,211 acres

* This table does not include existing WSAs, which are addressed separately in the Wilderness Study Areas section.
** Alternative B includes both the 106 Wilderness Character units (1,654,103 acres) identified during this planning effort and 7 existing units (1,187 acres) that were previously identified during the development of the *Lakeview RMP/ROD* (BLM 2001a, 2003b).
*** Under Alternatives C, D, and E, the BLM would designate setbacks from the boundaries of Category C units. These setbacks would provide management flexibility to adapt to other resource needs, threats, and opportunities along the unit boundaries of the unit. Wilderness characteristics within the setbacks could be substantially reduced or eliminated so their acreage is not included in the Category C unit totals in this table.

the Settlement Agreement would continue to supersede all other management direction (e.g., land tenure, ROW designations, VRM classes, etc.) under the existing RMP (Table 3-3), which are described in more detail under Alternative A. Within wilderness characteristics units, the BLM could continue to implement

Table 3-3. Changes in Land Use Allocations Within Wilderness Characteristics Units

Allocation	Planning Area[1] (acres)	No Action/ Alternative A[2] (acres)	Alternative B (acres)	Alternative C (acres)	Alternative D (acres)	Alternative E (acres)
VRM I	492,826	7,938	280,748	7,938	7,938	7,938
VRM II	160,098	117,055	1,374,018	472,110	121,740	427,424
VRM III	354,906	184,332	0	1,094,123	1,161,922	1,069,884
VRM IV	2,187,594	1,344,778	0	79,931	362,502	148,857
OHV Closed	10,809	1,225	1,655,290	1,225	1,225	1,225
OHV Limited	2,724,485	1,449,435	0	1,654,970	1,649,020	1,449,926
OHV Open	476,174	205,535	0	0	5,950	205,044
Land Tenure Zone 1	2,599,575	1,430,461	1,655,290	1,456,471	1,430,461	1,431,036
Land Tenure Zone 2	600,922	223,522	0	197,512	223,522	222,947
Land Tenure Zone 3	3,158	120	0	120	120	120
Major ROW Exclusion	485,995	1,198	1,655,290	411,033	4,671	372,218
Major ROW Avoidance	2,136,497	1,463,810	0	1,202,681	1,578,601	1,206,503
Major ROW Open	506,167	161,748	0	13,023	43,465	48,466
Major ROW Corridor	74,963	27,366	0	27,366	27,366	27,366
Solar/Wind Exclusion	1,093,288	401,155	1,655,290	411,033	401,205	401,210
Solar/Wind Avoidance	1,578,927	1,087,517	0	1,077,526	1,087,468	1,087,461
Solar/Wind Open	531,227	165,431	0	165,544	165,431	165,431
Minor ROW Exclusion	485,999	1,198	274,344	1,198	1,198	1,198
Minor ROW Avoidance	1,306,327	939,270	1,380,946	1,624,404	1,484,316	1,554,324
Minor ROW Open	1,411,295	713,636	0	28,501	168,584	98,581
Salable Closed	1,410,233	622,695	1,655,290	879,573	622,860	752,853
Salable Open[3]	1,858,389	982,336	0	724,458	982,171	852,178
Leasable Closed	504,284	18,580	282,720	18,580	18,580	18,580
Leasable Open with NSO	1,279,908	873,306	1,322,311	1,061,822	873,471	901,357
Leasable Open[3]	1,484,435	713,144	0	524,655	712,981	685,104
Locatable Closed[4]	13,257	600				
Locatable Open subject to UUD and other restrictions[5]	2,818,333	1,654,690				
Locatable Open subject to non-impairment standard and POO[6]	458,585	Not applicable				

[1] The BLM does not have management jurisdiction over the subsurface mineral rights for approximately 54,188 acres with wilderness characteristics (see Table 3-7). Restrictions on mineral development would only apply to those acres for which the BLM has jurisdiction over sub-surface mineral rights. Salable, Leasable, and Locatable mineral acreage restrictions for the Planning Area do not include approximately 424,528 acres of split estate minerals where restrictions are currently unknown.

[2] The No Action Alternative and Alternative A have the same acreages of wilderness characteristics under the various management allocations. For the No Action Alternative, however, all of the 106 wilderness characteristics units are managed under the Settlement Agreement's provisions.

[3] Open areas include those acres that are open but subject to controlled surface use (CSU) restrictions under the existing land use plan, as amended. These restrictions, which were developed for Greater Sage-Grouse and other resource values, include such measures as daily or seasonal timing restrictions or buffers on sage-grouse, raptors, and special status species habitats, avoidance of cultural resources, etc., as well as being subject to UUD standard.

[4] Through withdrawal or segregation.

[5] Restrictions vary from none to CSU and/or POO.

[6] This category includes existing Section 603 WSAs.

vegetation, fuel reduction, or wildlife habitat restoration treatments in wilderness characteristic units if it deemed they would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. Some treatments would continue to cause minor short-term or long-term effects on wilderness characteristics. For example, the BLM could carry-out treatments that would have minor impacts to apparent naturalness through the presence of stumps or mow lines, but only if it deemed that these impacts would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. Similarly, the presence of a work crew during a treatment or the resulting reduction in vegetative screening could temporarily impact outstanding opportunities for solitude or primitive and unconfined recreation. To the extent compatible with the Settlement Agreement, invasive species treatments would continue to be carried out, resulting in the removal of non-native vegetation, and promoting naturalness through the enhancement of native vegetation. Aerial and ground-based herbicide and seeding treatments could cause temporary effects on solitude during treatment. In addition, some ground-based treatments could create new motorized tracks on the landscape during the treatment operation that could temporarily impact naturalness, but such effects would be mitigated to the point where deemed by the BLM to not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics.

As under all alternatives, emergency wildfire suppression activities necessary to prevent loss of property, resource values, and/or human life could cause negative impacts on wilderness characteristics. These activities could result in short-term to long-term negative effects on naturalness due to the visibility of mechanical fire lines or other impacts of fire suppression.

Reseeding or replanting an area following wildfire rehabilitation or invasive plant management actions would speed up the vegetation recovery in the area and improve apparent naturalness at a faster rate than relying on natural revegetation alone. While these types of treatments could have some minor impacts on naturalness, the BLM would not implement any reseeding or replanting treatments if it deemed they would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics.

The BLM would allow the construction of new facilities or issue new ROWs where they would both comply with existing RMP decisions and where it deems such projects would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics.

Under the No Action Alternative, wilderness characteristics units would continue to fall into a variety of management allocations related to the development of locatable, leasable, and salable minerals (Table 3-3 and Maps M-2, M-3, and M-8, Appendix 1). The BLM would continue to authorize leasable and salable mineral development only where it deems such projects would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. It is unlikely that new impacts to wilderness characteristics would occur from salable or leasable mineral development under this alternative since these restrictions would likely preclude future surface development. The potential effects of locatable mining are addressed in the *Cumulative Impacts* section.

OHV and Travel Management Impacts

Continuing current OHV area designations (Table 3-3 and Map OHV-1, Appendix 1) would limit motorized vehicle use within most (88 percent) wilderness characteristics inventory units to either existing or designated, open routes. This would continue to limit the impact of motorized routes in these areas to those that already exist, which the BLM determined during its inventory are not substantially

noticeable. Impacts to apparent naturalness from these existing routes would continue, as would impacts to solitude and primitive and unconfined recreation from the presence and noise of motor vehicles on internal routes.

The BLM would continue to be prevented from conducting mechanical maintenance on interior routes that did not meet the definition of a boundary road (see *Glossary* in Appendix 8) or constructing new roads within inventory units because these actions would change the unit boundary and diminish the size of inventory unit.

Impacts to apparent naturalness and solitude and primitive and unconfined recreation from cross-country motorized use within approximately 205,434 acres of wilderness characteristics in the OHV Open area designation would also continue.

Livestock Grazing Management Impacts

Under the No Action Alternative, the BLM would continue current livestock grazing management practices, including maintenance of existing range improvements. While the presence of range improvements, as with all structures, has a negative effect on apparent naturalness, the BLM determined during its inventory that existing range improvements are not substantially noticeable, and that apparent naturalness exists throughout the majority of a unit despite their presence. Continuing current grazing management practices and maintaining existing range improvements would maintain the existing condition of wilderness characteristics. However, new range improvements would have the potential to negatively affect naturalness within inventory units and could not be authorized if the BLM deemed they would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics.

There are currently approximately 30,000 acres within wilderness characteristics units (about 2 percent) that are unavailable to livestock grazing under the direction in the *Lakeview RMP/ROD* (BLM 2003b, as maintained). Within these units or portions of units there would be no disturbance from grazing, and it is unlikely that there would be a need for new range improvements causing associated negative impacts to naturalness under any alternative.

Summary

Under the No Action Alternative, all 106 recently identified wilderness characteristics units (Map W-2, Appendix 1) would continue to be managed to protect these characteristics. While continued application of the management direction in Provisions 18 and 19 of the 2010 Settlement Agreement could allow some future management actions or projects to occur within wilderness characteristics units, the BLM would not implement or authorize any projects that it deems would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. For these reasons, the BLM expects wilderness characteristics within all wilderness characteristic units would be maintained over the long-term unless future locatable mining associated with a valid existing mining claim, or a new mining claim filed under the 1872 Mining Law occurs within a unit (see *Cumulative Impacts* section).

Impacts of Alternative A

Wilderness Characteristics Management Impacts

Under Alternative A, the BLM would not have an objective or direction to manage any of the 106 recently identified wilderness characteristics units (1,654,103 acres) to protect their wilderness

characteristics[1]. The management direction applied to these areas through the existing RMP would, in some cases, restrict certain types of projects and actions that could have negative impacts on wilderness characteristics. The BLM included these decisions in the existing RMP, as amended, in order to manage for a variety of values, including sage-grouse habitat and relevant and important values in areas of critical environmental concern (ACECs). One of the 106 units also partially overlaps with a river (Twelvemile Creek) the BLM has determined is suitable for inclusion in the National Wild and Scenic Rivers System and is protectively managing to maintain this suitability. The No Action/Alternative A column in Table 3-3 provides an overview of the acres of wilderness characteristics units currently managed under various management allocation decisions.

Under Alternative A, about 86 percent of the acres in the 106 wilderness characteristics units (1,430,461 acres) would continue to be managed as land tenure zone 1 (Table 3-3 and Map L-1, Appendix 1), which means the BLM would retain these lands, unless they are exchanged for other lands with higher value resources. This acreage includes the entirety of 65 wilderness characteristics units. The size of these 65 units would not be diminished due to sale and would be unlikely to be diminished due to exchange. An additional 14 percent of the acres in the 106 units would continue to be managed as land tenure zone 2; this includes the entirety of three units and 33 units that are split between land tenure zone 1 and 2. The size of these 39 units could be diminished by exchange but not by sale. The remaining 2 units would continue to be managed as a mix of land tenure zones 1, 2, and 3, meaning that their size could be diminished by either exchange or sale, though sales could only take place for the 120 acres designated as land tenure zone 3.

Under Alternative A, the BLM would continue to manage about 81 percent of the acres within the 106 wilderness characteristics units (1,344,778 acres) as visual resources management (VRM) Class IV (Table 3-3 and Map VRM-1, Appendix 1). This includes the entirety of 66 wilderness characteristics units and portions of 32 units. Class IV is the least restrictive VRM class and would allow for major modification of the existing character of the landscape and a high level of change. This VRM class would not restrict ground-disturbing projects that could remove or negatively impact wilderness characteristics. For example, under VRM IV vegetation, fuel reduction, or wildlife habitat restoration projects could take place without restrictions to prevent impacts that would remove apparent naturalness or screening that provides solitude from all or part of a wilderness characteristics unit. Similarly, facilities and range improvements that would be substantially noticeable could be allowed under VRM IV.

The BLM would continue to manage about 11 percent of the acres within the 106 wilderness characteristics units (184,332 acres) as VRM Class III. This includes the entirety of 3 units and portions of 34 units. Class III allows for partial modification of the existing character of the landscape and a moderate level of change. This VRM class could restrict some projects that would remove or negatively impact wilderness characteristics, though some projects that would be substantially noticeable could be allowed.

[1] The seven existing units protected under the existing RMP would continue to be managed under the existing protective management goal and direction under most alternatives.

Only VRM Class I and II are considered protective of wilderness characteristics under *BLM Manual 6320—Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process* (BLM 2021g). Under Alternative A, the BLM would continue to manage about 7 percent and 0.5 percent of acres within wilderness characteristic units respectively as VRM Class II (117,055 acres) and VRM Class I (7,938 acres). This includes the entirety of 2 units that would be managed as Class II, portions of 15 units that would be managed as Class II, and portions of 2 units that would be managed as Class I. Class II only allows for actions that would retain the existing character of the landscape and cause a low level of change. Class I only allows for actions that would preserve the existing character of the landscape and cause a very low level of change. Both VRM Class I and Class II would likely prevent actions that would be substantially noticeable and would thus remove wilderness characteristics from all or a portion of a unit, though some minor, negative impacts to apparent naturalness could occur, particularly under VRM II.

Under the existing RMP wilderness characteristics units include areas in which major ROW, solar/wind development ROW, and minor ROW would be variously excluded, avoided, or allowed without restrictions (Table 3-3 and Maps L-7, L-12, and L-17, Appendix 1). Under Alternative A, the BLM could issue ROWs within the 106 wilderness characteristics units as long as they are in conformance with the existing land use plan (e.g., the BLM could not issue an ROW in an area closed to that particular type of ROW; would avoid issuing them in avoidance areas; and could issue them in areas open to the particular type of ROW). Major or solar/wind ROW would likely reduce the size of a unit or cause substantially noticeable developments that would remove apparent naturalness from all or part of a wilderness characteristics unit. A minor ROW (see *Glossary* in Appendix 8) could reduce the size of a wilderness characteristics unit depending on whether it includes the building of roads or the mechanical improvement of primitive routes. Similarly, a minor ROW could remove apparent naturalness from all or part of a wilderness characteristics unit depending on the level of development.

Under Alternative A, the location of new major ROWs would be precluded on about 1,198 acres (0.1 percent) of the 106 wilderness characteristic units and avoided on about 1,463,810 acres (88 percent) of wilderness characteristics inventory units (Table 3-3 and Map L-7, Appendix 1). This includes all or portions of 103 units. In the event that a major ROW is issued for an area designated for avoidance, the stipulations required could reduce impacts to wilderness characteristics though the stipulations would be designed to avoid impacts to Greater Sage-Grouse habitat or other resource values and not wilderness characteristics. It is very likely that developing a major ROW in a wilderness characteristics unit would remove apparent naturalness from at least a portion of the unit. Under Alternative A, 161,748 acres (10 percent) of wilderness characteristics units would remain open to major ROWs, including all of 3 units and portions of 40 units. As under all alternatives except Alternative B, an additional 27,366 acres (2 percent) would continue to be in designated major ROW corridors. The development of major ROW on these acres would very likely eliminate or decrease the size of wilderness characteristics units through the development of roads and/or substantially noticeable facilities.

Under Alternative A, the location of new wind and solar ROWs would be precluded on about 401,155 acres (24 percent) and avoided on about 1,087,517 acres (66 percent) (Table 3-3 and Map L-12, Appendix 10 of wilderness characteristics inventory units. Wind and/or solar ROW would continue to be excluded from the entirety of 21 wilderness characteristics units and portions of 22 other units. Wind and/or solar ROW would be avoided in the entirety of 32 units and portions of 48 units. In the event that a wind or solar ROW is issued for an area designated for avoidance, the stipulations required would be unlikely to minimize impacts to wilderness characteristics (see Appendix 7 for existing stipulations). The remaining 165,431 acres (10 percent) of the 106 wilderness characteristics units, including the entirety of 4 units and

portions of 38 units, would continue to be open for wind and/or solar ROWs. The development of wind or solar ROWs in these areas would very likely eliminate or decrease the size of wilderness characteristics units through the development of substantially noticeable facilities.

The location of new minor ROWs would continue to be precluded on about 1,198 acres (0.1 percent) and avoided on about 939,270 acres (57 percent) of wilderness characteristics inventory units (Table 3-3 and Map L-17, Appendix 1). This includes all of 22 units and portions of 78 units. The remaining 713,636 acres (43 percent) of wilderness characteristics units would be open to minor ROW. Depending on the activity or development authorized, minor ROWs would likely have a negative impact on apparent naturalness and could create substantially noticeable disturbances or roads that remove it from all or part of a wilderness characteristics unit.

Under Alternative A, about 622,695acres (39 percent) of wilderness characteristics units would continue to be closed to salable mineral development (Table 3-3 and Map M-8, Appendix 1. The remaining 982,336 (61 percent) would remain open to salable mineral development. Salable mineral development in these areas would likely have at least minor impacts on apparent naturalness; the development of a pit or quarry would remove apparent naturalness in at least its immediate vicinity, thus reducing the size of an area with wilderness characteristics.

Under Alternative A, about 18,580 acres (1 percent) of wilderness characteristics units would continue to be closed to mineral leasing (Table 3-3 and Map M-3, Appendix 1). An additional 873,306 (54 percent) would be open to mineral leasing with NSO. This includes all of 26 units and portions of 59 wilderness characteristics units. These units would not be negatively affected by the development of leasable minerals. The remaining 713,147 acres (44 percent) would be open to mineral leasing with no restrictions or subject to controlled surface use (CSU) restrictions[2] While there is negligible potential for the development of some types of leasable minerals in the planning area (e.g., oil and gas, there is potential for the development of others (e.g., sodium, potassium, and geothermal). The development of leasable minerals involving surface occupancy in a wilderness characteristics unit would have negative impacts on apparent naturalness and would likely remove apparent naturalness from at least the immediate area, thus reducing the total size of the area retaining wilderness characteristics.

The potential effects of locatable mining are addressed in the *Cumulative Impacts* section.

OHV and Travel Management Impacts

Impacts to wilderness characteristics from OHV and travel management would be similar to those described under the No Action Alternative. The primary difference would be that the BLM could conduct mechanical maintenance on interior routes and construct new roads within most inventory units, as needed. The BLM could undertake such actions in wilderness characteristics units designated as either open (205,535 acres) or limited (1,449,435 acres) for OHV use (Table 3-3 and Map OHV-1, Appendix 1). Where it occurred, mechanical road maintenance and the construction of new roads would reduce the size of wilderness characteristics units.

[2] CSU includes timing restrictions and buffers on habitat and would have minimal to no protective effect on lands with wilderness characteristics.

Livestock Grazing Management Impacts

Impacts to wilderness characteristics from livestock grazing management would be similar to those described under the No Action Alternative. The primary difference would be that the BLM could allow the development of new, substantially noticeable range improvements in addition to the minor, substantially unnoticeable range improvements (e.g., a mile of new fence or an additional trough, depending on the context) that could be allowed under the No Action Alternative. Numerous or larger range improvements could be substantially noticeable and would remove apparent naturalness from a portion of a wilderness characteristics unit. As under all alternatives, within the approximately 30,000 acres in wilderness characteristics units (~2 percent) that are unavailable to livestock grazing there would be no disturbance from grazing, and it is unlikely that there would be negative impacts to naturalness from new range improvements.

Summary

Under Alternative A, some of the 106 wilderness characteristics units would likely decrease in size or lose their wilderness characteristics in part or entirely over the long-term. Under this alternative, the BLM would not be required to mitigate impacts to wilderness characteristics in the 106 wilderness characteristics units. Any reduction of impacts to wilderness characteristics would come only as the by-product of managing or mitigating for other resource values (as described above). The BLM could conduct or authorize future actions that reduce a wilderness characteristics unit's size or removed apparent naturalness or opportunities for solitude or primitive and unconfined recreation. This could include the mechanical maintenance of motorized routes and/or the development of new roads in OHV open or limited areas and the development of substantially noticeable range improvements.

The BLM cannot predict the locations of future internally or externally proposed actions that could remove wilderness characteristics or reduce a unit's size. Though the management direction under this alternative would allow human-caused ground-disturbing management activities to occur within wilderness characteristics units, such activities would not likely occur within all units over the long-term. Wilderness characteristics would likely be retained in some areas and lost in others. The BLM would prepare site-specific NEPA analyses for all future proposed management actions within these units that have the potential to affect wilderness characteristics.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Under Alternative B, all 106 wilderness characteristics units (approximately 1,654,103 acres) and 7 units (1,187 acres) previously identified during the development of the *Lakeview RMP/ROD* (BLM 2001a, 2003b); Table 3-2; Map W-3, Appendix 1) would be managed to protect wilderness characteristics. The majority of these units (77 whole units and portions of 2, encompassing approximately 1,381,142 acres), would be managed as Category C units. The remainder or the units (34 whole units and portions of 2, encompassing approximately 273,705 acres) are contiguous or adjacent to existing WSAs and would be managed as WSAs established under the authority of Section 202 of the FLPMA.

The BLM would manage the new Section 202 WSAs in the same manner as existing WSAs under *BLM Manual 6330—Management of BLM Wilderness Study Areas* (BLM 2012h), except that the BLM would retain the discretion to modify these new Section 202 WSAs through a subsequent land use plan

amendment or revision. In addition, the BLM would manage these new Section 202 WSAs as land tenure zone 1, VRM I, major, minor and solar/wind ROW exclusion areas, and closed to salable and leasable mineral development. Locatable mineral exploration and development would be allowed within the new Section 202 WSAs subject to the unnecessary and undue degradation standard rather than the non-impairment standard (BLM 2012h, p. 1-24). The BLM would only authorize new uses or facilities within the new Section 202 WSAs if such uses are both temporary (i.e., needed for a defined time period to respond to a temporary need) and would not create new surface disturbance or meet one of the exceptions to the non-impairment standard.

The BLM would manage Category C units as land tenure zone 1, VRM II (except where they are VRM I under the existing RMP), major and solar/wind ROW exclusion areas, minor ROW avoidance areas, closed to salable mineral development, and open to mineral leasing subject to no surface occupancy. Most human-caused ground-disturbing activities would be prohibited within Category C units except where they meet the restrictions described in the previous paragraph and are consistent with protecting wilderness characteristics (with the exception of locatable mineral development; see *Cumulative Impacts* section).

Within Category C units the BLM could continue to carry out vegetation/habitat management projects, as well as allow new developments, under certain circumstances, though these circumstances would be narrower for the new Section 202 WSAs. In WSAs, vegetation/habitat management projects could be carried out where they are non-surface disturbing (i.e., where they meet the non-impairment standard) or where the BLM determines that they would protect or enhance wilderness characteristics[3]. Under this exception, actions that clearly benefit a WSA by protecting or enhancing wilderness characteristics are allowable even if they do not meet the non-impairment standard, though they must still be carried out in the manner that is least disturbing to the site. There are no explicit prohibitions on methods of undertaking a vegetation/habitat management project as long as the BLM determines that the method is the least disruptive technique that has the best likelihood for success (BLM 2012h, page 1-13).

For Category C units, the BLM could carry out vegetation/habitat management to the extent that it is compatible with protecting wilderness characteristics (e.g., meet VRM Class II objectives, are substantially unnoticeable, do not involve the development of new roads or the mechanical maintenance of existing routes, etc.). The BLM would apply appropriate BMPs to future vegetation/habitat management activities in these units to ensure the protection of wilderness characteristics (see Appendix 7). The use of heavy equipment and drill seeding methods would be restricted in some Category C units which could reduce the potential for additional ground disturbing impacts to naturalness or noise impacts to solitude opportunities during the implementation of reclamation, rehabilitation, and restoration actions. However, these effects would be short-term and would be offset by more natural appearing landscapes over the long-term.

[3] Under certain circumstances, ground disturbing vegetation management could also be allowed under the exceptions for emergencies (e.g., where vegetation needs to be managed during a fire that threatens lands outside of the WSA), legacied uses, and valid existing rights.

In both new Section 202 WSAs and Category C units the management of vegetation/habitat would preserve unit size and protect apparent naturalness and opportunities for solitude and primitive recreation over the long-term. The higher bar for authorizing projects and the greater restrictions on management methods would prevent some minor, negative impacts to wilderness characteristics that could occur under the No Action Alternative.

Managing all acres in wilderness characteristics units as land tenure zone 1 would have similar protection from potential diminishment of unit size due to the disposal of land as that provided under the No Action Alternative. Compared to Alternative A, Alternative B would increase protection from land disposal for 34 wilderness characteristics units by changing a portion of their acres from land tenure zone 2 (223,522; 14 percent) or land tenure zone 3 (120 acres; 0.01 percent) to land tenure zone 1 (Table 3-3 and Map L-2, Appendix 1).

Under Alternative B, about 280,748 acres in the new Section 202 WSAs would be managed as VRM I (Table 3-3 and Map VRM-2, Appendix 1). This is a higher level of protection than provided under the No Action Alternative. Compared to Alternative A, Alternative B would increase the protection of apparent naturalness by shifting about 15 percent of wilderness characteristics acres (242,619 acres) from VRM Class IV to VRM Class I, 1 percent of wilderness characteristics acres (21,783 acres) from VRM Class III to VRM Class I, and 0.5 percent of wilderness characteristics acres (8,732 acres) from VRM Class II to VRM Class I. Approximately 0.5 percent of wilderness characteristics units are currently VRM I and would retain the same level of protection from visual disturbance as under Alternative A.

Also under Alternative B, Category C units would be managed as VRM Class II except where they are VRM Class I under the existing land use plan (7,938 acres) (Table 3-3 and Map VRM-2, Appendix 1). This is a similar level of protection as the No Action Alternative. Compared to Alternative A, Alternative B would increase the protection of apparent naturalness by shifting about 67 percent of wilderness characteristics acres (1,103,318 acres) from VRM Class IV to VRM Class II and 10 percent of wilderness characteristics acres (163,046 acres) from VRM Class III to VRM Class II. Approximately 7 percent of wilderness characteristics units are currently VRM II and would retain the same level of protection from visual disturbance as under Alternative A. Both VRM Class I and Class II would likely prevent actions that would be substantially noticeable, though some minor, negative impacts to apparent naturalness could occur, particularly under VRM II.

The BLM would restrict or prohibit major ROW, minor ROW and solar/wind development ROW in all Category C units and new Section 202 WSAs (1,655,290 acres) under Alternative B (Table 3-3 and Map L-8, Appendix 1). These ROW designations would be similar in protectiveness to the No Action Alternative, under which the Settlement Agreement would continue to preclude ROW that would remove wilderness characteristics from all or part of a unit. Compared to Alternative A, Alternative B would shift about 88 percent of acres in wilderness characteristics units (1,463,810 acres in 103 units) from major ROW avoidance to major ROW exclusion and about 10 percent of acres in wilderness characteristics units (161,748 acres) from major ROW open to major ROW exclusion. Approximately 0.1 percent of acres (1,198 acres) would be managed as major ROW exclusion areas under all alternatives. Compared to Alternative A, Alternative B would shift 66 percent of acres in wilderness characteristics units (about 1,087,517 acres in 103 units) from wind/solar ROW avoidance to wind/solar ROW exclusion and about 10 percent of acres in wilderness characteristics units (165,431 acres in 42 units) from solar/wind ROW open to solar/wind ROW exclusion. Approximately 24 percent of acres in wilderness characteristics units (401,155 acres in 42 units) would continue to be closed to wind/solar ROW under all alternatives.

Under Alternative B, the BLM would avoid minor ROW on about 83 percent of the acres with wilderness characteristics units (1,380,946 acres) and exclude them on 17 percent of acres (274,344 acres) (Table 3-3 and Map L-18, Appendix 1). In avoidance areas within Category C units, the BLM would not allow minor ROWs where they are incompatible with protecting wilderness characteristics (e.g., where they involve the building of roads, the mechanical maintenance of motorized routes, or substantially noticeable developments), but minor ROW could occur that would have some minor negative impacts to apparent naturalness or solitude and primitive and unconfined recreation. Alternatives C, D, and E would have the same acres of wilderness characteristics units closed to minor ROW (1,198 acres). Compared to Alternative A, Alternative B would shift about 27 percent of acres in wilderness characteristics units (438,926 acres) from minor ROW open to minor ROW avoidance and about 16 percent of acres in wilderness characteristics units (272,119 acres) from minor ROW open to minor ROW closed.

All Category C units and new Section 202 WSAs would be closed to salable mineral development under Alternative B (Table 3-3 and Map M-9, Appendix 1). Since the Settlement Agreement precludes salable mineral development in wilderness characteristics units, even in areas currently open to salable mineral development, the level of protection under Alternative B would be similar to the level of protection under the No Action Alternative. Compared to Alternative A (where approximately 39 percent of acres in wilderness characteristics units (622,695 acres in 63 units) are closed to salable mineral development) an additional 61 percent of acres (982,336 acres in 82 units) that are currently open to salable mineral development would be shifted to closed under Alternative B, removing the potential for impacts to wilderness characteristics from this activity.

As under all alternatives, about 18,850 acres (1 percent) of wilderness characteristics units would continue to be closed to mineral leasing (Table 3-3 and Map M-4, Appendix 1). Under Alternative B, an additional 263,947 acres (16 percent) would be closed to mineral leasing in new Section 202 WSAs. For the remaining 84 percent of acres in Category C units the BLM would only allow leasable mineral development with no surface occupancy. Approximately 37 percent of acres in wilderness characteristics units (618,606 acres) would shift from open to mineral leasing to mineral leasing only with no surface occupancy, removing the potential for impacts to wilderness characteristics from surface disturbance related to mineral leasing. The remaining 47 percent of acres in wilderness characteristics units (772,737 acres) currently have a no surface occupancy restriction under the existing RMP and would continue to have this restriction under Alternative B. Both a decision to close an area to mineral leasing or prohibit surface occupancy would remove the potential for surface disturbance impacts to wilderness characteristics from mineral leasing in the future.

Under Alternative B, about 273,680 acres in the new Section 202 WSAs would remain open to locatable mineral exploration and development subject to the unnecessary and undue degradation standard rather than the non-impairment standard (BLM 2012h, p. 1-24). For this reason, locatable mineral development would have the potential to negatively impact wilderness characteristics in these areas in the future.

OHV and Travel Management Impacts

Under Alternative B, all wilderness characteristics units, whether they are new Section 202 WSAs or Category C units, would be closed to public motorized vehicle use (i.e., OHV use) (Table 3-3 and Map OHV-2, Appendix 10). Compared to the No Action Alternative and Alternative A, this would shift about 12 percent of acres in wilderness characteristics (205,535 acres in 37 units) from open to public cross country motorized travel to closed to all public motorized vehicle use. An additional 88 percent of acres (1,448,348 acres in 105 units) would shift public motorized vehicle use from limited (to existing or designated routes) to closed to all public motorized vehicle use. Closing all wilderness characteristics

units to public motorized vehicle use would substantially reduce the potential for the development of new user-created routes which would enhance the protection of naturalness compared to the No Action Alternative. Closing all wilderness characteristics units to public motorized use would result in the closure of all existing internal primitive routes (approximately 1,452 miles; Map OHV-2, Appendix 1). Naturalness would also improve as closed routes revegetate over time. Opportunities for solitude and primitive unconfined recreation would also be maintained or improved compared to the No Action Alternative or Alternative A, as the noise associated with motorized vehicles would be removed within the interior of all wilderness characteristics units.

Livestock Grazing Management Impacts

Under Alternative B, the BLM would allow the development of new range improvements within 273,680 acres of new Section 202 WSAs only where they meet the non-impairment standard or one of its exceptions consistent with BLM (2012h). Under the "legacied use" exception, range improvements that exist at the date of the signing of the record of decision for this RMP amendment could continue to be used and maintained; they can have the same, but not more, physical or visual impact as they did at the time of designation. Under the protect or enhance wilderness characteristics exception, new range developments could be authorized where the BLM determines that the structure's benefits to the natural functioning of the ecosystem outweigh the increased presence of human development. The structure must also be designed and installed in the manner least disturbing to the site. This would be the highest level of restriction on the development of new range improvements units under any alternative.

Within the 1,381,610 acres of Category C units under Alternative B, the BLM would allow the development of new range improvements only where they were determined to be substantially unnoticeable. This restriction would provide a higher level of protection of wilderness characteristics compared to Alternative A and a similar level of protection to the No Action Alternative.

In addition, anywhere from 0 to 100 percent of wilderness characteristics units (Table 2-4) could experience a reduction or complete removal of grazing over the long-term due to voluntary permit relinquishment or rangeland health issues. Existing livestock management facilities would no longer be maintained in areas where grazing is completely removed. The reduction in disturbances due to livestock grazing and associated range improvements would improve naturalness within these units. In addition, there would also be fewer livestock permittees using motorized vehicles to manage livestock which would also improve opportunities for solitude within these units.

Summary

Under Alternative B, all of the 113 wilderness characteristics units (1,655,290 acres) would be managed to protect their wilderness characteristics. The majority (1,381,142 acres) of these would be Category C units and the remaining 273,705 acres would be managed under a higher level of protection as new Section 202 WSAs. In both areas wilderness characteristics would be retained or enhanced over the long-term. Under this alternative, the BLM would also close all wilderness characteristics units to public motorized vehicle use, which would lead to the enhancement of wilderness characteristics beyond the No Action Alternative. Over the long-term, this alternative could also lead to enhancements in protection over the No Action Alternative in any wilderness characteristics units where grazing is reduced or removed due to voluntary permit relinquishment or rangeland health issues. For these reasons, Alternative B would provide the most protections of, and benefits to, wilderness characteristics out of all the alternatives analyzed.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Under Alternative C, the BLM would undertake a mixed approach to wilderness characteristics, managing some units to protect these characteristics (Category C), others to balance them with other resources and multiple uses (Category B), and the remainder without an objective to manage for wilderness characteristics (Category A).

About a quarter of the acres in wilderness characteristics units (411,033 acres encompassing 26 whole units and portions of 4 units[4]; Table 3-2; Map W-4, Appendix 1) would be managed to protect wilderness characteristics (i.e., managed as Category C units). This would eliminate most human-caused, ground-disturbing activities from these units (with the exception of locatable mineral development; see *Cumulative Impacts* section). See Alternative B, above, for a description of the types of impacts that could occur in Category C units.

Along the edges of Category C units with roads as boundaries, approximately 7,276 acres in wilderness characteristics units would be managed as setbacks under Alternative C[5]. Though large-scale commodity production/uses, and highly visible or visually dominant activities would be constrained within the setback boundaries of these units, wilderness characteristics within these setbacks could be substantially diminished or completely eliminated over the long-term.

Approximately 70 percent of the acres in wilderness characteristics units (1,161,199 acres encompassing 71 whole units and portions of 2; Table 3-2; Map W-4, Appendix 1) would be managed to balance the management of wilderness characteristics with other resources and multiple uses (i.e., managed as Category B units). Within these units, the BLM would analyze the potential impacts of future proposed management actions (e.g., vegetation/habitat management, lands, realty, and cadastral survey actions, mining, facilities, recreation, etc.) on wilderness characteristics within site-specific NEPA analyses and could adopt, at the decision-maker's discretion, appropriate BMPs to mitigate impacts to wilderness characteristics (see Appendix 7).

The BLM would also manage these Category B units as VRM Class III (except where VRM Class I or II under the existing RMP) and as avoidance areas for all types of ROWs (except where closed under the existing RMP). However, new facilities, ROWs, mining, or other developments could impact size, naturalness, or solitude opportunities within some Category B units over time. Most vegetation/habitat,

[4] The portions of units that would be managed as Category C units each encompass at least 5,000 acres.

[5] The original inventory unit boundaries would not automatically change as a result of the application of Category C unit boundary setbacks. If future management actions occur within the setbacks that cause that portion of the unit to lose naturalness it could result in that portion of the unit (setback) being removed from the inventory unit during a future inventory update.

invasive species, and fuel treatments would have only short-term impacts on opportunities for solitude, but would have long-term benefits to apparent naturalness, and may not require BMPs.

The remaining 4 percent of acres in wilderness characteristics units (74,529 acres encompassing five whole units and portions of three; Table 3-2; Map W-4, Appendix 1) would be managed in a manner that emphasizes other resources and multiple uses over wilderness characteristics (i.e., managed as Category A units). Within these units, the BLM would analyze the potential impacts of future proposed management actions (e.g., vegetation/habitat management, lands, realty, and cadastral survey actions, mining, facilities, recreation, etc.) on wilderness characteristics within site-specific NEPA analyses and mitigate for potential effects on other resource values, but reductions in potential impacts to wilderness characteristics within these units would come only as the by-product of managing for, or mitigating impacts to other resource values (i.e., visual, recreation, ACECs). Though the BLM could allow actions that would remove wilderness characteristics from all or part of a Category A unit, such activities would not likely occur within all Category A units. The BLM would manage about 88 percent of acres in wilderness characteristics units as land tenure zone 1 under Alternative C; this is a 2 percent (26,029 acre) increase in the acres of wilderness characteristics protected from sale and exchange (Table 3-3 and Map L-3, Appendix 1) compared to Alternative A. Approximately 12 percent of the acres with wilderness characteristics (197,512 acres) would be managed under land tenure zone 2 and the remaining 120 acres would be managed as land tenure zone 3. This would be similar to Alternative A and would represent a reduction in protection compared to the No Action Alternative and Alternative B, both of which would protect all acres of wilderness characteristics from diminishment of size through sale or exchange.

Under Alternative C, about 29 percent of the acres in wilderness characteristics units would be VRM Class II (472,110 acres) (Table 3-3 and Map VRM-3, Appendix 1). Compared to management under Alternative A, Alternative C would increase the protection of apparent naturalness by shifting about 21 percent of the acres in wilderness characteristics units (355,055 acres) from VRM Class IV or VRM Class III to VRM Class II. Approximately 7 percent of wilderness characteristics units are currently VRM II and would retain the same level of protection from visual disturbance as under Alternative A. As under all alternatives, approximately 0.5 percent of acres in wilderness characteristics units would be VRM Class I. Both VRM Class I and Class II would likely prevent actions that would be substantially noticeable, though some minor, negative impacts to apparent naturalness could occur, particularly under VRM II.

In addition, under Alternative C, about 55 percent of the acres in wilderness characteristics units would shift from VRM IV to VRM III (909,791 acres) increasing the total acres of lands with wilderness characteristics units in VRM III to about 1,094,123 acres. VRM Class III is more restrictive than VRM Class IV; it allows for partial modification of the existing character of the landscape and a moderate level of change. This VRM class could restrict some projects that would remove or negatively impact wilderness characteristics, though some projects that would be substantially noticeable could be allowed. The remaining 5 percent of acres in wilderness characteristics units (79,931 acres) would remain VRM Class IV, which is the least restrictive VRM Class.

The BLM would prohibit major ROWs on approximately 25 percent of the acres in the 106 wilderness characteristics units (411,033 acres in major ROW exclusion) under Alternative C (Table 3-3 and Map L-9, Appendix 1). Compared to Alternative A, this would increase protection from potential impacts from major ROW for nearly all of these acres (1,198 acres are in major ROW exclusion under the existing RMP). The remaining acres in wilderness characteristics units would continue to be managed under the same major ROW avoidance and open designations identified in the existing RMP (Table 3-3) and would be subject to potential impacts to wilderness characteristics from such developments. This includes about

27,366 acres (2 percent) of units that would continue to fall within designated (but currently unoccupied portions of) major ROW corridors.

The management of solar/wind ROW would remain essentially the same as Alternative A, with about 25 percent of acres in wilderness characteristics units managed as solar/wind ROW exclusion areas (Table 3-3 and Map L-14, Appendix 1). Wilderness characteristics within these exclusion areas would continue to be protected from future solar/wind development impacts. About 65 percent of wilderness characteristics units would be managed as solar/wind ROW avoidance areas and about 10 percent would be managed as open to solar/wind ROW. The development of wind or solar ROWs in these areas would very likely eliminate or decrease the size of wilderness characteristics units through the development of substantially noticeable facilities.

Under Alternative C, the BLM would avoid minor ROW on about 98 percent of acres with wilderness characteristics (1,624,404 acres) and exclude them on about 0.1 percent of acres (1,198 acres) (Table 3-3 and Map L-19, Appendix 1). The remaining 2 percent (28,522 acres) would be open to minor ROW. Depending on the activity or development authorized, minor ROWs could create substantially noticeable disturbances or roads that would remove apparent naturalness within all or part of a wilderness characteristics unit.

In Category C units, the BLM would not allow minor ROW where they are incompatible with protecting wilderness characteristics (e.g., where they involve the building of roads or the mechanical maintenance of routes), but minor ROW could occur that would have some minor negative impacts to apparent naturalness or solitude and primitive and unconfined recreation. All alternatives would have the same number of acres of wilderness characteristics units closed to minor ROWs (1,198 acres). Compared to Alternative A, Alternative C would shift about 41 percent of acres in wilderness characteristics units (685,134 acres) from minor ROW open to minor ROW avoidance.

Compared to the No Action Alternative, fewer acres within wilderness characteristics units would be closed to salable mineral development under this alternative (Table 3-3 and Map M-10, Appendix 1). Approximately 61 percent of the acres in wilderness characteristics units (879,573 acres) would be closed to salable mineral development under Alternative C, including about 256,878 acres that would shift from open to closed to salable mineral development. This would remove the potential for impacts to wilderness characteristics from this activity. The remaining 39 percent of acres in wilderness characteristics units (724,458 acres) would be subject to potential negative impacts from salable mineral development, similar to Alternative A.

As under all alternatives, about 18,850 acres (1 percent) of wilderness characteristics units would continue to be closed to mineral leasing (Table 3-3 and Map M-5, Appendix 1). Approximately 54 percent (873,306 acres) of the wilderness characteristics units would continue to be open to leasable mineral development subject to no surface occupancy. An additional 11 percent of the acres in wilderness characteristics units (188,516 acres) would shift from open to mineral leasing, to mineral leasing subject to no surface occupancy under Alternative C. These areas would be protected from the potential for impacts to wilderness characteristics from surface disturbance related to mineral leasing. The remaining 44 percent of acres in wilderness characteristics units (524,655 acres) would remain open to mineral leasing and would be subject to potential impacts to wilderness characteristics from such development.

OHV and Travel Management Impacts

Under Alternative C, the BLM would limit public motorized vehicle use (i.e., OHV use) to existing routes on most (1,654,970) acres within wilderness characteristics units. Approximately 1,225 acres would remain closed to OHV use (Table 3-3 and Map OHV-3; Appendix 1). This would eliminate authorized public cross-country motor vehicle use in an additional 12 percent of the acres in all three categories (A, B, and C) wilderness characteristics units (205,535 acres) where it is currently allowed. Limiting such use to existing routes would reduce the potential for development of new user-created routes with negative impacts to naturalness within these acres. Noise associated with vehicle use on open internal routes would continue to impact opportunities for solitude or primitive unconfined recreation the same as the No Action Alternative and Alternative A.

Future maintenance of interior primitive routes within Category C units would be limited to spot maintenance by non-mechanical means. This level of maintenance would not change the primitive nature of the route to that of a wilderness inventory "boundary road." No new roads would be constructed within Category C units (unless specifically required by law). For this reason, route maintenance or construction activities would not change the boundary or reduce the size of Category C units.

Future maintenance of interior routes within Category B units would be limited to spot maintenance but could occur by mechanical means. This level of maintenance could change the primitive nature of the route to that of a wilderness inventory "boundary road." New roads could also be constructed within Category B units. Mechanical route maintenance and new construction would also be allowed in Category A units. Where it occurred, mechanical road maintenance could, and the construction of new roads would, result in changing unit boundaries reducing the size of wilderness characteristics units.

Livestock Grazing Management Impacts

Based on past rangeland health trends, anywhere from 0 to 7 percent of the planning area could potentially experience a temporary reduction or removal of grazing due to rangeland health issues under this alternative. If some of these grazing reductions occurred within Category A, B, or C units there would be temporary reductions in ground disturbances and slight improvements in naturalness within these units. There could also be fewer livestock permittees using motorized vehicles to manage livestock which would improve opportunities for solitude within these areas until such time as grazing resumes.

Under this alternative, permit relinquishments involving WSAs could lead to the need for an estimated additional 30-50 miles of new fencing to keep livestock out of WSAs. Since this fencing would likely be constructed just outside of WSA boundaries (to meet the WSA non-impairment criteria) and there are numerous wilderness characteristics units that are contiguous to WSAs (Table 2-3), there is the potential to negatively impact naturalness within contiguous units due to new fence construction. Such impacts would be allowable within Category A and B units, but there would be constraints on future range improvements within Category C units to protect naturalness. In Category C units (about 25 percent of the acres in wilderness characteristics units under Alternative C), the BLM would allow the development of range improvements only where they were determined to be substantially unnoticeable. This restriction would protect wilderness characteristics in these areas, but would not apply to, or protect wilderness characteristics within, the remaining 75 percent of acres in wilderness characteristics (Category A and B) units.

Summary

Of the 106 wilderness characteristics units, 26 entire units and portions of 4 units (encompassing about 411,033 acres; 25 percent of inventoried acres with wilderness characteristics) would be managed as Category C (Table 3-2) and their wilderness characteristics would be retained or enhanced over the long-term. Wilderness characteristics within the Category C setbacks (7,276 acres) could be substantially diminished or completely eliminated over the long-term.

Some category B and A wilderness characteristics units would likely decrease in size or entirely lose wilderness characteristics over the long-term. In the 71 units and portions of 2 units (approximately 1,161,199 acres; 70 percent of the acres with wilderness characteristics) managed as Category B, the management direction could allow future internally or externally proposed actions that could remove wilderness characteristics or reduce a unit's size. The BLM would consider minimizing impacts to wilderness characteristics in order to balance the management of wilderness characteristics with other resources and multiple uses. The Category B management direction—including the shifting of the great majority of acres with wilderness characteristics from VRM IV to VRM III, and the removal of all ROW open areas—would preclude some actions that could create substantially noticeable impacts, though others could be allowed.

Within the remaining 5 units and portions of 3 other units (approximately 74,529 acres; 4 percent) managed as Category A under this alternative, the management direction would allow future internally or externally proposed actions that could remove wilderness characteristics or reduce a unit's size and the BLM would not mitigate impacts to wilderness characteristics within these units.

In both category A and B units the BLM could authorize the mechanical maintenance of motorized routes and/or the development of new roads in OHV open or limited areas, which it would not do under the No Action Alternative. Similarly, it could allow the development of substantially noticeable range improvements in category A and B units, including fences that could be added near the boundary of WSAs if permits are relinquished under this alternative.

While the BLM cannot predict the locations of future internally or externally proposed actions that could impact wilderness characteristics, such activities would not likely occur within all units over the long-term and fewer actions that could remove wilderness characteristics would likely take place within Category B units than within Category A units. As a result, more wilderness characteristics would likely be retained in Category B units compared to Category A units.

Under Alternative C, about 12 percent of all categories of wilderness characteristics units (A, B, and C) would shift from OHV open to OHV limited. This would slightly reduce the potential negative effects of OHV use and enhance the protection of naturalness from such use in those areas compared to the No Action Alternative and Alternative A.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Under Alternative D, the BLM would undertake a mixed approach to wilderness characteristics, managing a small number of units to protect these characteristics (Category C), others to balance them with other resources and multiple uses (Category B), and the remainder without an objective to consider wilderness characteristics (Category A).

Two units (approximately 4,671 acres; Table 3-2; Map W-5, Appendix 1) would be managed to protect wilderness characteristics (i.e., managed as Category C units). See Alternative B above, for a description of the general types of impacts that could occur in Category C units.

Along the edges of the two Category C units, approximately 166 acres would be managed as setbacks. Though large-scale commodity production/uses, and highly visible or visually dominant activities would be constrained within the setback boundaries of these units, wilderness characteristics within these setbacks could be substantially diminished or completely eliminated over the long-term.

Approximately 65 percent of the acres in wilderness characteristics units (1,066,919 acres encompassing 41 whole units and portions of 18; Table 3-2; Map W-4, Appendix 1) would be managed to balance the management of wilderness characteristics with other resources and multiple uses (i.e., managed as Category B units). See Alternative C, above, for a description of the general types of impacts that could occur in Category B units.

The remaining 35 percent of acres in wilderness characteristics units (582,355 acres encompassing 45 whole units and portions of 18; Table 3-2; Map W-4, Appendix 1) would be managed in a manner that emphasizes other resources and multiple uses over wilderness characteristics (i.e., managed as Category A units). See Alternative C, above, for a description of the general types of impacts that could occur in Category A units.

The BLM would manage about 87 percent of the acres in wilderness characteristics units as land tenure zone 1, 13 percent as land tenure zone 2, and less than 1 percent as land tenure zone 3 under Alternative D (Table 3-3 and Map L-4, Appendix 1). With respect to how this land tenure management protects wilderness characteristics, this is the same management as Alternative A and represents a reduction in protection compared to the No Action Alternative and Alternative B, both of which would protect all acres of wilderness characteristics from diminishment of size through sale or exchange.

Under Alternative D, about 7 percent of the acres in wilderness characteristics units would be managed as VRM Class II (121,740 acres) (Table 3-3 and Map VRM-4, Appendix 1). Compared to management under Alternative A, Alternative D would slightly increase the protection of apparent naturalness by shifting about 4,685 acres in wilderness characteristics units from VRM Class IV or VRM Class III to VRM Class II. The remaining VRM II acres are already managed as such under the existing RMP and would retain the same level of protection from visual disturbance as under Alternative A. As under all alternatives, approximately 0.5 percent of acres in wilderness characteristics units would be VRM Class I. Both VRM Class I and Class II would likely prevent actions that would be substantially noticeable, though some minor, negative impacts to apparent naturalness could occur, particularly under VRM II.

In addition, under Alternative D, about 59 percent of the acres in wilderness characteristics units would shift from VRM IV to VRM III (977,590 acres) increasing the total acres of wilderness characteristics units in VRM III to 1,161,922 acres. VRM Class III is more restrictive than VRM Class IV; it allows for partial modification of the existing character of the landscape and a moderate level of change. This VRM class could restrict some projects that would remove or negatively impact wilderness characteristics, though some projects that would be substantially noticeable could be allowed. The remaining 22 percent of the acres in wilderness characteristics units (362,502 acres) would remain VRM Class IV, which is the least restrictive VRM Class.

Under Alternative D, the BLM would prohibit major ROWs on about 4,671 acres (0.3 percent), an increase of 3,473 acres compared to Alternative A (Table 3-3 and Map L-10, Appendix 1). The BLM

would also shift about 7 percent of the acres in wilderness characteristics units (114,791 acres) from open to major ROW to major ROW avoidance. The remaining acres in wilderness characteristics units would continue to be managed under the same major ROW avoidance and open designations identified in the existing RMP and would be subject to potential negative impacts to wilderness characteristics from such developments. This includes about 27,366 acres (2 percent) of units that would continue to fall within designated (but currently unoccupied portions of) major ROW corridors.

The management of solar/wind ROW would remain essentially the same as Alternative A, with about 24 percent of the acres in wilderness characteristics units managed as solar/wind ROW exclusion areas (Table 3-3 and Map L-15, Appendix 1). Wilderness characteristics within these exclusion areas would continue to be protected from future solar/wind development impacts. About 66 percent of wilderness characteristics units would be managed as solar/wind ROW avoidance areas and about 10 percent managed as open to solar/wind ROW. The development of wind/solar or major ROWs in these areas would very likely eliminate or decrease the size of wilderness characteristics units through the development of substantially noticeable facilities.

Under Alternative D, the BLM would avoid minor ROW on about 90 percent of acres with wilderness characteristics (1,484,316 acres). All alternatives would have the same number of acres of wilderness characteristics units closed to minor ROWs (1,198 acres). The remaining 10 percent (168,584 acres) would be open to minor ROWs (Table 3-3 and Map L-17, Appendix 1). Compared to Alternative A, this would shift about 33 percent of the acres in wilderness characteristics units (545,046 acres) from being open to minor ROW to being minor ROW avoidance areas. Depending on the activity or development authorized, minor ROWs could create substantially noticeable disturbances or roads that could change a unit boundary or remove apparent naturalness within all or part of a wilderness characteristics unit.

In Category C units, the BLM would not allow minor ROWs where they are incompatible with protecting wilderness characteristics (e.g., where they involve the building of roads or the mechanical maintenance of existing routes), but minor ROWs could occur that would have some minor negative impacts to apparent naturalness or solitude and primitive and unconfined recreation. Compared to Alternative A, Alternative D would shift about 7 additional acres in wilderness characteristics units (8,101 acres total) from minor ROW open to minor ROW avoidance.

Approximately 37 percent of the acres in wilderness characteristics units (622,860 acres) would be closed to salable mineral development under Alternative D (Table 3-3 and Map M-11, Appendix 1). Compared to the No Action Alternative fewer acres within wilderness characteristics units would be closed to salable mineral development under this alternative. Compared to Alternative A, this alternative would shift about 164 acres in wilderness characteristics units from being open to closed to salable mineral development. A total of approximately 63 percent of the acres in wilderness characteristics units (982,182 acres) would be subject to potential negative impacts from salable mineral development.

As under all alternatives, about 18,850 acres (1 percent) of wilderness characteristics units would continue to be closed to mineral leasing (Table 3-3 and Map M-6, Appendix 1). On about 55 percent of the acres in wilderness characteristics units (886,786 acres), the BLM would only allow leasable mineral development with no surface occupancy. This would shift about 1 percent of the acres in wilderness characteristics units (16,012 acres) from open to mineral leasing to open to mineral leasing subject to no surface occupancy, removing the potential for impacts to wilderness characteristics from surface disturbance related to mineral leasing. The remaining 42 percent of the acres in wilderness characteristics units (695,834 acres) would remain open to mineral leasing and would be subject to potential surface-disturbing impacts from such development.

The potential effects of locatable mining are addressed in the *Cumulative Impacts* section.

OHV and Travel Management Impacts

Under Alternative D, the BLM would limit public motorized vehicle (OHV) use to existing routes on most (1,649,020) of the acres within wilderness characteristics units. Approximately 1,225 acres would remain closed to OHV use (Table 3-3 and Map OHV-4, Appendix 4). This would eliminate authorized public cross-country motor vehicle use in an additional 12 percent of the acres in wilderness characteristics units (199,585 acres) where it is currently allowed. Limiting such use to existing routes would reduce the potential for development of new user-created routes with negative impacts to naturalness within these acres. About 5,950 acres would remain open to cross-country motor vehicle use and associated impacts to naturalness. Noise associated with vehicle use would continue to impact opportunities for solitude or primitive unconfined recreation the same as the No Action Alternative and Alternative A.

Future maintenance of interior routes within Category C units would be limited spot maintenance by non-mechanical means. This level of maintenance would not change the primitive nature of the route to that of a wilderness inventory "boundary road." No new roads would be constructed within Category C units (unless specifically required by law). For this reason, route maintenance or construction would not change a boundary or reduce the size of Category C wilderness characteristics units.

Future maintenance of interior routes within Category B units would be limited to spot maintenance but could occur by mechanical means. This level of maintenance could change the primitive nature of the route to that of a wilderness inventory "boundary road." New roads could also be constructed within Category B units. Mechanical route maintenance and new construction would also be allowed in Category A units. Where it occurred, mechanical road maintenance could, and the construction of new roads would, reduce the size of wilderness characteristics units. Livestock Grazing Management

In Category C units (0.3 percent of the acres in wilderness characteristics units under Alternative D), the BLM would allow the development of range improvements only where they were determined to be substantially unnoticeable. This restriction would protect wilderness characteristics in these areas, but would not apply to, or protect wilderness characteristics within the remaining 99 percent of acres in wilderness characteristics (Category A and B) units. Except for Category C units, the effects of livestock grazing management within all three categories of wilderness characteristics units would be similar to those described for Alternative A.

Summary

Under Alternative D, two of the 106 wilderness characteristics units (approximately 4,671 acres; 0.3 percent of acres with wilderness characteristics) would be managed as Category C and their wilderness characteristics would be retained or enhanced over the long-term. Wilderness characteristics within the Category C setbacks (166 acres) could be substantially diminished or completely eliminated over the long-term.

Some of the Category B and A units would likely decrease in size or entirely lose wilderness characteristics over the long-term. In 41 units and parts of 18 units (approximately 1,066,919 acres; 65 percent of acres with wilderness characteristics) managed as Category B, the management direction could allow future actions that could remove wilderness characteristics or reduce a unit's size. The BLM would

consider minimizing impacts to wilderness characteristics in order to balance the management of wilderness characteristics with other resources and multiple uses. The Category B management direction, including the shifting of the great majority of acres with wilderness characteristics from VRM IV to VRM III and the removal of all ROW open areas, would preclude some actions that could create substantially noticeable impacts, though others could be allowed. Because of this, the BLM assumes that fewer actions that could remove wilderness characteristics could take place within Category B units than within Category A units. As a result, the BLM assumes more wilderness characteristics would be retained in Category B units compared to Category A units.

Within the remaining 45 units and portions of 18 other units (approximately 582,355 acres; 35 percent) managed as Category A units under this alternative, the management direction would allow future internally or externally proposed actions that could remove wilderness characteristics or reduce a unit's size. The BLM would not mitigate impacts to wilderness characteristics within these Category A units.

In both category A and B units the BLM could authorize the mechanical maintenance of motorized routes and/or the development of new roads in OHV open or limited areas, which it would not do under the No Action Alternative. Similarly, it could allow the development of substantially noticeable range improvements in category A and B units.

The BLM cannot predict the locations of future internally or externally proposed actions that would remove wilderness characteristics or reduce a unit's size. Though the management direction under this alternative would allow human-caused ground-disturbing management activities to occur within wilderness characteristics units, such activities would not likely occur within all units over the long-term. Wilderness characteristics would likely be retained in some areas and lost in others.

Under Alternative D, about 12 percent of all categories of wilderness characteristics units (A, B, and C) would shift from OHV open to OHV limited. This would slightly reduce the potential negative effects of OHV use and enhance the protection of naturalness from such use in those areas compared to the No Action Alternative and Alternative A and would be very similar to Alternative C.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Under Alternative E, the BLM would undertake a mixed approach to wilderness characteristics, managing some units to protect these characteristics (Category C), others to balance them with other resources and multiple uses (Category B), and the remainder without an objective to consider wilderness characteristics (Category A). Approximately 22 percent of acres in wilderness characteristics units (approximately 372,218 acres encompassing 26 units; Table 3-2; Map W-5, Appendix 1) would be managed to protect wilderness characteristics (Category C units). See Alternative B, above, for a description of the general types of impacts that could occur in Category C units.

Along the edges of Category C units with roads as boundaries, approximately 4,211 acres would be managed as setbacks under Alternative E. Though large-scale commodity production/uses, and highly visible or visually dominant activities would be constrained within the setback boundaries of these units, wilderness characteristics within these setbacks could be substantially diminished or completely eliminated over the long-term.

Approximately 67 percent of acres in wilderness characteristics units (approximately 1,109,160 acres encompassing 68 units; Table 3-2; Map W-4, Appendix 1) would be managed to balance the management of wilderness characteristics with other resources and multiple uses (Category B units). See Alternative C, above, for a description of the general types of impacts that could occur in Category B units.

The remaining 10 percent of acres in wilderness characteristics units (approximately 168,512 acres encompassing 12 units; Table 3-2; Map W-4, Appendix 1) would be managed in a manner that emphasizes other resources and multiple uses over wilderness characteristics (Category A units). See Alternative C, above, for a description of the general types of impacts that could occur in Category A units.

The BLM would manage about 87 percent of the acres in wilderness characteristics units as land tenure zone 1, 13 percent as land tenure zone 2, and less than 1 percent as land tenure zone 3 under Alternative E (Table 3-3 and Map L-5, Appendix 1). This would provide approximately the same level of protection from sale or exchange as Alternative A but represents a reduction in protection compared to the No Action Alternative and Alternative B.

Under Alternative E, about 26 percent of the acres in wilderness characteristics units would be VRM Class II (427,424 acres) (Table 3-3 and Map VRM-5, Appendix 1). Compared to management under Alternative A, Alternative E would increase the protection of apparent naturalness by shifting about 310,369 acres in wilderness characteristics units from VRM Class IV or III to VRM Class II. The remaining VRM II acres are already managed as such as VRM Class II and would retain the same level of protection from visual disturbance as under Alternative A. As under all alternatives, approximately 0.5 percent of acres in wilderness characteristics units would be VRM Class I. Both VRM Class I and Class II would likely prevent actions that would be substantially noticeable, though some minor, negative impacts to apparent naturalness could occur, particularly in VRM Class II areas.

In addition, under Alternative E, about 54 percent of the acres in wilderness characteristics units would shift from VRM Class IV to VRM Class III (approximately 885,552 acres), increasing the total acres of lands with wilderness characteristics units in VRM III to about 1,070,993 acres. VRM Class III is more restrictive than VRM Class IV; it allows for partial modification of the existing character of the landscape and a moderate level of change. This VRM class could restrict some projects that would remove or negatively impact wilderness characteristics, though some projects that would be substantially noticeable could be allowed. The remaining 9 percent of acres in wilderness characteristics units (148,857 acres) would remain VRM Class IV, which is the least restrictive VRM Class.

The BLM would prohibit major ROW on approximately 23 percent of the acres in the 106 wilderness characteristics units (372,218 acres) under Alternative E (Table 3-3 and Map L-11, Appendix 1). Compared to Alternative A, this would increase protection from potential impacts from major ROW for nearly all of these acres (1,198 acres are in major ROW exclusion under the existing RMP). The remaining acres in wilderness characteristics units would continue to be managed under the same major avoidance and open designations identified in the existing RMP and would be subject to potential impacts to wilderness characteristics from such developments. This includes about 27,366 acres (2 percent) of units that would continue to fall within designated (but currently unoccupied portions of) major ROW corridors.

The management of solar/wind ROW would remain essentially the same as under Alternative A, with about 24 percent of the acres in wilderness characteristics units managed as solar/wind ROW exclusion areas, about 66 percent managed as solar/wind ROW avoidance areas, and about 10 percent managed as

open to solar/wind ROW (Table 3-3 and Map L-16, Appendix 1). The development of wind/solar or major ROWs would very likely eliminate or decrease the size of wilderness characteristics units through the development of substantially noticeable facilities.

In Category C units, the BLM would not allow minor ROW where they are incompatible with protecting wilderness characteristics (e.g., where they involve the building of roads or the mechanical maintenance of existing routes), but minor ROW could occur and could have some minor negative impacts to apparent naturalness or solitude and primitive and unconfined recreation. The BLM would avoid minor ROWs on about 94 percent of the acres with wilderness characteristics (1,554,324 acres) (Table 3-3 and Map L-20, Appendix 1). All alternatives would have the same number of acres of wilderness characteristics units closed to minor ROW (1,198 acres). The remaining 6 percent (about 98,581 acres) would be open to minor ROW. Compared to Alternative A, this would shift about 37 percent of the acres in wilderness characteristics units (615,054 acres) from being open to minor ROW to being minor ROW avoidance areas. Depending on the activity or development authorized, minor ROWs could create substantially noticeable disturbances or roads that would remove apparent naturalness within all or part of a wilderness characteristics unit.

Approximately 47 percent of acres in wilderness characteristics units (752,853 acres) would be closed to salable mineral development under Alternative E (Table 3-3 and Map M-12, Appendix 1). Compared to the No Action Alternative fewer acres within wilderness characteristics units would be closed to salable mineral development under this alternative. Compared to Alternative A, this alternative would shift about 8 percent of the acres in wilderness characteristics units (about 130,158 acres) from being open to salable mineral development to being closed to this use, removing the potential for impacts to wilderness characteristics from this activity. The remaining 53 percent of acres in wilderness characteristics units (about 852,178 acres) would be subject to potential negative impacts from salable mineral development, similar to Alternative A.

As under all alternatives, about 18,850 acres (1 percent) of wilderness characteristics units would continue to be closed to mineral leasing. On about 56 percent of the acres in wilderness characteristics units (901,357 acres), the BLM would only allow leasable mineral development with no surface occupancy. This would shift about 2 percent of the acres in wilderness characteristics units (about 28,051 acres) from open to mineral leasing to open to mineral leasing subject to no surface occupancy (Table 3-3 and Map M-7, Appendix 1), removing the potential for impacts to wilderness characteristics from surface disturbance related to mineral leasing. The remaining 43 percent of acres in wilderness characteristics units (about 685,104 acres) would remain open to mineral leasing and would be subject to potential surface-disturbing impacts from such development.

The potential effects of locatable mining are addressed in the *Cumulative Impacts* section.

OHV and Travel Management Impacts

Under Alternative E, public motorized vehicle (OHV) use open, closed, and limited designations acres in wilderness characteristics units would be nearly identical to the No Action Alternative and Alternative A (Table 3-3 and Map OHV-5, Appendix 1). For this reason, the potential effects of motorized vehicle/OHV use on wilderness characteristics would be similar to those described for the No Action Alternative and Alternative A.

Future maintenance of interior routes within Category C units would be limited spot maintenance by non-mechanical means. This level of maintenance would not change the primitive nature of the route to that

of a wilderness inventory "boundary road." No new roads would be constructed within Category C units (unless specifically required by law). For this reason, route maintenance or construction would not reduce the size of Category C wilderness characteristics units.

Future maintenance of interior routes within Category B units would be limited to spot maintenance but could occur by mechanical means. This level of maintenance could change the primitive nature of the route to that of a wilderness inventory "boundary road." New roads could also be constructed within Category B units. Mechanical route maintenance and new construction would also be allowed in Category A units. Where it occurred, mechanical road maintenance and the construction of new roads would reduce the size of wilderness characteristics units.

Livestock Grazing Management Impacts

In Category C units (about 22 percent of the acres in wilderness characteristics units under Alternative E), the BLM would allow the development of range improvements only where they were determined to be substantially unnoticeable. This restriction would protect wilderness characteristics in these areas, but would not apply to, or protect wilderness characteristics within the remaining 78 percent of acres in wilderness characteristics (Category A and B) units. Except for Category C units, the effects of livestock grazing management within wilderness characteristics units would be similar to those described for Alternative A.

Summary

Of the 106 wilderness characteristics units, 26 units (approximately 372,218 acres; 22 percent of acres with wilderness characteristics) would be managed as Category C and their wilderness characteristics would be retained or enhanced over the long-term. Wilderness characteristics within the Category C setbacks (about 4,211 acres) could be substantially diminished or completely eliminated over the long-term.

Some Category A and B units would likely decrease in size or entirely lose wilderness characteristics over the long-term. In the 68 units (approximately 1,109,160 acres; 67 percent of acres with wilderness characteristics) managed as Category B, the management direction could allow future actions that could remove wilderness characteristics or reduce a unit's size. The BLM would consider minimizing impacts to wilderness characteristics in order to balance the management of wilderness characteristics with other resources and multiple uses. The Category B management direction—including the shifting of the great majority of acres with wilderness characteristics from VRM IV to VRM III and the removal of all ROW open areas—would preclude some actions that could create substantially noticeable impacts, though others could be allowed. Because of this, the BLM assumes that fewer actions that could remove wilderness characteristics could take place within Category B units than within Category A units. As a result, the BLM assumes more wilderness characteristics would be retained in Category B units compared to Category A units. The BLM would prepare site-specific NEPA analyses that address the potential effects to wilderness characteristics for all future proposed management actions within these units.

Within the remaining 12 units (approximately 168,512 acres; 10 percent) managed as Category A units, the management direction would allow future proposed actions that could remove wilderness characteristics or reduce a unit's size. The BLM would not mitigate impacts to wilderness characteristics within these Category A units.

In both category A and B units the BLM could authorize the mechanical maintenance of motorized routes and/or the development of new roads in OHV open or limited areas, which it would not do under the No Action Alternative. Similarly, it could allow the development of substantially noticeable range improvements in category A and B units.

The BLM cannot predict the locations of future internally or externally proposed actions that would remove wilderness characteristics or reduce a unit's size. Though the management direction under this alternative would allow human-caused ground-disturbing management activities to occur within wilderness characteristics units, such activities would not likely occur within all units over the long-term. Wilderness characteristics would likely be retained in some areas and lost in others.

Under Alternative E, 491 acres of wilderness characteristics units would shift from OHV open to OHV limited. This shift would enhance the protection of naturalness from authorized cross-country motorized use in a slightly larger area compared to the No Action Alternative and Alternative A.

Cumulative Impacts

Wilderness Characteristics

The additive, incremental benefits to wilderness characteristics across BLM-administered lands in the planning area from wilderness characteristics management would vary across the range of alternatives. Under Alternative A, wilderness characteristics would be maintained or enhanced on an estimated 486,140 acres within existing WSAs and 7 small existing wilderness characteristics units. Under the No Action Alternative and Alternative B, the wilderness characteristics on about 2,140,243 acres would be maintained or enhanced (1,654,103 additional acres on top of the existing WSAs and 7 small units). Under Alternative C, the wilderness characteristics on about 897,173 would be maintained or enhanced (411,033 additional acres on top of the existing WSAs and 7 small units). Under Alternative D, the wilderness characteristics on about 490,811 acres would be maintained or enhanced (4,671 additional acres on top of the existing WSAs and 7 small units). Under Alternative E, the wilderness characteristic on about 858,358 acres would be maintained or enhanced (372,218 additional acres on top of the existing WSAs and 7 small units) (see also the *Wilderness Study Area - Cumulative Impacts* section).

Reasonably Foreseeable Future Actions

With the exception of locatable mineral development, all of the reasonably foreseeable future actions (RFAs) listed in Table 3-1 would either be prohibited (new land sales or exchanges, ROWs, salable mining, facilities, or developed recreation sites) or reduced (vegetation, fire, and fuels management) within all wilderness characteristics units (No Action Alternative) or all Category C units (Alternatives B-E). While some of the reasonably foreseeable future actions listed in Table 3-1 could potentially occur in Category A or B units under Alternatives A, C, D, or E, these effects would also represent direct effects that have been addressed in the preceding *Environmental Effects* section. For these reasons, no additional or incremental cumulative effects to wilderness characteristics would likely occur from any RFAs (Table 3-1) under any of the alternatives, with the exception of locatable mineral development.

Since the majority of the 106 wilderness characteristics units are not withdrawn from locatable mineral entry and would remain open to locatable mineral exploration and development (Table 3-3 and Map M-2, Appendix 1) under all alternatives, future locatable mining could negatively impact wilderness characteristics. Such activity, whether under a mining notice or a plan of operations could occur within one or more wilderness characteristics units (or new Section 202 WSA under Alternative B) and could negatively impact or reduce naturalness or opportunities for solitude and/or primitive recreation over the

long-term. Compliance with relevant laws and regulations, and implementing appropriate reclamation measures (see Appendix 3, and Appendices D and N3 of BLM 2003b) would prevent unnecessary or undue degradation (43 CFR § 3809.1(a) and 2809.5) and could reduce but would not completely eliminate potential adverse impacts on wilderness characteristics.

Lands, Realty, and Cadastral Survey

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect BLM's ability to manage land tenure and land use authorizations in the planning area?*

Affected Environment

This program includes a wide range of public land transactions such as rights-of-way authorizations, communications use leases, film permits, land acquisitions, sales, exchanges, and withdrawals to directly support the BLM's mission of multiple use.

Within the planning area, the BLM administers public lands in Lake and Harney Counties (Table 1-1). About 56% of Lake County and 91% of Harney County within the planning area boundary are public lands. The majority of these are public domain lands (3,080,383 acres), with approximately 81,032 acres of acquired public lands located in the Fort Rock and Warner Valley areas. The planning area also contains about 121,000 acres of reserved federal mineral estate with no surface ownership. The majority of the planning area consists of large, solid blocks of public lands with state and private land blocks intermingled throughout (Map M-1, Appendix 1).

Public/Private Land Interface

Although there are situations where public and private lands intermingle, creating property boundaries that do not conform to logical natural topographic features, the planning area does not generally have a public/private land interface problem (Map A-1, Appendix 1). However, this occasionally complicates management and increases costs of some activities such as easement acquisitions, trespass resolution, right-of-way (ROW) processing, prescribed burns, and livestock grazing.

Land Use Classifications/Recreation and Public Purposes Act (RPPA)

The planning area has one existing land use classification (segregation) for the Sunstone Public Collection Area (2,500 acres); no applications are pending that would require new classifications. Historically, the majority of the planning area has been under a classification for multiple uses. Any new RPPA applications would be considered subject to completion of site-specific NEPA analysis.

Land Tenure

Existing land tenure decisions within the *Lakeview RMP/ROD* and *Oregon Greater Sage-Grouse RMPA* (BLM 2003b, 2015b) have classified all public lands in the planning area into one of three land tenure zones (1, 2, or 3) (see *Glossary* in Appendix 8 for definitions). Currently, there are approximately 2,599,575 acres designated as land tenure Zone 1 (lands identified for retention), including approximately 1,430,461 acres within wilderness characteristics units. Approximately 600,922 acres are designated as

land tenure Zone 2 (lands identified for exchange), including approximately 223,522 acres within wilderness characteristics units. Approximately 3,158 acres are designated as land tenure Zone 3 (lands identified for disposal), including approximately 120 acres within wilderness characteristics units) (Table A2-3 of Appendix 2 and Map L-1, Appendix 1).

Land Use Authorizations

Land use authorizations include rights-of-ways (ROWs), easements, and permits. Existing decisions within the *Lakeview RMP/ROD* and *Oregon Greater Sage-Grouse RMPA* (BLM 2003b, 2015b) have identified areas that are open to new ROWs, areas where new ROWs should be avoided (or would require substantial mitigation), and areas where new ROWs are excluded or not allowed (Table A2-3 of Appendix 2 and Maps L-7, L-12, and L-17, Appendix 1). While the number of land use authorizations varies annually, the BLM typically processes 15-20 ROW applications each year (Table 3-1) in the planning area. Most of these applications are for renewals of existing ROWs.

Major ROWs

Approximately 506,167 acres (15.8%) in the planning area are currently open to location of major ROWs, including approximately 161,748 acres within existing wilderness characteristics units. Approximately 2,136,497 acres (66.7%) in the planning area are currently designated as avoidance areas for major ROWs, including 1,464,716 acres within existing wilderness characteristics units. Approximately 485,995 acres (15.2%) in the planning area are currently excluded from location of major ROWs, including 1,198 acres within existing wilderness characteristics units (Table 3-3, Table A2-3 of Appendix 2, and Map L-7, Appendix 1).

ROW Corridors

There are six designated ROW corridors presently traversing the planning area totaling approximately 74,963 acres, including 27,336 acres within wilderness characteristics units (Map L-6, Appendix 1). Three of the corridors contain large (500+ kilovolt) power transmission lines: one running east-west, north of Summer Lake and south of Christmas Valley, Oregon (PP&L); a second north-south corridor traverses east of Fort Rock and Silver Lake, Oregon (7-11); and a third corridor running north-south, east of Christmas Valley and west of Adel, Oregon (BPA Direct Intertie). An unoccupied east-west energy corridor (7-24) traverses the southern portion of the planning area (BLM 2009c). The designated widths and descriptions of these 4 energy ROW corridors are shown in Table 3-4.

Table 3-4. Existing Designated Major Utility Right-of-Way Corridors

Name	Designated Width	Description
7-11	1,500 ft.	750 ft. either side of centerline.
PP&L	2,000 ft.	1,000 ft. either side of centerline except where the corridor forms the boundary of a special designation the width is 2,000 feet on the side opposite that boundary.
BPA Direct Intertie	2,000 ft.	1,000 ft. either side of centerline except where the corridor forms the boundary of a special designation the width is 2,000 feet on the side opposite that boundary. Where corridor crosses the west side of the Fossil Lake/Sand Dunes/Lost Forest ACEC/WSA/RNA complex, it is limited to 1,000 total (500 ft. on either side of centerline).
7-24	3,500 ft.	1,750 ft. either side of centerline.

State Highways 31 and 140 comprise the remaining two ROW corridors (Map L-6, Appendix 1). Future

upgrading of these existing roads and transmission lines are likely within these corridors and co-location of additional utility line ROWs are encouraged within these corridors.

The FERC approved a new major gas pipeline (Ruby) across the planning area in April 2010 (FERC 2010). The BLM issued a ROW for this pipeline across BLM-administered lands in July 2010 (BLM 2010c). The majority of this pipeline is located outside of a designated energy corridor.

In total, there is an estimated 27,366 acres of designated corridors which contain approximately 237 miles of existing State Highways and major utility line ROWs (with about 1,122 acres of actual ground disturbance) on BLM-administered lands in the planning area (Table 3-3).

Wind/Solar Energy ROWs

Approximately 531,227 acres (16.6%) in the planning area are currently open to solar/wind ROWs, including 165,431 acres within existing wilderness characteristics units. Approximately 1,578,927 acres (49.3%) in the planning area are designated as avoidance areas for wind/solar ROWs, including 1,087,517 acres within existing wilderness characteristics units. Approximately 1,093,288 acres (34.1%) in the planning area are designated as exclusion areas for wind/solar ROWs, including 401,155 acres within existing wilderness characteristics units (Table A2-3 of Appendix 2 and Map L-12, Appendix 1).

While the BLM has received seven proposals for wind energy testing in the last 10 years, none of these have moved forward into the development stage. Wind testing occurred under temporary ROWs. Five of these have expired and 3 of these are currently in the rehabilitation phase. While several small-scale solar energy developments have occurred on private lands in Lake County over the last 5 years, there is currently only one preliminary proposal for either wind or solar energy development on public lands in the planning area.

Minor ROWs

Approximately 1,411,295 acres (44%) in the planning area are open to location of minor ROWs, including 713,636 acres within existing wilderness characteristics units. Approximately 1,306,327 acres (40.8%) in the planning are designated as avoidance areas for minor ROWs, including 939,270 acres within existing wilderness characteristics units. Approximately 485,999 acres (15.2%) in the planning area are designated as exclusion areas for minor ROWs, including 1,198 acres within existing wilderness characteristics units (Table A2-3 of Appendix 2 and Map L-17, Appendix 1).

Linear ROWs

There are an estimated 554 miles (1,469 acres of ground disturbance) associated with existing minor linear ROWs for County roads, private access roads, power distribution lines, and fiber optic cable lines on BLM-administered lands in the planning area. Since existing ROWs were used to define inventory unit boundaries (see Appendix 2), none of these existing minor ROWs fall within wilderness characteristics units.

Communication Site ROWs

There are currently five existing designated communication sites in the planning area (Table 3-5; Map L-6, Appendix 1) covering about 30 acres. All have the potential for future expansion (with some restrictions). Since existing ROWs were used to define inventory unit boundaries (see Appendix 2), none of these existing communication site ROWs fall within wilderness characteristics units. A seventh designated site, Mahogany Mountain, is currently unoccupied. The BLM expects an increase in demand for communication facilities could result in requests to establish new communication sites over the long-term.

Table 3-5. Existing Communication Sites

Communication Site	Legal Description
Table Rock	T.28S., R.15E., W.M., Oregon; Section 12: NW¼.
Coglan Butte	T.34S., R.20E., W.M., Oregon; Section 16: Lot 1, NE¼NW¼.
Coyote Hills	T.35S., R.22E., W.M., Oregon; Section 11: NE¼.
Fish Creek Rim	T.39S., R.24E., W.M., Oregon; Section 18: NE1/4SE1/4
Doughtery Slide	T.41S, R29E, W.M., Oregon; Section 18

Source: BLM's LR2000 database.

Temporary Authorizations

There are, at any particular time, 3-5 temporary land use permits in effect across the planning area that authorize such activities as trespass prior to resolution, access, hay storage, apiary sites, military reserve training, engineering feasibility studies, film permits, and other miscellaneous short-term activities. These temporary authorizations typically involve small acreages of BLM-administered lands ranging from 5-100 acres each.

Unauthorized Occupancy and Use

Unauthorized occupancy and use have become more prevalent in the planning area in recent years. Unauthorized occupancies are typically encroachments of buildings or agricultural uses onto public land and may have existed for many years. Discovery of such situations occurs most often in the course of surveying projects. Unauthorized agricultural uses typically involve the encroachment onto small areas of public land from agricultural operations on adjoining private land, and unauthorized ROW situations. Resolution of such situations depends on individual circumstances and could include but would not be limited to issuance of temporary land use permits, leases or ROWs, disposal of the land by either sale or exchange, or removal of the unauthorized use.

Access (Easement) Acquisition

Currently, access to public land in the planning area has not been a significant problem since physical access on existing routes is readily available to most areas. However, several hundred locations occur throughout the planning area where existing routes cross other ownerships and the BLM does not currently have legal access. These are locations where the BLM may need to acquire individual easements in the future to preserve legal public and administrative access. Areas of high public interest include the Sand Dunes and Derrick Cave areas. A future comprehensive Travel Management Planning (TMP) process will need to address this issue; in the interim, the BLM could pursue easement acquisition on a case-by-case basis, as needed.

Environmental Effects

This section analyzes the potential impacts of the alternatives on BLM's ability to make land tenure adjustments (retention, disposal, and acquisition), approve land use authorizations (e.g., major and minor ROWs, permits, easements, and leases), and acquire legal public access. Managing for wilderness characteristics under the various alternatives would have the potential to limit or deny some of these other valid multiple uses of the public lands.

Analysis Assumptions

- The BLM expects the demand for all types of land use authorizations to increase across the planning area over the long-term (see *Reasonably Foreseeable Future Actions* section), though the locations where these may be approved would vary across the range of alternatives.
- Maintaining and upgrading existing utilities, communication sites, and other ROWs would be preferred over construction of new facilities, but only if upgrading can be accommodated within or directly adjacent to existing ROWs.
- Co-locating new infrastructure within or adjacent to existing corridors/ROWs (Map L-6, Appendix 1) would be preferred over authorizing ROWs in new locations. Co-location would reduce, but not completely eliminate new land authorizations with temporary or permanent surface disturbance.
- Additional stipulations could be included in land use authorization renewals, re-assignments, or amendments to reduce potential environmental effects (see Appendix 7).

Impacts Common to All Alternatives

Wilderness Characteristics Management Impacts

Existing ROWs

Since existing ROW boundaries were used to define inventory unit boundaries and have been specifically excluded from wilderness characteristics units (see Appendix 2), these existing ROWs could be renewed upon expiration and current ROW holders would not be negatively impacted under any alternative.

OHV, Travel, and Livestock Grazing Management Impacts

None of the OHV management alternatives would have any effects on land tenure. In addition, OHV area designations would have no effects on existing land use authorization holders under any alternatives, as such authorizations typically allow the authorization holder the right to access the area, regardless of the OHV designation.

None of the livestock grazing management alternative actions would have any effects on land tenure or land use authorizations.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Land Tenure

Under the No Action Alternative, all of the public lands currently in land tenure zone 1, including approximately1,430,461 acres within wilderness characteristics units, would remain in the public domain, subject to continued BLM management administration. Most of the public lands currently in zones 2 and 3, including 223,522 and 120 acres respectively, within wilderness characteristics units (Table 3-3; Map L-1, Appendix 1), would likely remain in the public domain due to the low priority placed on land exchanges and disposal/sale actions nationally. The BLM would be further precluded by the Settlement Agreement from selling or exchanging any public lands within wilderness characteristics units, as such actions would reduce the size of the unit(s). While this management would collectively result in retaining large blocks of public land that are efficient to manage, particularly within wilderness characteristics units, it would continue to cause some management difficulties or inefficiencies associated with scattered land ownership patterns in portions of the planning area.

Land Use Authorizations

Since existing road, utility line, and communication site ROWs were specifically excluded from inventory unit boundaries (see Appendix 2), keeping these areas open for co-location of new utility lines/communication facilities (Map L-6, Appendix 1) would result in grouping new land use authorization disturbances within or adjacent to existing disturbed areas (with the exception of most of corridor 7-24). This management direction would continue to meet the projected need for some future public and other agency energy transmission and communication facilities, while reducing the potential for negative impacts to wilderness characteristics.

However, even though large portions of many wilderness characteristics units are designated as open to the location of major, wind/solar, and minor ROWs under the existing land use plan direction (BLM 2003b, as maintained; 2015b, as maintained), the BLM could not authorize new ROWs within wilderness characteristics units if it deemed they would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. For this reason, some public, commercial, and other agency land use authorization needs would not be met on BLM-administered lands within wilderness characteristics units under this alternative over the long-term.

Summary

Over the long-term, this alternative would result in public requests for land sales, exchanges, and land use authorizations within wilderness characteristics units being denied or unmet.

Impacts of Alternative A

Wilderness Characteristics Management Impacts

Land Tenure

The effects of land tenure zone management would be similar to those described for the No Action Alternative. However, the BLM would be able to consider the sale or exchange of public lands within land tenure zones 2 and 3 inside wilderness characteristics units (Table 3-3; Map L-1, Appendix 1). For this reason, more public requests for land sales or exchanges could be met over the long-term. In addition, there would be slightly more opportunities to block up scattered land ownership patterns and improve management efficiencies in portions of the planning area compared to the No Action Alternative.

Land Use Authorizations

Under this alternative ROW open, avoidance, and exclusion area designations would be the same as the No Action Alternative (Table 3-3; Maps L-7, L-12, and L-17, Appendix 1). Overall, land use authorizations would be the least restricted of all the alternatives analyzed. Public lands would continue to be available for land use authorizations within open or avoidance areas (subject to appropriate mitigation measures to minimize impacts to other resources) similar to the No Action Alternative. However, the BLM would also be able to consider new land use authorizations within wilderness characteristics units. The potential impacts of co-locating new utilities within existing energy corridors would be the same as those described for the No Action Alternative.

Summary

Overall, more public, commercial, and other agency land sales, exchanges, and land use authorization needs would be met under this alternative compared to the No Action Alternative.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Land Tenure

Under this alternative, approximately 224,829 additional acres would be placed into land tenure zone 1 management, all of which fall within Category C units and Section 202 WSAs. As a result, more acres (2,822,781 total) within the planning area would be managed for retention (zone 1) and fewer acres would be available for land sale or exchange (zones 2 or 3) compared to either the No Action Alternative or Alternative A (Table 3-3). While this would result in retaining large blocks of public land that are efficient to manage, it would not resolve management difficulties or inefficiencies associated with the existing scattered land ownership pattern in other portions of the planning area. Over the long-term, this management direction would result in the most public requests for land sales or exchanges within units being denied or unmet of all the alternatives.

Land Use Authorizations

Under this alternative, major ROW exclusion areas would increase by about 1,654,092 additional acres, all of which fall within Category C units and new Section 202 WSAs. Wind/solar ROW exclusion areas would increase by about 1,254,135 additional acres, all of which fall within Category C units and new Section 202 WSAs. As a result, more of the planning area (2,112,875 and 2,347,195 total acres, respectively) would be unavailable for major or wind/solar rights-of-way compared to the No Action Alternative and Alternative A (Table 3-3; Maps L-8, L-13, Appendix 1).

This alternative would prevent the future occupation of most of designated (but largely unoccupied) corridor 7-24 by new major utility lines. This alternative would also prevent the co-location of new major utility lines within existing designated utility corridors (Map L-8, Appendix 1). As a result, new major utility lines would either be precluded from large portions of the planning area or would have to be located in the remaining open areas outside of wilderness characteristics units. This could cause a higher degree of ground disturbance and potential impacts to, or conflicts with, other resources compared to co-locating future facilities as described under the No Action Alternative and Alternative A.

Under this alternative, minor ROW exclusion areas would increase by about 272,670 acres and minor ROW avoidance areas would increase by about 442,152 acres, all of which fall within Category C units and new Section 202 WSAs. As a result, more of the planning area (2,503,126 total acres) would have additional constraints (BMPs, mitigation, etc.) associated with minor right-of-way location compared to the No Action Alternative and Alternative A (Table 3-3; Map L-18, Appendix 1). In addition, since no unit setbacks are included in this alternative, no new minor ROWs could be authorized within or immediately adjacent to these units. This would effectively prevent minor re-aligning or expanding the widths of some roads for safety purposes and prevent co-location of new utility lines along boundary roads.

OHV and Travel Management Impacts

While OHV closure area designations would close existing internal routes to the general public, existing and new minor ROWs could still be allowed in lands with wilderness characteristics units to provide reasonable legal access to private in-holdings (Maps L-8, L-13, and L-18, Appendix 1), subject to appropriate BMPs (see Appendix 7).

Summary

Overall, land sales, exchanges, and land use authorizations would be restricted to the highest degree of any of the alternatives and the fewest public, commercial, and other agency land sale, exchange, and authorization needs would be met by Alternative B when compared to all other alternatives.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Land Tenure

Under this alternative, Category C unit management would result in approximately 26,010 additional acres managed as land tenure zone 1. Existing land tenure zone designations within the remainder of the

planning area, including Category A and B units, would be retained. As a result, slightly more acres would be managed for retention (zone 1) and slightly fewer acres would be available for land sale or exchange (zones 2 or 3) compared to the No Action Alternative or Alternative A (Table 3-3). While this management would retain large blocks of public land that are efficient to manage, it would not resolve management difficulties or inefficiencies associated with the existing scattered land ownership pattern in portions of the planning area.

Land Use Authorizations

Major ROW exclusion areas would increase by about 409,835 additional acres and wind/solar ROW exclusion areas would increase by about 9,878 acres (Table 3-3; Maps L-9, L-14, Appendix 1), all within Category C units. Minor ROW avoidance areas would increase by about 685,134 additional acres (Table 3-3; Map L-19, Appendix 1) within Category B and C units. New major and wind/solar ROWs within Category C units would be denied. While minor ROWs (*e.g.* small-scale utilities or access roads) would be allowed within Category C unit boundary setbacks, major ROWs, commercial renewable energy projects, or projects that would have pervasive, ever-present impacts to wilderness characteristics would not be allowed. New ROWs could also be authorized within ROW avoidance areas, but the application of appropriate BMPs (see Appendix 7) to reduce potential effects on wilderness characteristics would make it more difficult for, or increase costs to, the ROW applicant(s) compared to the No Action Alternative and Alternative A.

This alternative would prevent the future occupation of large portions of designated (but largely unoccupied) corridor 7-24 by major new utility lines. This alternative would also prevent the co-location of new major utility lines within portions of other existing designated utility corridors in the planning area (Map L-9, Appendix 1). As a result, new major utility lines would either be precluded from large portions of the planning area or would have to be located within the remaining open areas outside of Category C units. This could cause a higher degree of ground disturbance and potential impacts to, or conflicts with, other resources compared to co-locating such facilities as described under the No Action Alternative and Alternative A.

Summary

Over the long-term, this alternative would result in slightly more requests for land sales or exchanges being met compared to the No Action Alternative.

Overall, new land use authorizations would be restricted to a higher degree than Alternative A, but less than Alternative B or the No Action Alternative respectively. For these reasons, slightly more public, commercial, and other agency land use authorization needs would be met compared to the No Action Alternative or Alternative B.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Land Tenure

Management under this alternative would result in no changes in existing land tenure zones within Category C units. Existing land tenure zone designations within the remainder of the planning area,

including Category A and B units, would also be retained (Table 3-3). For this reason, the impacts of wilderness characteristics management on land tenure would be the same as the No Action Alternative and Alternative A.

Land Use Authorizations

Major ROW exclusion areas would increase by about 3,508 additional acres and wind/solar ROW exclusion areas would increase by about 40 additional acres compared to the No Action Alternative and Alternative A. Minor ROW avoidance areas would increase by about 544,965 additional acres within Category B and C units (Table 3-3; Maps L-10, L-15, L-17, Appendix 1). While new major and wind/solar ROWs within Category C units would be denied, this would impact relatively few additional acres compared to the No Action Alternative and Alternative A. The potential impacts to land use authorizations within the Category C unit boundary setbacks would be similar to those described for the setbacks under Alternative C. While new ROWs could be authorized within ROW avoidance areas, the application of appropriate BMPs (see Appendix 7) to reduce potential effects on wilderness characteristics would make it more difficult for, or increase costs to, the ROW applicant(s) compared to the No Action Alternative and Alternative A.

This alternative would retain existing energy corridors (including corridor 7-24) and keep them open for co-location of new utility lines (Maps L-4 and L-10, Appendix 1), as well as encourage future utility lines to co-locate within or immediately adjacent to existing linear ROWs. This would allow opportunities for some additional major and minor utility ROWs in the future. This would result in a similar amount of future ground disturbance and potential impacts to other resource values as Alternative A.

Summary

Over the long-term, this alternative would result in slightly more requests for land sales or exchanges being met compared to the No Action Alternative and similar levels as Alternative A.

Overall, new land use authorizations would be restricted to a slightly higher degree than the No Action Alternative and Alternative A. Therefore, slightly fewer public, commercial, and other agency land use authorization needs would be met compared to the No Action Alternative or Alternative A.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Land Tenure

Category C unit management would result in approximately 575 additional acres in land tenure zone 1. Existing land tenure zone designations within the remainder of the planning area, including Category A and B units, would be retained. Overall, slightly more acres would be managed in zone 1 (1,431,036 total acres) and slightly fewer acres would be available for land sale or exchange in zones 2 or 3 compared to the No Action Alternative or Alternative A (Table 3-3; Map L-5, Appendix 1). For this reason, the impacts of wilderness characteristics management on land tenure would be similar to Alternative A over the long-term.

Land Use Authorizations

Major ROW exclusion areas would increase by approximately 371,020 additional acres and wind/solar ROW exclusion areas would increase by about 202,171 additional acres compared to the No Action Alternative and Alternative A, all within Category C units. Minor ROW avoidance areas would increase by about 615,054 additional acres within Category B and C units (Table 3-3; Maps L-11, L-16, L-20, Appendix 1). New major and wind/solar ROWs within Category C units would be denied. The potential impacts to land use authorizations within the Category C unit boundary setbacks would be similar to those described under Alternative C. While new ROWs could be authorized within ROW avoidance areas, the application of appropriate BMPs (see Appendix 7) to reduce potential effects on wilderness characteristics would make it more difficult for, or increase costs to, the ROW applicant(s) compared to the No Action Alternative and Alternative A.

This alternative would prevent the future occupation of portions of designated (but largely unoccupied) corridor 7-24 by major new utility lines. This alternative would also prevent the co-location of new major utility lines within portions of other existing designated utility corridors in the planning area (Map L-11, Appendix 1). As a result, new major utility lines would either be precluded from large portions of the planning area or would have to be located in remaining open areas outside of Category C units. This could cause a higher degree of ground disturbance and potential impacts to, or conflicts with, other resources compared to co-locating such facilities as described under the No Action Alternative and Alternative A.

Summary

Overall, this alternative would result in slightly more requests for land sales or exchanges being met compared to the No Action Alternative and similar levels as Alternative A.

Overall, new land use authorizations would be restricted to a slightly higher degree than the No Action Alternative or Alternative A. Therefore, fewer public, commercial, and other agency land use authorization needs would be met compared to the No Action Alternative or Alternative A.

Cumulative Effects

Wilderness characteristics management direction would have an additive, incremental effect on the total number and location of future land use authorizations (primarily ROWs) that could be approved within the planning area over the long-term. Based on past trends, an estimated 40-120 new minor ROWs, 1-4 new communication site ROWs, and one new major utility line ROW could be issued over the long-term, depending upon the alternative. This would result in an estimated 307-615 acres of BLM-administered lands in the planning area that could be occupied by new ROWs over the long-term (Tables 3-1 and 3-6).

Being able to approve new major, wind/solar, minor, and temporary land use authorizations within areas open to ROW location, outside of all wilderness characteristics units (No Action and Alternative B) or outside of Category C units (Alternatives C-E) would meet some, but not all of the projected public, commercial, and other agency demands for land use authorizations in large portions of the planning area. As a result, future land use authorizations would be more concentrated elsewhere in the planning area outside of Category C units (including within Category A and B units, and the boundary setbacks of Category C units) or other BLM-administered lands outside of the planning area. While some land use

Table 3-6. Potential Impacts to Opportunities for Land Use Authorizations

Land Use Authorization	Common to All Alternatives (Past or On-Going Actions)	No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
New Major ROWs/Corridors							
Major Utility Lines *State/Federal Highways*	173 mi./812 acres 64 mi./310 acres[1]	1 new major utility ROW (100 additional acres)	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative
New Minor ROWs							
Road/Access *Utility Lines*	287 mi./971 acres 267 mi./558 acres	4-6 new ROWs/year (300-500 additional acres total)	5-6 new ROWs/year (500 additional acres total)	2-3 new ROWs/year (200 additional acres total)	3-5 new ROWs/year (300-400 additional acres total)	5-6 new ROWs/year (400-500 additional acres total)	3-5 new ROWs/year (300-400 additional acres total)
Communication Sites	6 sites/30 acres	2-3 new sites (10-15 additional acres total)	3-4 new sites (15 additional acres total)	1 new site (7 additional acres total)	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative
TOTAL	2,681 acres	410-615 additional acres	615 additional acres	307 additional acres	410-515 additional acres	510-615 additional acres	410-515 additional acres

[1] Includes acres associated with the Zayo fiber optic ROW currently under construction and located entirely within existing highway ROWs in the Lakeview Field Office (BLM 2022c).

authorization needs could also be met within ROW avoidance areas, they would be subject to additional mitigation measures to minimize impacts to other resources (see Appendix 7), which could increase proponent costs.

None of the other RFAs listed in Table 3-1 (mining, facility, recreation, vegetation, or fire and fuels management) would have any additive, incremental cumulative effects on future public, commercial, or other agency opportunities for land sales, exchanges, or authorizations.

Mineral and Energy Resources

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect locatable, leasable, and salable mineral development in the planning area?*

Affected Environment

Within the planning area boundary, the BLM administers all Federal subsurface mineral estate, including those underlying other Federal lands (Forest Service, General Services Administration, U.S. Fish and Wildlife Service), as well as Federal mineral estate underneath state, county, or private surface ownerships (split estate). In total, there are approximately 3,090,947 acres of BLM-administered surface/federal mineral estate and 857,646 acres of other split estate minerals within the planning area boundary (Map M-1, Appendix 1). The management of the surface and any associated restrictions on mineral development on other Federal lands generally fall under the jurisdiction of the surface-managing agency. In addition, all lands with BLM-administered mineral estate underlying other Federal lands

within the planning area are located outside of any wilderness characteristics units. For these reasons, this plan amendment will not address BLM-administered mineral estate underlying other Federal lands.

Table 3-7 summarizes the BLM-administered mineral estate within the entire planning area and within wilderness characteristic units. There are approximately 1,599,074 acres of BLM-administered surface/mineral estate and 271 acres of split estate minerals specifically within wilderness characteristic units.

Table 3-7. BLM-Administered Surface and Mineral Estate

Surface ownership and mineral estate	Planning Area (acres)	106 Wilderness Characteristic Units (acres)
Federal mineral estate and BLM surface – all minerals	3,088,019	1,599,074
Reserved federal mineral estate with no BLM surface - all minerals	843,979	0
Reserved federal mineral estate with no BLM surface - partial minerals[2]	13,667	271
Reserved federal mineral estate and BLM surface - partial minerals	1,077	0
Acquired federal minerals and Bankhead-Jones surface[1] – all minerals	1,851	0
No Federal mineral estate and BLM surface	112,126	54,188

Source: BLM Subsurface Mineral Estate GIS database.
[1]Bankhead Jones lands were homesteaded, but later reverted back to the Federal government and the minerals were acquired.
[2] Partial minerals includes combinations of administration such as oil and gas only, oil, gas, and geothermal, and all minerals except oil and gas.

The probability of mineral and energy resources being present within the planning area is tied directly to the geology of the area. A summary of potential mineral resources and both historic and recent mining activity in the planning area is contained in Chapter 2 of the *Lakeview Proposed RMP/Final EIS* (BLM 2003a, pages 2-90 to 2-95) and Appendix N1 of the *Lakeview Draft RMP/EIS* (BLM 2001a, pages A-292 to A-297). These discussions are hereby incorporated by reference in their entirety in accordance with the provisions of 40 CFR § 1502.21 and are cited in this section where appropriate.

Mineral and energy resources are classified into one of three categories (locatable, leasable, and salable) based on various laws and regulations that govern their management (see *Glossary* in Appendix 8 for definitions). Mining activities in the planning area have included exploration or production of sand, gravel, rock, cinders, decorative stone, sunstones, diatomaceous earth (diatomite), uranium, and perlite. Production of minor amounts of mercury, gold, lead, dolomitic limestone, and zinc has occurred from scattered sources in the past. Currently, the principal mineral activities in the planning area are the production of gravel, rock, and cinders for road maintenance and the mining of sunstones and perlite.

Disturbances associated with active and reclaimed mining activities were considered during the wilderness characteristics inventory process when the BLM assessed the apparent naturalness for the many units where mining activity was present. In most cases, the BLM removed these disturbed areas from the inventory unit boundary (see Appendix 2).

Locatable Minerals

Locatable minerals include precious and base metals (such as gold and silver) and some non-metallic minerals that possess unique properties for which mining claims can be located (uncommon variety minerals, uranium). The probability for locatable mineral resources in the planning area was developed from known geologic settings, inferred geologic processes (mineralization models), current mining activity, and extrapolation of known mineralization into areas of inferred similar geologic setting and is

discussed further in the *Lakeview Proposed RMP/Final EIS* (see Table 2-50a, BLM 2003a) and *Lakeview Draft RMP/EIS* (see Map M-4 of BLM 2001a).

Approximately 13,257 acres of BLM-administered Federal minerals in the planning area (0.5% of the Federal mineral estate in the planning area) where the BLM also manages the surface are currently withdrawn or segregated from some form of locatable mining under the mining laws or the Classification and Multiple Use Act of 1964, including about 600 acres within four wilderness characteristics units. (This total does not include withdrawn Federal minerals under State Wildlife Refuge, National Forest, or National Refuge lands in the planning area). Table 3-8 includes a summary of the existing locatable mineral withdrawals and segregations in the planning area.

Table 3-8. Mining Statistics

Mineral Category	Sites (acres)
Salable Minerals	
Community pits	23
Free-use permits	24
Material site right-of-way-pits/quarries	20
Material site right-of-way storage sites	13
Locatable Minerals	
Mining claims	439
43 CFR § 3809 mining/notices of exploration	1
43 CFR § 3809 mining/plans of operations	44
43 CFR § 3802 mining/plans of operations	0
43 CFR § 3715 occupancies	18
Leasable Minerals	
Known geothermal resource areas (KGRAs)	3 (50,400 acres)
Geothermal leases/notices	0/0
Oil and gas leases/notices	0/0
Mineral Withdrawals and Segregations	
Withdrawals (BLM)	
- All minerals (Lost Forest RNA/ISA and Sand Dunes WSA)	1 (8,646 acres)
- Non-metalliferous locatable minerals only (Public Water Reserves)	5 (1,676 acres)
- All locatable and salable minerals (Greaser National Register District)	1 (326 acres)
Withdrawals (Other Surface Managing Agencies[2])	
- All minerals (Summer Lake State Wildlife Refuge)	1 (7,142 acres)
- All minerals (Forest Service Administrative Sites)	2 (237 acres)
- All minerals (Hart Mountain and Sheldon National Wildlife Refuges)	2 (255,051 acres)
Segregations	
- Leasable and salable minerals (WSAs)	13 (466,590 acres)
- Locatable minerals only (Sunstone Public Collection Area[1])	1 (2,609 acres)

Source: BLM Mineral GIS databases; BLM 2023.
[1] Segregated from mineral location under the Classification and Multiple Use Act of 1964.
[2] Includes areas with BLM-administered mineral estate where other state or Federal agencies have surface jurisdiction.

About 4,578 acres within the Red Knoll ACEC has been proposed for mineral withdrawal (BLM 2003b), but the withdrawal has not been completed to date. About 2,163 of these acres also fall within wilderness characteristics units. This area remains open to locatable mineral development subject to the preparation of a plan of operations until such time as the withdrawal has been approved.

About 458,585 acres of Federal mineral estate (14% of planning area) underlying WSAs are open to locatable mineral development, subject to the non-impairment standard and preparation of a plan of

operations (POO)[6]. About 2,153,037 acres (65.9%) of Federal mineral estate within ACECs and Sage-grouse PHMA are open to locatable mineral development, subject to preparation of a POO. About 1,388,115 of these acres also fall within wilderness characteristics units. About 631,823 acres (19.3%) of Federal mineral estate would remain open for locatable mineral development with no constraints, including about 216,315 acres within wilderness characteristics units (Table 3-3). The constraints on locatable minerals on about 424,528 acres of split estate are currently unknown. These existing constraints on locatable mineral development are shown on Map M-2 (Appendix 1) and would not change under any of the alternatives addressed in this analysis.

Notices of Exploration

Except for sunstones, notices for exploration of locatable minerals in the planning area has been sporadic over the years. Approximately 85% of all mining exploration notices have involved sunstones in the Rabbit Basin area. The remaining 15% have covered perlite exploration at Tucker Hill, diatomite exploration near Christmas Valley, and gold exploration in the Coyote Hills, Fir Timber Butte, Summer Lake, Horsehead Mountain, and Dry Valley areas. Table 3-8 summarizes current locatable mining notice-level activity in the planning area.

The *Lakeview RMP/Final EIS* analysis addressed the potential for notice level disseminated gold exploration and gold suction dredging on BLM-administered lands in the planning area (BLM 2003a, pages A-217 to A-218). There is currently one existing notice for gold exploration in the Coyote Hills area impacting about four hundred acres within two wilderness characteristics units.

Plans of Operation

The *Lakeview RMP/Final EIS* analysis addressed the potential for up to 7 new plans of operations for sunstones in the Rabbit Basin area each year along with expansion of the perlite mine at Tucker Hill (BLM 2003a, pages A-218 to A-219). Currently there are 44 approved sunstone plans of operation clustered around the Rabbit Basin and Eagle Butte areas and one approved perlite mining plan of operations (which has been amended multiple times since 1995) at Tucker Hill (Table 3-8). In total there are about 520 acres of active locatable mining (under both notices and POOs) currently occurring in the planning area (D'Amo 2018, BLM 2017f, 2018k, 2020a), not including about 75 acres currently under-going reclamation. All current locatable mining operations occurring under plans of operations are located outside of wilderness characteristics units.

Leasable Minerals

Leasable minerals include energy minerals (*e.g.* oil and gas, coal, and geothermal) and lakebed evaporite minerals such as sodium and potassium. Currently, there are about 504,284 acres (15.4%) of Federal minerals in the planning area that are withdrawn from, or closed to mineral leasing due to ACEC, RNA,

[6] An additional 7,986 acres studied under Sect. 202 of the FLPMA and located within the entire Sagehen Hills WSA and portions of the Rincon and Basque Hills WSAs would be subject to the requirement to prepare a plan of operations and meet the unnecessary and undue degradation standard rather than the non-impairment standard.

WSA, and other resource values. About 466,590 acres of these acres are segregated from mineral leasing due to WSA status and about 18,850 acres of these closed acres overlap with wilderness characteristics units (Map M-3, Appendix 1). About 1,278,908 acres in the planning area, including about 873,306 acres within wilderness characteristics units, are open to leasable mineral development subject to a no surface occupancy (NSO) stipulation due to existing sage-grouse PHMA or ACEC management direction. The constraints on leasable minerals on about 424,528 acres of split estate in the planning area are currently unknown. The remaining 1,484,535 acres in the planning area, including approximately 713,144 acres within wilderness characteristics units, are currently open to leasable mineral development with no constraints or subject to controlled surface use (CSU) restrictions (Table 3-3).

Table 3-8 summarizes current mineral leasing activity in the planning area. There is currently no exploration or leasing for oil and gas, coal, coalbed methane, oil shale, or tar sands in the planning area, and there is a low probability for locating or developing these mineral resources in the future. In accordance with 43 CFR § 3461.5(a)(3)(d)(1), the BLM has determined that the planning area is unsuitable for further consideration of oil and gas, coal, coalbed methane, oil shale, or tar sands development (BLM 2003a, page A-210). For these reasons, these energy mineral resources will not be discussed further.

Most of the planning area has some probability for leasable geothermal energy development (BLM and FS 2008), including areas underlying many wilderness characteristics units. In particular, the Summer Lake/Paisley, south Warner Valley, and Lakeview areas contain hot springs and hot wells. Based on geology, evidence of geothermal energy (heat flow), and past commercial interest, three known geothermal resource areas (KGRAs) were designated in the planning area. Based on heat flow, the remainder of the planning area has either moderate or low probability for geothermal resource development (see Map M-5, BLM 2001a). Currently, geothermal energy from private wells provides heating for homes, businesses, schools, and the hospital in the Lakeview area and for mineral baths in the Lakeview and Summer Lake areas (Boyd 2007). While geothermal testing has occurred in portions of the planning area in the past, the studies did not find high enough temperatures to support geothermal energy development (BLM 2003a, pages A-212 to A-213). One geothermal lease was issued on the south end of the Summer Lake KGRA in the last 15 years but has since expired. No geothermal development has occurred on BLM-administered lands in the planning area in the last 25 years and no proposals are pending.

Based on known deposits and direct evidence, the probability for leasable sodium, potassium, and associated lakebed evaporite-type minerals is high in the Summer, Abert, and Alkali Lake areas. BLM has determined that other lakebeds in the planning area have a moderate probability, and the remaining portions of the planning area have low probability for these types of minerals (see Map M-5, BLM 2001a). The *Lakeview RMP/Final EIS* analysis addressed the potential for prospecting and sodium leasing development on Lake Abert (BLM 2003a, pages A-213 to A-215). While interest in sodium leasing in the Lake Abert area has been documented in the past (BLM 1996c) and more recently near Mugwump Lake, no sodium or other lakebed evaporite mineral leasing has occurred on BLM-administered lands in the planning area in the last 25 years and no proposals are pending.

Salable Minerals

Salable minerals consist of common variety minerals such as sand, gravel, rock, cinders, and decorative stone. Most of the planning area has moderate probability for the occurrence of salable minerals. High probability areas occur near known developed deposits (see Map M-3 of BLM 2001a), typically in hard-

rock outcrops, cinder cones, alluvial fans, and ancient beach terraces (see Table 2-53 of BLM 2003a). Currently, about 1,410,233 acres (43.1%) of the planning area are withdrawn from, or closed to salable mineral development due to ACEC, RNA, WSA, and Sage-Grouse PHMA, special status plant, and/or cultural resource management direction (Map M-8, Appendix 1). About 622,695 of these closed acres are located within wilderness characteristics units (Table 3-3).

About 248,500 acres (7.6%) and 1,609,889 acres (49.3%) of the Federal mineral estate in the planning area would be open to salable mineral disposal with no constraints or subject to additional stipulations (to protect specific special status wildlife habitat and visual quality), respectively. About 982,336 acres that are open to salable mineral disposal fall within wilderness characteristics units (Table 3-3). The constraints on salable minerals on about 424,528 acres of split estate in the planning area are currently unknown.

Table 3-8 summarizes current salable mineral activity in the planning area. From 2001-2011, the production of nearly 1,000,000 cubic yards of sand, gravel, and rock from quarries and pits for construction and road maintenance occurred in the planning area. Use has declined to around 20,000 cubic yards from 2011 to 2018 due to the county and ODOT developing their own gravel resources. Sales of sand and gravel to individuals have averaged about 2,500 cubic yards per year. During the same period, cinder production has varied from about 200 to 1,000 cubic yards per year (mostly for use on county roads).

There are currently 24 active sand, gravel, rock, and cinder pits on public lands in the planning area that serve as community pits or common use areas (Table 3-8; BLM 2023a). All of these existing pits are located outside of wilderness characteristics unit boundaries. Community pits are designated sites for the sale of mineral materials to the public. Common use areas are located in conjunction with free-use permit areas in the planning area, though they are permitted under different authorizations. Free-use permit areas are typically issued to Lake County or the BLM, but material sales can also be made available to the public from these sites with the coordination of the free-use permit holder. ODOT also operates 20 pits (totaling approximately 2,964 acres) under material site right-of-way (ROW) authorizations, all of which are located outside of wilderness characteristics unit boundaries. Sales of mineral materials to individuals average about 20-25 sales per year. The number of salable mineral permits issued annually has been relatively static in recent years. While the *Lakeview RMP/Final EIS* analysis addressed the potential for 15-30 new salable mineral pits on BLM-administered lands within the planning area (BLM 2003a, pages A-219 to A-220) over the life of that plan, only eight new pits have actually been developed during that timeframe.

Decorative stone occurs throughout the planning area. Premium deposits of slab lava occur in the Devils Garden lava flow. Another area of moderate probability is the Abert Rim where platy rhyolitic stone is located. However, these areas fall within WSAs that are currently closed to salable mineral disposal by BLM policy (BLM 2012h). The *Lakeview RMP/Final EIS* analysis addressed the potential for 4-10 requests for decorative stone permits annually (BLM 2003a, page A-220), but the BLM has actually received one or fewer requests annually for other locations scattered across the planning area over the last 15 years.

Abandoned Mines

During the late 1990s, an abandoned mine land survey was conducted in the planning area. Abandoned mine features (adits, shafts, pits, trenches, roads, etc.) were scattered across the planning area, but are

primarily concentrated on Coyote Hills, Fir Timber Butte, and Horsehead Mountain areas. These features are found in nine wilderness characteristics inventory units and influenced how the BLM determined the inventory unit boundaries in several of these units (see Appendix 2). However, most of these unnatural features could not be excluded from the unit boundaries. Disturbances associated with abandoned mines were considered during the wilderness characteristics inventory process when the BLM assessed the apparent naturalness for each unit.

While the BLM has made progress remediating some of the most hazardous sites, two historic mercury processing sites at Miners Draw in Coyote Hills and China Cup Mine at Horsehead Mountain have small areas (less than 0.10 acre) with slightly elevated mercury levels in the soil. These two sites have been identified for remediation when funding becomes available.

Environmental Effects

Analysis Assumptions

- Potential effects to mineral development opportunities can be described and quantified based on placement into one of three mineral constraint categories: (1) closures, including segregations and withdrawals; (2) no-surface-occupancy (for leasable minerals); (3) standard requirements, lease terms, and controlled surface use stipulations. This analysis uses these terms to compare effects of the alternatives.
- Areas with valid mining claims and existing Notices or Plans of Operations (active, pending) would have the highest potential for future locatable mineral development. While existing, active locatable mineral developments have been excluded from wilderness characteristics unit boundaries, some units may contain valid mining claims that do not currently have mining activity occurring. However, BLM assumes for the purposes of this analysis that areas with valid mining claims have a higher potential for future locatable mineral development than areas with no mining claims.

Impacts Common to All Alternatives

Wilderness Characteristics, OHV and Travel, and Livestock Grazing Management Impacts

Locatable Minerals

Under all alternatives, most of the wilderness characteristics units would remain open to locatable mineral exploration and development. These opportunities would not be further restricted or impacted by wilderness characteristics management, OHV and travel management, or livestock grazing management. Locatable mining could potentially occur anywhere that is open to locatable mining, including most wilderness characteristics units (Tables 3-3 and Table A2-3 of Appendix 2; Map M-2, Appendix 1).

As long as a prospector/miner meets the requirements of the General Mining Law of 1872 (as amended), the Federal Land Policy and Management Act (FLPMA), and relevant mining regulations (43 CFR § 3802 and 3809), locatable mineral exploration, occupancy, and development within areas open to locatable minerals cannot be denied (see Appendix 3). Compliance with relevant laws, regulations, and implementing appropriate reclamation measures to prevent unnecessary and undue degradation (see Appendices D and N3 of BLM 2003b) could increase mineral development costs but would not prohibit locatable mineral development from occurring. For these reasons, none of the wilderness characteristics,

OHV and travel management, or livestock management alternatives would have any effects on locatable mineral development opportunities (see also *Cumulative Impacts Common to All Alternatives* section).

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Leasable Minerals

Under the No Action Alternative, there would be no change in existing leasable mineral constraints within wilderness characteristics units (Tables 3-3 and Table A2-3 of Appendix 2). Approximately 18,580 acres within wilderness characteristics units would remain closed mineral leasing. Approximately 873,306 would remain open to new leasable mineral development in wilderness characteristics units subject to a NSO stipulation. While this stipulation could still allow for the development of some leasable fluid mineral or energy resources using methods such as directional drilling from adjacent open areas, it could effectively prevent leasable development from the interior of some large geographic areas due to the inability to occupy the surface above the mineral resource and the higher costs or technical limitations of directional drilling methods.

Approximately 713,144 acres within wilderness characteristics units would remain open to leasable mineral and energy development with no constraints or subject to controlled surface use restrictions (Table 3-3 and Table A2-3 of Appendix 2). However, the BLM could not authorize leasable mineral or energy development within wilderness characteristics units if it deemed it would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. These constraints would collectively restrict or impact leasable mineral development opportunities on about 1,605,030 acres within wilderness characteristics units over the long-term.

Salable Minerals

Under the No Action Alternative, there would be no change in existing salable mineral constrains within wilderness characteristics units (Table 3-3 and Table A2-3 of Appendix 2). About 622,695 acres of Federal mineral estate within wilderness characteristics units would remain closed to salable mineral development (Map M-8, Appendix 1). No salable mineral exploration or development would be allowed in these areas.

While approximately 982,336 acres of the Federal mineral estate within wilderness characteristics units would remain open to salable mineral disposal with no constraints or subject to stipulations to protect other resource values. However, the BLM could not authorize salable mineral development within wilderness characteristics units if it deemed it would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics.

Wilderness characteristics management would have no impacts on existing salable mineral pits and mineral material site ROWs because these existing areas are located outside of wilderness characteristics unit boundaries. However, approval of new pits or expansion of existing pits into wilderness characteristics units has been precluded by compliance with Provisions 18 and 19 of the Settlement Agreement (BLM 2023a). Overall, this alternative would have more constraints on salable mineral exploration and development than Alternatives A and D, relatively similar constraints as Alternative B, but fewer constraints than Alternatives C or E.

Abandoned Mine Land Reclamation

Under this alternative, small-scale abandoned mine land reclamation activities could occur using a variety of methods, including the use of mechanical and heavy equipment. While these activities could have short-term negative effects on naturalness and/or solitude opportunities within a few wilderness characteristics units while reclamation is actively occurring, they would not diminish the unit size or cause an entire BLM wilderness characteristics unit to no longer meet the criteria for wilderness characteristics. Such activities would be beneficial to apparent naturalness because vegetation would be re-established on the site(s) over the long-term. In addition, public health and safety would be improved following reclamation.

OHV, Travel, and Livestock Grazing Management

Livestock management under this alternative would not have any direct or indirect effects on future mineral development opportunities. However, the operator(s) could incur additional costs associated with fencing some mineral development sites to keep cattle out of the mining area due to the presence of physical safety hazards or direct interference with mining operations.

OHV management under this alternative would not have any direct effects on mining activities because the BLM could authorize miners to travel off-road in OHV Limited or Closed areas or travel on closed routes where needed to access valid mining claims, leases, or authorized mineral pits under OHV Exception #5 (see *Off-Highway Vehicle Use and Travel Management* section).

Impacts of Alternative A

Wilderness Characteristics Management Impacts

Leasable and Salable Minerals

Under this alternative, there would be no additional constraints on leasable and salable mineral exploration and development within wilderness characteristics units (Table 3-3 and Table A2-3 of Appendix 2; Maps M-3 and M-8, Appendix 1).

This alternative would provide the highest level of potential salable and leasable mineral exploration and development opportunities of all of the alternatives. Compliance with relevant laws, regulations, and implementing appropriate reclamation and mitigation measures (see Appendices D and N3 of BLM 2003b) would reduce, but not completely eliminate the potential adverse impacts of salable and leasable mineral development on other resources.

Abandoned Mine Land Reclamation

Under this alternative, abandoned mine land reclamation activities could occur using a variety of methods, including the use of mechanical and heavy equipment. While these activities would have short-term negative effects on soils and vegetation, these effects would diminish as the area is returned to a

more natural contour and vegetation is re-established on the site(s) over the long-term. In addition, public health and safety would be improved following reclamation.

OHV, Travel, and Livestock Grazing Management Impacts

The potential effects of OHV, travel, and livestock grazing management under this alternative on mineral development opportunities would be the same as the No Action Alternative.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Locatable Minerals

Under this alternative, the effects of wilderness characteristics management would generally be the same as described in the *Impacts Common to All Alternatives* section above. While Category C units and new Section 202 WSAs would remain open to locatable mineral exploration and development, the area within the new WSAs would have an additional requirement to prepare a plan of operations prior to development which could increase overall mineral development costs in these areas.

Leasable Minerals

Under Alternative B, all new Section 202 WSAs would be closed to mineral leasing (282,720 acres; see Table 3-3). This would prevent all leasable fluid mineral and energy development within these areas. An additional 449,572 acres within Category C units would be subject to a NSO leasing stipulation on top of the existing 873,306 acres within wilderness characteristics units already subject to this stipulation (1,322,311 acres total) (Table 3-3). This stipulation could effectively prevent leasable fluid mineral and energy development within larger units due to the inability to occupy the surface above the mineral resource and the higher development costs or technical limitations associated with directional drilling. These constraints would collectively restrict or impact leasable mineral development opportunities on about 1,605,131 acres within wilderness characteristics units over the long-term (Map M-4, Appendix 1).

Overall, this alternative would have the most constraints on leasable mineral exploration and development opportunities of all the alternatives, followed by the No Action Alternative, Alternative C, and Alternative E, respectively.

Salable Minerals

Under Alternative B, approximately 1,032,595 additional acres of Federal mineral estate within Category C units and new Section 202 WSAs would be closed to salable mineral exploration and development on top of the existing 622,695 acres within wilderness characteristics units that are already subject to this restriction (1,655,290 acres total) (Table 3-3; Map M-9, Appendix 1). These constraints would negatively impact the availability of salable minerals within the planning area to a similar degree as the No Action Alternative. Compliance with relevant laws, regulations, and implementing appropriate reclamation and mitigation measures (see Appendices D and N3 of BLM 2003b) would reduce the potential adverse impacts of salable mineral development on other resources. Overall, this alternative would have the most

constraints on salable mineral exploration and development opportunities of all the alternatives analyzed, followed closely by the No Action Alternative.

Abandoned Mine Land Reclamation

Under this alternative, one Category C unit contains numerous known abandoned mine sites (Coyote Hills). Reclamation activities could occur in this area using a variety of methods. However, heavy equipment use could be constrained making reclamation more difficult in this area.

OHV, Travel, and Livestock Grazing Management Impacts

Under this alternative OHV and travel management direction could impact mining opportunities in some wilderness characteristics units over the long-term. While the BLM could authorize miners to travel off-road in OHV Limited or Closed areas or travel on closed routes to access valid mining claims, leases, or authorized mineral pits under OHV Exception #5 (see Off-Highway Vehicle Use and Travel Management section), they would not be allowed to mechanically maintain any access routes in these areas. This could result in a loss of viable access to some mine sites over the long-term.

Reductions in livestock grazing under this alternative could lead to less need to fence and keep cattle out of mineral sites compared to the No Action Alternative.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Leasable Minerals

Under Alternative C, approximately 18,580 acres within wilderness characteristics units would remain closed mineral leasing. An additional 188,516 acres within Category C units would be subject to a NSO leasing stipulation on top of the existing 873,306 acres within wilderness characteristics units already subject to this stipulation (1,061,822 acres total) (Table 3-3). This could effectively prevent leasable fluid mineral and energy development within larger units due the inability to occupy the surface above the mineral resource and the higher development costs or technical limitations associated with directional drilling. These constraints would collectively restrict or impact leasable mineral development opportunities on about 1,080,402 acres within wilderness characteristics units over the long-term.

An additional 524,655 acres within wilderness characteristics units would be open with no constraints, or subject to stipulations to minimize potential effects to other resource values (Map M-5, Appendix 1). Areas with additional stipulations would also be subject to increased exploration and development costs which could negatively affect the potential availability of leasable energy minerals compared to Alternative A. After Alternative B and the No Action Alternative, this alternative would have the most constraints on leasable mineral and energy exploration and development opportunities.

Salable Minerals

Under Alternative C, approximately 256,878 additional acres of Federal mineral estate within Category C units would be closed to salable mineral development on top of the existing 622,695 acres within

wilderness characteristics units that are already subject to this restriction (879,573 acres total) (Table 3-3). About 724,458 acres of Federal mineral estate within wilderness characteristics units would remain open to salable mineral disposal with no constraints or subject to constraints to protect other resource values (Map M-10, Appendix 1). Compliance with relevant laws, regulations, and implementing appropriate reclamation and mitigation measures (see Appendices D and N3 of BLM 2003b) would reduce the potential adverse impacts of salable mineral development on other resources. Overall, this alternative would have fewer constraints on salable mineral exploration and development than Alternative B or No Action Alternative, respectively, but more constraints than Alternatives E, D, or A, respectively.

Abandoned Mine Land Reclamation

Under this alternative, no known abandoned mine sites fall within a Category C unit. For this reason, abandoned mine land reclamation activities could occur using a variety of methods, including the use of heavy equipment, without additional constraints on reclamation activities. Public health and safety would be improved following reclamation.

OHV, Travel, and Livestock Grazing Management Impacts

Under this alternative OHV and travel management direction would not directly impact access to mining sites. The BLM could authorize miners to travel off-road in OHV Limited or Closed areas or travel on closed routes to access valid mining claims, leases, or authorized mineral pits under OHV Exception #5 similar to the No Action Alternative.

Reductions in livestock grazing under this alternative could lead to less need to fence and keep cattle out of mineral sites compared to the No Action Alternative.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Leasable Minerals

Under Alternative D, approximately 18,580 acres within wilderness characteristics units would remain closed mineral leasing. An additional 165 acres within Category C units would be subject to a NSO leasing stipulation on top of the existing 873,306 acres within wilderness characteristics units already subject to this stipulation (873,471 acres total) (Table 3-3). This constraint could effectively prohibit leasable fluid mineral and energy development within larger units due the inability to occupy the surface above the mineral resource and the higher development costs or technical limitations associated with directional drilling on a similar number of acres as the No Action Alternative. These constraints would collectively restrict or impact leasable mineral development opportunities on about 892,051 acres within wilderness characteristics units over the long-term. An additional 712,981 acres within wilderness characteristics units would be open with no constraints, or subject to stipulations to minimize potential effects to other resource values (Maps M-6, Appendix 1). Areas with additional stipulations would also be subject to increased exploration and development costs which could negatively affect the potential availability of leasable energy minerals on a similar number of acres as the Alternative A. Overall, this alternative would provide about the same amount of land available for leasable mineral exploration and development opportunities as Alternative A.

Salable Minerals

Under Alternative D, approximately 165 additional acres of Federal mineral estate within Category C units would be closed to salable mineral development on top of the existing 622,695 acres within wilderness characteristics units that are already subject to this restriction (622,860 acres total) (Table 3-3). About 982,171 acres of Federal mineral estate within wilderness characteristics units would remain open to salable mineral disposal with no constraints or subject to constraints to protect other resource values (Map M-11, Appendix 1). Compliance with relevant laws, regulations, and implementing appropriate reclamation and mitigation measures (see Appendices D and N3 of BLM 2003b) would reduce the potential adverse impacts of salable mineral development on other resources. Overall, this alternative would have fewer constraints on salable mineral exploration and development than Alternative B, No Action Alternative, or Alternatives C or E, respectively. The effects of this alternative on salable mineral exploration and development opportunities would be similar to Alternative A.

Abandoned Mine Land Reclamation

Under this alternative, the effects of wilderness characteristics management on abandoned mine reclamation activities at the Coyote Hills site would be similar to Alternative C.

OHV, Travel, and Livestock Grazing Management Impacts

Under this alternative OHV and travel management direction would not directly impact access to mining sites in Category A or B units. The BLM could authorize miners to travel off-road in OHV Limited or Closed areas or travel on closed routes to access valid mining claims, leases, or authorized mineral pits under OHV Exception #5 similar to the No Action Alternative.

The effects of livestock grazing management on mineral development opportunities under this alternative would be similar to the No Action Alternative.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Leasable Minerals

Under Alternative E, approximately 18,580 acres within wilderness characteristics units would remain closed mineral leasing. An additional 28,051 acres within Category C units would be subject to a NSO leasing stipulation on top of the existing 873,306 acres within wilderness characteristics units already subject to this stipulation (901,357 acres total) (Table 3-3). This could effectively prohibit leasable fluid mineral and energy development within larger units due the inability to occupy the surface above the mineral resource and the higher development costs or technical limitations associated with directional drilling. These constraints would collectively restrict or impact leasable mineral development opportunities on about 920,207 acres within wilderness characteristics units over the long-term. An additional 685,104 acres within wilderness characteristics units would be open with no constraints, or subject to stipulations to minimize potential effects to other resource values (Maps M-7, Appendix 1). Areas with additional stipulations would also be subject to increased exploration and development costs which could negatively affect the potential availability of leasable energy and minerals compared to

Alternative A. Overall, this alternative would have fewer constraints on leasable mineral and energy exploration and development opportunities than Alternative B, No Action, and Alternative C, respectively, but more constraints than Alternatives D or A.

Salable Minerals

Under Alternative E, approximately 130,158 additional acres of Federal mineral estate within Category C units would be closed to salable mineral development on top of the existing 622,695 acres within wilderness characteristics units that are already subject to this restriction (879,573 acres total) (Table 3-3). About 852,178 acres of Federal mineral estate within wilderness characteristics units would be open to salable mineral disposal with no constraints or subject to constraints to protect other resource values. (Map M-12, Appendix 1). Compliance with relevant laws, regulations, and implementing appropriate reclamation and mitigation measures (see Appendices D and N3 of BLM 2003b) would reduce the potential adverse impacts of salable mineral development on other resources. Overall, this alternative would have fewer constraints on salable mineral exploration and development than Alternative B, No Action Alternative, and Alternative C, respectively, but more constraints than Alternatives D or A.

Abandoned Mine Land Reclamation

Under this alternative, the effects of wilderness characteristics management on abandoned mine reclamation activities at the Coyote Hills site would be similar to Alternative C.

OHV, Travel, and Livestock Grazing Management Impacts

Under this alternative OHV and travel management direction would not directly impact access to mining sites in Category A or B units. The BLM could authorize miners to travel off-road in OHV Limited or Closed areas or travel on closed routes to access valid mining claims, leases, or authorized mineral pits under OHV Exception #5, similar to the No Action Alternative.

The effects of livestock grazing management on mineral development opportunities under this alternative would be similar to the No Action Alternative.

Cumulative Impacts Common to All Alternatives

Locatable Minerals

Locatable mineral exploration and development represents a reasonably foreseeable future action that could occur anywhere within the planning area that is open to locatable mineral development and where a locatable mineral resource exists (Tables 3-1 and 3-9) under all alternatives (see Appendix 3). For this reason, the potential impacts to locatable mineral development opportunities would be similar across all alternatives. The BLM estimates about 1-3 new notices could occur annually for sunstone exploration in the sunstone area representing an estimated 60-100 additional acres total (BLM 2018k, p. 1-2) over the long-term. Based on low mineral potential for gold, the BLM currently anticipates only 1-2 additional notices for gold exploration (approximately 5 acres) over the long-term. The BLM recently approved a POO amendment to expand perlite mining operations at Tucker Hill by an additional 262 acres, but this expansion has not yet occurred on the ground (BLM 2020a). In addition, the BLM estimates that

approximately 50-150 additional acres of locatable mining could occur as a result of the approval of future mining notices or POOs over the long-term (Table 3-9).

Table 3-9. Potential Impacts to Locatable and Salable Mining Opportunities

	Common to All Alternatives (Past or On-Going Actions)	No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Locatable Minerals	About 520 acres of on-going mining and 75 acres of reclamation activities.	262 additional acres associated with Perlite POO Amendment (BLM 2020a) 50-150 additional acres total associated with 1-3 Sunstone POOs/year (BLM 2018k). 60-100 additional acres total associated with 1-3 notices per/year (BLM 2018k).	Same as the No Action Alternative.	Same as the No Action Alternative.	Same as the No Action Alternative.	Same as the No Action Alternative.	Same as the No Action Alternative.
Salable Minerals	24 existing mineral pits (1,037 acres) 25 existing mineral material site ROWs (2,964 acres)	5 new pits (137 additional acres) (BLM 2023a)	7 new pits (158 additional acres) (BLM 2023a)	5 new pits (137 additional acres) (BLM 2023a)	6 new pits (154 additional acres) (BLM 2023a)	7 new pits (158 additional acres) (BLM 2023a)	7 new pits (158 additional acres) (BLM 2023a)
TOTAL	4,521 acres	509-649 additional acres	530-670 additional acres	530-649 additional acres	526-666 additional acres	530-670 additional acres	530-670 additional acres

Other Reasonably Foreseeable Future Actions

With the exception of salable mineral development, discussed in the following section, none of the other reasonably foreseeable future actions listed in Table 3-1 would have any potential additive, incremental cumulative effects on mineral development opportunities over the long-term.

Cumulative Impacts of No Action Alternative and Alternative B

Salable Minerals

The BLM recently analyzed a proposal to open up to 7 new salable mineral material pits (BLM 2023a) within the planning area. Two of the proposed new pits are located within wilderness characteristics units. The wilderness character management constraints under the No Action Alternative and Alternative B would preclude the development and utilization of salable mineral materials from these two reasonably foreseeable future mineral material sites. As a result, new salable mineral development could only occur on the five material sites encompassing an estimated 137 additional acres outside of wilderness characteristic units (Table 3-9) under these two alternatives. BLM estimates that the development of

these five sites would meet most, but not all of the BLM, other agency, and public needs for salable mineral materials across the planning area over the long-term (BLM 2023a).

Cumulative Impacts of Alternatives A, D, and E

Salable Minerals

Under these alternatives, there would be no wilderness characteristics management constraints on salable mineral materials within the two proposed pits within wilderness characteristics units. Therefore, salable minerals would be available from all seven reasonably foreseeable mineral material sites. As a result, new salable mineral development could occur on up to an estimated 158 additional acres (Table 3-9) and would meet all of the anticipated BLM, other agency, and public needs for salable mineral materials across the planning area over the long-term (BLM 2023a).

Cumulative Impacts of Alternative C

Salable Minerals

Under Alternative C, the wilderness characteristics management constraints on salable mineral development would preclude the utilization of salable mineral materials from one reasonably foreseeable mineral material site occurring within a wilderness characteristics unit. As a result, new salable mineral development could occur on six proposed material sites (covering an estimated 154 additional acres) (Table 3-9) and would meet most, but not all of the BLM, other agency, and public needs for salable mineral materials across the planning area over the long-term (BLM 2023a).

Visual Resources

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect visual resources in the planning area?*

Affected Environment

Visual resources consist of the land, water, vegetation, structures, and other features that collectively make up the scenery of BLM-administered lands. BLM classifies lands according to their relative value from a visual resource management (VRM) point of view. Three factors are typically considered in the designation of VRM classes: the inherent scenic quality of the landscape, the visual sensitivity the public has for the landscape, and the visual distance (whether the landscape can be seen as foreground, middle ground, background, or is seldom seen from a travel route or sensitivity area). Examples of highly scenic areas include Abert Rim, and Deep Creek, Camas Creek, and Twentymile Creek Canyons. Public lands seen from Highway 140 or along a national backcountry byway are examples of lands highly sensitive to landscape modification.

VRM classes have been designated for all BLM-administered lands the planning area during several past planning efforts, which took place between 1982 and 2003. Map VRM-1 (Appendix 1) shows the existing VRM classes and Table 3-3 lists the acreages in each VRM class in the planning area. A description of the four VRM classes and associated management objectives are included in the *Glossary* (Appendix 8). VRM Class I currently consists primarily of WSAs, Lost Forest ISA, the east side of Lake

Abert, and 7 small wilderness characteristics units identified in 2001. VRM Class II currently occur in areas readily visible from highways and main county roads, as well as Twelvemile Creek suitable WSR. Large portions of VRM Class III lands are also visible from highways and main county roads. Approximately two-thirds of the planning area falls within VRM Class IV. These areas tend to be more remote, being located further away and less visible from main access roads.

Environmental Effects

Analysis Assumptions

- The visual contrast rating process would be used for project assessment tool during future environmental review. Contrast ratings would be required for proposed projects in highly sensitive areas or high impact projects but could also be used for other projects where it would be an effective visual impact assessment tool. A brief narrative visual assessment would be completed for all other projects which require an environmental assessment or environmental impact statement. Though the contrast rating system is not the only means of resolving future potential impacts, it would provide a systematic means for evaluating proposed projects to determine if they conform with approved VRM objectives (see *Glossary* in Appendix 8). It would also provide a means to identify potential mitigation measures (see Appendix 7) to minimize adverse visual impacts (BLM 1984c, page 5).

Impacts Common to All Alternatives

Managing all existing WSAs (484,953 acres) and portions of several wilderness characteristics units (7,938 acres) to meet VRM Class I objectives (Table 3-3) would allow for natural ecological changes and limited management activity within approximately these portions of the planning area under all alternatives. Very low levels of visual change would be allowed during future project level planning/activities, so long as they do not attract attention, as determined through the visual contrast rating system. Managing to meet VRM Class I Objectives would continue to preserve the existing visual character of the landscape in these areas under all alternatives over the long-term.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

This alternative would continue to manage scenic values by assessing impacts of future project/planning decisions through the visual contrast rating system, and where appropriate, mitigating potential adverse effects of future management activities (see Appendix 7) to adhere to appropriate VRM class objectives. Within wilderness characteristics units approximately 7,938, 117,055, 184,332, and 1,344,778 acres would continue to be managed for VRM Class I, II, III, and IV objectives, respectively (Table 3-3 and Table A2-3 of Appendix 2; Map VRM-1, Appendix 1). The 2010 Settlement Agreement would prevent many ground-disturbing activities that could potentially impact scenic/visual quality. Collectively, this management would reduce potential visual impacts and maintain scenic character within most wilderness characteristics units over the long-term.

OHV and Livestock Grazing Management Impacts

Continuing current livestock and OHV management under this alternative would result in little or no change to existing scenic quality or ability to meet VRM class objectives across the planning area, including within wilderness characteristics units.

Impacts of Alternative A

Wilderness Characteristics Management Impacts

Approximately 117,055 acres (within wilderness characteristics units) would continue to be managed to meet VRM Class II objectives under this alternative. Low levels of visual change would be allowed during future project level planning/activities, so long as they do not attract attention of the casual observer, as determined through the visual contrast rating system. Managing to meet VRM Class II Objectives would continue to preserve most of the existing scenic/visual character of the landscape in these areas. However, most of the wilderness characteristics units fall within VRM Classes III or IV (Table 3-3 and Table A2-3 of Appendix 2; Map VRM-1, Appendix 1). Continuing to manage to meet these VRM Class objectives would not prevent potential negative effects of future management actions on scenic/visual quality within most wilderness characteristics units. Though BMPs (see Appendix 7) could be applied to future management actions to reduce/mitigate potential visual resource impacts, scenic/visual quality could be negatively impacted within some wilderness characteristics units over the long-term when compared to the No Action Alternative.

OHV and Livestock Grazing Management Impacts

Continuing current livestock and OHV management under this alternative would result in little or no changes to existing visual resources or scenic quality across the planning area over the long-term in a similar fashion as the No Action Alternative.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Under Alternative B, approximately 280,748 acres of new Section 202 WSAs would be managed as VRM Class I (Table 3-3 and Map VRM-2, Appendix 1). This is a higher level of protection to visual resources than provided under the No Action Alternative. Compared to Alternative A, Alternative B would increase the protection of visual resources by shifting about 242,619 acres from VRM Class IV to VRM Class I, about 21,783 acres from VRM Class III to VRM Class I, and about 8,732 acres from VRM Class II to VRM Class I. The BLM would assess potential impacts of future projects/management actions using the visual contrast rating system, and where appropriate, mitigate potential adverse effects (see Appendix 7) to adhere to VRM Class I Objectives.

Also under Alternative B, Category C units would be managed as VRM Class II (except where they are VRM Class I under the existing land use plan; 7,938 acres in two units) (Table 3-3 and Map VRM-2, Appendix 1). This is a similar level of protection to visual resources as the No Action Alternative. Compared to Alternative A, Alternative B would increase the protection of visual resources by shifting about 1,103,318 acres from VRM Class IV to VRM Class II and about 163,046 acres from VRM Class III to VRM Class II.

VRM Class II would allow levels of visual change in these areas, but would not attract the attention of the casual observer. Any changes would repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. The BLM would assess potential impacts of future projects/management actions using the visual contrast rating system, and where appropriate, mitigate potential adverse effects (see Appendix 7) to adhere to VRM Class II Objectives. As a result, the existing visual character/scenic quality of the landscape within all new Section 202 WSA and Category C units would be maintained or protected over the long-term. Overall, Alternative B would protect scenic/visual quality across a much larger portion of the planning area compared to all of the other alternatives.

OHV and Livestock Grazing Management Impacts

Reducing livestock grazing and associated facilities and closing large portions of the planning area to motorized vehicle use under this alternative would reduce ground disturbances associated with these activities in Category C units and WSAs (up to 2.1 million acres). These actions could potentially help maintain or improve existing visual character/scenic quality across large portions of the planning area.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Under Alternative C, there would be an increase (about 355,055 acres; 21.6%) in areas managed for VRM Class II Objectives, all within Category C units (Table 3-3). In addition, within Category B units there would be a substantial increase (about 910,791 acres; 55.3%) in area managed for VRM Class III objectives (that were formerly managed as Class IV), along with about 66,776 acres continuing to be managed as VRM Class II. The BLM would assess potential impacts of future projects/management actions in these areas using the visual contrast rating system, and where appropriate, mitigate potential adverse effects (see Appendix 7) to adhere to VRM Class II or III Objectives. As a result, the existing visual/scenic character of the landscape within all Category C units and a portion of Category B units would be retained or protected over the long-term. Approximately 79,931 acres in Category A units would remain in VRM Class IV. Compared to the No Action Alternative and Alternative A, this alternative would maintain or protect the scenic/visual quality on more area over the long-term.

OHV and Livestock Grazing Management Impacts

Limiting public motorized vehicle use throughout the planning area to existing routes and reducing livestock grazing under this alternative would reduce ground disturbances associated with these activities within portions of the planning area. These actions would maintain or improve existing scenic quality across portions of the planning area to a higher degree than either the No Action Alternative or Alternative A, but to a lesser degree than Alternative B.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Under Alternative D, there would be a slight increase (about 4,671 acres; 0.3%) in areas managed for VRM Class II objectives within Category C units (Table 3-3). Within Category B units there would be a

substantial (52.4%) increase (about 861,934 acres) in areas managed for VRM Class III objectives, along with about 28,584 acres continuing to be managed as VRM Class II. The BLM would assess potential impacts of future projects/management actions using the visual contrast rating system, and where appropriate, mitigate potential adverse effects (see Appendix 7) to adhere to VRM Class II or III Objectives. As a result, the existing visual/scenic character of the landscape within the two Category C units and portions of several Category B units would be retained or protected over the long-term. Compared to the No Action Alternative and Alternative A, this alternative would maintain or protect the scenic/visual quality slightly more area over the long-term.

OHV and Livestock Grazing Management Impacts

The effects of livestock grazing and OHV management on visual/scenic quality under this alternative would be the same as the No Action Alternative and Alternative A.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Under Alternative E, there would be an increase (18.9%) in the area (about 310,369 acres) managed for VRM Class II Objectives, all within Category C units (Table 3-3). In addition, within Category B units there would be an increase (about 885,552 acres) in areas managed for VRM Class III objectives, along with about 50,992 acres continuing to be managed as VRM Class II. The BLM would assess potential impacts of future projects/management actions using the visual contrast rating system, and where appropriate, mitigate potential adverse effects (see Appendix 7) to adhere to VRM Class II or III Objectives. As a result, the existing visual/scenic character of the landscape within Category C units and portions of some Category B units would be retained or protected over the long-term. Compared to the No Action Alternative and Alternative A, this alternative would maintain or protect the scenic/visual quality on more area over the long-term.

OHV and Livestock Grazing Management Impacts

The effects of livestock grazing and OHV management on visual resources/scenic quality under this alternative would be the same as the No Action Alternative and Alternative A.

Cumulative Impacts Common to All Alternatives

Wilderness characteristics management would prevent or reduce potential direct impacts to visual resources specifically within wilderness characteristics units (No Action Alternative) or Category C units (Alternatives B-E), as described as direct effects in the preceding *Environmental Effects* section. However, many of the RFAs listed in Table 3-1 (*e.g.* vegetation management, ROWs, mining, facilities, etc.) could still occur on other BLM-administered lands within the planning area. These actions could have additive, incremental effects on the overall visual/scenic quality of the planning area and could include both temporary and long-term visual effects. Designing future proposals to meet the appropriate VRM class objectives (see Appendix 7) would reduce or mitigate some of these potential negative visual effects over the long-term.

Vegetation

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect the ecological health or condition of sagebrush steppe, forest and woodland, and riparian and wetland vegetation communities and BLM's ability to effectively manage these communities in the planning area?*

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect BLM's ability to make special forest products in the planning area available to the public?*

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect BLM's ability to effectively manage and treat non-native invasive plants in the planning area?*

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect special status plants and their habitat in the planning area?*

General Overview

Approximately 91% of the planning area supports shrub-dominated plant communities (sagebrush steppe). Another 7% is tree-dominated forest or woodlands, while less than 2% is water influenced riparian and wetland vegetation (Map V-1 shows the general plant communities within the planning area, based on DATAGAP 1 satellite imagery classification by the Oregon Natural Heritage Program (Kagan and Caicco 1996). Pursuant to 40 CFR § 1502.21, the BLM hereby incorporates the existing plant communities discussion by reference in its entirety from the *Proposed Lakeview RMP/Final EIS* (BLM 2003a, pages 2-2 to 2-18). Table 3-10 contains a summary of the plant communities found in the planning area. Additional descriptive information for each plant community is located in Appendix 6.

The BLM has also collected Ecological Site Inventory (ESI) data for the planning area (available at the Lakeview District Office). The top 15 dominant upland vegetation types from the ESI are shown in Table 3-11. The ESI process and a complete listing of the dominant vegetation associations in the planning area are described in more detail in Appendix 6.

Affected Environment – Sagebrush Steppe Vegetation Communities

Sagebrush steppe plant communities dominate the planning area (approximately 91%; Table 3-10). Various big sagebrush communities comprise the dominant sagebrush type (Table 3-11; Map V-1, Appendix 1). Additional information on sagebrush communities in the planning area is provided in Appendix 6.

In sagebrush steppe ecosystems, periodic pre-settlement fires killed most western juniper saplings before dense stands could develop. Two historic factors have influenced the present distribution of western juniper: post-settlement grazing (which reduced fine fuels capable of carrying fire across the landscape) and fire suppression activities have allowed western juniper to encroach into sagebrush steppe sites. In addition to western juniper expansion into neighboring vegetation communities, there has also been a

Table 3-10. Existing General Upland Vegetation Communities

Plant Community	Acres	Description
Big sagebrush shrub/grassland	1,733,690	Most common vegetative cover in southeastern Oregon; can occur with other shrubs and various grasses and forbs. Forms a mosaic with other plant communities.
Low and black sagebrush shrub/grassland	415,022	Common throughout eastern Oregon, generally on shallow soils. Usually has sparse shrub, grass, and forb cover that is usually insufficient to carry fire. Often in a mosaic with big sagebrush types.
Salt desert scrub/grassland	262,197	Common in alkaline playa or dry lake basins of Great Basin. Prominent around Lake Abert, Summer, Alkali, and Warner Lakes. Consists of salt-tolerant shrubs, grasses with few forbs.
Modified grassland	250,773	Extensive grasslands and shrub grasslands of southeastern Oregon that have been planted with crested wheatgrass, typically after a wildfire; some of these areas are dominated by invasive annual grasses, primarily cheatgrass.
Lava flow, sand dune, playa, bare ground	130,283	Expanses of barren lava fields, unvegetated dry lakebed playa, bare ground, rock outcrops, and Aeolian sands with occasional isolated patches of big and low sagebrush.
Miscellaneous shrub/grassland	70,820	Usually consist of mountain mahogany, bitterbrush, and snowberry communities with a bunchgrass understory; often on steep slopes or in association with western juniper.
Silver sagebrush shrub/grassland	28,767	Usually found in moist playas or on semi-alkaline flats and valley bottom lands.
Mountain big sagebrush/grassland	8,117	Occur at higher elevations on plateaus and rocky flats. Shrubs tend to be denser, grasses and forbs abundant.
Western juniper woodland	215,930	Sagebrush steppe with western juniper as primary over-story tree species; understory vegetation often includes native sagebrush species, bunchgrasses, and forbs. Includes western juniper old-growth stands.
Ponderosa pine forest	30,364	Widespread forest type in eastern Oregon; usually found in the foothills margin bordering the mixed conifer forest on adjacent national forests; widely spaced pines dominate over-story with diverse shrub and forb under-story.
Quaking aspen	2,053	Widely scattered throughout the coniferous forest and sagebrush grasslands of eastern Oregon. Typically, in isolated pockets with denser grasses and forbs.
Mixed conifer forest	1,345	A close-canopied, upper montane forest type that includes several plant communities dominated by pine and fir species and a variety of understory shrubs, grasses, and forbs.

Source: Oregon GAP GIS data (Kagan and Caicco 1996).

Table 3-11. Existing Dominant Shrub and Grassland Communities

Dominant Vegetation	Acres
Low sagebrush/black sagebrush/bluegrasses/prairie junegrass	352,162
Wyoming big sagebrush/perennial grasses	329,916
Big sagebrush/perennial grasses	264,281
Basin big sagebrush/perennial grasses	220,892
Low sagebrush/black sagebrush/perennial grasses	209,870
Western juniper/sagebrush/perennial grasses	160,350
Greasewood/perennial grasses	140,255
Rabbitbrush/perennial grasses	119,045
Mountain big sagebrush/perennial grasses	108,404
Big sagebrush/bluegrasses	94,757
Wyoming big sagebrush/bluegrasses	77,240
Crested wheatgrass	62,127
Wyoming big sagebrush/cheatgrass	57,341
Wyoming big sagebrush	51,943
Rabbitbrush/cheatgrass/medusahead	42,277

Source: ESI Vegetation data.

substantial amount of infill and increased density of juniper trees across the planning area, as indicated by observing stand dynamics and research (Miller *et al.* 2008). This infill of post-settlement juniper could

pose a risk of subjecting these sites to higher intensity, stand-replacing fires under specific climatic conditions.

Miller *et al.* (2007) developed guidelines for land managers to use to assess juniper dynamics and differentiate between pre- and post-settlement trees during vegetation management activities. Miller *et al*. (2005) classifies areas with juniper into three phases (I, II, or III) based on the level of juniper encroachment/dominance. Phase I consists of areas dominated by sagebrush and other shrubs (sagebrush steppe) with scattered young juniper trees interspersed. Phase II consists of areas with higher densities of larger juniper trees, with an intact shrub/grass understory. Junipers and shrubs are co-dominant and influence ecological processes equally. Phase III consists of areas dominated by high densities of older juniper trees where the understory has been lost, leaving bare ground beneath the trees.

Since 1984, an estimated 82,860 acres of mechanical juniper or shrub treatments have occurred in sagebrush steppe habitats in the planning area to restore sagebrush steppe communities and wildlife habitat. Pile or broadcast burning has been used as a follow up treatment in some of these areas to reduce fuel loading.

Fire Ecology

Fire occurs at various intervals (fire return intervals) in different vegetation types. Intervals between fires are longer in warm, dry sites (where the presence of only a small amount of fuel limits fire spread) and cool, wet sites (where burning conditions are limited despite the large amount of fuel). The shortest fire return intervals occur where there is an optimal combination of flammable fuel and ignition source.

Factors that determine fire regimes include the long-term frequency, intensity, and extent of fire events, which are all largely dependent on climate and weather patterns. Alterations in natural fire regimes have greatly influenced the distribution, composition, and structure of rangeland and forest vegetation.

Changes resulting from decreased fire frequency in the planning area have included:

- Encroachment of conifers, including ponderosa pine, white fir, and western juniper into sagebrush steppe vegetation at forest-fringe boundaries.
- Increased tree density in former savannah-like stands of western juniper and ponderosa pine.
- Increased density or coverage of big sagebrush and other shrubs, with an accompanying loss of herbaceous understory vegetation.

Studies performed on fuels similar to those in the planning area have estimated fire return intervals for various vegetation communities (Table 3-12). The range of western juniper continues to expand into sagebrush steppe and other vegetation communities. The mountain big sagebrush fire regime (where western juniper is actively encroaching) typically burned every 12 to 25 years. Young western juniper possesses thin bark and are highly susceptible to mortality from fire. Western juniper typically does not re-sprout after fire. Re-establishment is through seed dispersal by water and animal transport. Juniper stands with an intact grass and shrub understory (phase II) have sufficient fuel loading to allow fire to carry through the area. As juniper trees mature and dominate a site, they out compete shrubs and grasses (phase III), leaving little understory capable of carrying fire.

Table 3-12. Existing Fire Return Intervals for Native Vegetation Communities

Vegetation	Fire Return Interval Range in Years	Scientific Citation
Wyoming Big/perennial grass	30–100, 35–100	Crawford *et al*. 2004, Brown and Smith 2000
Low sagebrush	>150, 100–200	Miller and Rose 1999, Crawford *et al.* 2004
Mountain Big/ perennial grass	15–25	Crawford *et al.* 2004
Mountain Big/western Juniper	12–15, 12–25, 12–15	Miller and Rose 1999, Miller and Tuasch 2001, Crawford *et al.* 2004
Ponderosa pine	15–25	Taylor and Skinner 1998
Mixed conifer	5–25	Beaty and Taylor 2001

Recovery times following fire in sagebrush types greatly depend on seed availability and moisture following disturbance. Sagebrush fire return intervals are highly variable based on current literature (Table 3-12). Since sagebrush plants are typically consumed during fire events, there are no fire scars that can be examined (as there are in forest types) to determine historical fire regimes. However, site productivity affects the fire behavior and frequency in these sagebrush stands. Sites with higher productivity (more grass and forb understory) have higher fuel loading and carry fire easier and more frequently than sites with lower productivity. Generally, silver and low sagebrush vegetation types are located on less productive sites compared to mountain, basin, or Wyoming big sagebrush.

Sagebrush Steppe Vegetation Conditions and Trends

Ecological conditions of the sagebrush steppe plant communities in the planning area have been examined at multiple scales over the years (Map V-2, Appendix 1). The Interior Columbia Basin Ecosystem Management Project (ICBEMP) assessed rangeland integrity at the broad subbasin scale in the mid-1990s. A summary of the ICBEMP findings and assessment is located in Appendix A of BLM 2001a. Pursuant to 40 CFR § 1502.21, the BLM hereby incorporates the ICBEMP assessment by reference in its entirety. The ICBEMP assessment found rangelands in the primary subbasins in the planning area (Summer Lake, Lake Abert, Warner Lakes, and Guano) were significantly altered by grazing and fire exclusion. Measures of rangeland integrity used in the assessment included grazing influences on vegetation patterns and composition, disruptions to hydrologic regimes, expansion of exotic species, changes in fire severity and frequency, increases in bare soil, and expansion of western juniper into grass and shrublands. Ecological integrity was defined as the degree to which all ecological components and their interactions are represented and functioning, as measured by proxies. Summer Lake and Lake Abert subbasins were rated as having low rangeland ecological integrity, while the Warner Lakes and Guano subbasins rated as having moderate rangeland ecological integrity (FS and BLM 1996c).

The ESI assigned an ecological status rating to an area based on a comparison of how closely the existing vegetation community matched the climax community (based on ecological site descriptions). Table 3-13 shows a summary of the ecological status of BLM-administered lands in the planning area based on ESI data.

The ecological condition of the sagebrush-steppe vegetation in the planning area has more recently been delineated using data gathered by Open Range Consulting (ORC 2017; Map V-2, Appendix 1). Condition is based on the State and Transition threat models (Sage-SHARE 2016). Although initially developed to assess the potential suitability as Greater Sage-Grouse habitat, the ecostates represent the general ecological condition of an area at a large spatial scale, indicating whether the area is healthy with properly functioning ecological processes or if conditions are degraded. A drawback to the models used,

Table 3-13. Existing Ecological Status of Upland Vegetation Communities

Ecological Status[1]	Acres	Percent of Planning Area
Early Seral	476,997	15
Mid Seral	1,410,730	45
Late Seral	897,518	28
Potential Natural Community	79,805	2
Seedings (Crested Wheatgrass)	118,774	4
Unknown	179,458	6
TOTAL	**3,162,279**	**100**

Source: Lakeview ESI data.

[1] Early Seral - areas where 0%-25% of the current vegetation matches the climax vegetation.
Mid Seral - areas where 26%-50% of the current vegetation matches the climax vegetation.
Late Seral - areas where 51%-75% of the current vegetation matches the climax vegetation.
Potential Natural Community (PNC) - areas where 76%-100% of the current vegetation matches the climax vegetation.

is that there are plant communities and topographic areas that do not fit nicely into this method of condition assessment. These areas are in the non-habitat (for Greater Sage-Grouse) category and are not necessarily in poor ecological condition based on their site potential. These areas include open water, salt desert scrub, playas, and mixed conifer/ponderosa pine/mountain mahogany forest (Table 3-14).

Table 3-14. Existing Ecostate of Sagebrush-Steppe Vegetation Communities

Ecostate	Description	Percent of Planning Area	Estimated Accuracy
A	Sagebrush with a predominately perennial herbaceous understory	40	100
A-C	Sagebrush with no understory[1]	17	
B	Herbaceous perennial dominated (may be native or seeded in crested wheat)	7	100
C	Sagebrush with a predominately annual herbaceous understory	17	77
D	Invasive annual grass dominated	6	75
Juniper/Dual C	Juniper dominated with a sagebrush and/or perennial understory	5	80
Dual D	Juniper with annual understory	<1	80
Dual Threat E	Juniper skeletons with annual grasses	<1	80
Closed Canopy (like Juniper E)	Closed canopy juniper; likely old growth; may have no understory	<1	90
Burn Scar 2016 and 2017	Recent wildfire areas	<1	
Non-Habitat	Water, rock, ponderosa pine forest, greasewood, steep slopes etc.	8	

Source: ORC data (2017).

Environmental Effects – Sagebrush Steppe Vegetation Communities

Analysis Assumptions

- Based on past trends observed in existing OHV open areas within the Lakeview planning area, the BLM assumes for analytical purposes that up to 20% of any open OHV area designations within sagebrush steppe communities could result in high, concentrated motorized vehicle use resulting in loss of vegetation and bare ground over the long-term.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Under this alternative, most passive and active vegetation management methods (*e.g.* cutting, burning, spraying, seeding, and planting) could continue to be carried out in wilderness characteristics units provided the BLM deems it would not diminish the size or cause the entire inventory unit to no longer meet the criteria for wilderness characteristics. These types of treatments would generally result in a mosaic of desirable shrubs, forbs, and grasses of diverse age classes across portions of the planning area (BLM 2003a, pages 4-9 to 4-14), including treated areas within wilderness characteristics units over the long-term.

Sagebrush steppe vegetation communities within wilderness characteristics units that are in good ecological condition (29%) would maintain that condition over the long-term in the absence of a major disturbance (Table 3-15).

Table 3-15. Existing Ecological Condition of Vegetation in Wilderness Characteristics Units

Alternative	Ecological Condition (Percent of units)		
	Good	Fair	Poor
No Action/A (106 units)	29	66	5
B (Category C units)	29	66	5
C (Category C units)	44	48	7
D (Category C units)	89	11	0
E (Category C units)	69	27	4

Source: LWC Matrix Ecological Score using Open Range Consulting Data.

Including mitigation measures in the treatment design that would reduce the potential negative effects to naturalness or opportunities for solitude (*e.g.* vegetative screening) to a level that the BLM deems wouldnot cause the entire inventory unit to no longer meet the criteria for wilderness characteristics could reduce the number of acres that could feasibly be treated/restored or could reduce the effectiveness of the treatment measures utilized within a given treatment area. As a result, the BLM would not be able to fully implement needed restoration treatment actions within some wilderness characteristics units resulting in ecologically degraded areas (poor and fair condition classes) within some wilderness characteristics units continuing in a static or downward trend. The increased risk of large-scale disturbances such as a wildfire or weed expansion could also change existing ecological conditions within wilderness characteristics units. As a result, sagebrush steppe vegetation and ecological conditions would not be maintained or restored to desired future conditions or ecological state within some wilderness characteristics units that are currently in a degraded condition over the analysis timeframe.

Though new fuel breaks within wilderness characteristics units would be precluded under this alternative if the BLM deemed they would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics, continuing to maintain existing fuel breaks could occur and would have both positive and negative effects on sagebrush steppe communities within and adjacent to many wilderness characteristics units. Mowing or cutting vegetation would negatively impact sagebrush within a narrow swath immediately adjacent to existing routes. However, these fuel breaks would continue to be used to actively manage and control wildfires. The negative effects of the loss of sagebrush on about 5,350 acres of existing fuel breaks would be offset by reducing the potential for large, catastrophic wildfires that result in the loss of much larger areas of sagebrush steppe communities over the long-term.

OHV and Travel Management Impacts

Existing OHV management under this alternative (Map OHV-1, Appendix 1) would continue to subject about 30,000 acres within the planning area to concentrated cross-country motorized vehicle use and associated vegetation trampling impacts. The potential for increased demand for OHV opportunities and new access routes could increase vegetation trampling impacts on up to an estimated 93,320 acres within Open OHV area designations over the long-term.

The area of highest impact to vegetation communities from motorized vehicle use would continue to occur within the confines of the surface of BLM's existing route network. Vehicle use on open routes would continue to reduce or eliminate vegetative cover on approximately 8,024 acres in the planning area. New roads could potentially remove existing vegetation from an additional estimated 22-26 acres over the long-term.

However, continuing current OHV allocations and travel management direction under this alternative could negatively impact BLM's ability to access and implement vegetation restoration treatments and monitor vegetation conditions within wilderness characteristics units over the long-term. Though all interior routes would remain open to both BLM and public vehicle use and the BLM would retain legal administrative access, the BLM would be prohibited from conducting mechanical road maintenance by Provisions 18 and 19 of the Settlement Agreement. In the short-term, the BLM would still be able to access most of the planning area to monitor vegetation conditions and implement vegetation maintenance and habitat restoration projects. However, over time some interior routes could become impassable due to lack of maintenance. When this happens, the interior of a unit(s) could become inaccessible and most ground-based active vegetation management methods would no longer be feasible.

Livestock Grazing Management Impacts

Up to 8.1% of the planning area would continue to be ungrazed for various reasons (see Tables 3-35 and A5-3, Appendix 5). Vegetation communities in these areas would not be subject to livestock impacts. Livestock use would continue to have negative impacts on some vegetation communities due to heavy grazing and trampling of vegetative cover and soil compaction in high concentration areas around water sources and trails along fences on about 42,000 acres within the planning area. Impacts of livestock grazing on vegetation communities described in this section are based on the general vegetation communities from the Oregon GAP dataset (Kagan and Caicco 1996; Table 3-10 and Appendix 6).

Big Sagebrush Shrub/Grassland

This is the largest vegetation community in the planning area. Approximately 1,497,680 of these acres are grazed within allotments with a defined grazing system (Table 3-16). The majority (51%) of this Vegetation community is grazed under a rest/rotation grazing system. This grazing system would significantly improve the composition of the key perennial herbaceous species. Approximately 363,857 acres (21%) of this vegetation community, are grazed under the deferred rotation grazing system where composition of key perennial herbaceous and palatable woody species would be maintained. On the 275,365 acres (16%) grazed in the spring/summer and 7,276 acres grazed season long, the composition of perennial species would be maintained or decrease. Additionally, in areas of continuous use under the spring/summer and season-long systems, available forage would decrease over time. Winter and spring grazing systems occur on 118,758 acres or 7% of this vegetation community, where the composition of the key perennial species would be expected to be maintained or improved.

Approximately 22,951 acres (1%) of this vegetation community are grazed under the deferred grazing system where composition of key perennial herbaceous species would be improved or maintained and composition of palatable woody species (*e.g.* antelope bitterbrush) may decrease. The grazing system on 35,883 acres of this vegetation type are unknown. Approximately 31,056 acres (2%) of this vegetation community are located on scattered public lands within allotments where the grazing system is excluded or not part of an allotment system (unallotted). These acres are generally not grazed by livestock.

Black Sagebrush/Grassland

This is not a common vegetation community and occurs on less than 1% of the acres of the planning area. Approximately, 58% of this vegetation community is grazed under a spring/summer grazing season (Table 3-16) where the composition of perennial species would be maintained or decrease. Additionally, available forage, will decrease over time. Approximately 759 acres (18%) of this vegetation community are grazed under the deferred grazing system where composition of key perennial herbaceous species

Table 3-16. Existing Vegetation Communities Grazed under each Grazing System

Vegetation Community	Winter	Early Spring	Spring/Summer	Deferred	Deferred Rotation	Rest Rotation
Big sagebrush/ grassland	46,861	71,897	275,365	22,951	363,857	870,249
Black sagebrush /grassland	555	0	2,403	0	759	228
Silver sagebrush/ grassland	0	30	4,571	0	4,708	0
Low sagebrush/ grassland	310	362	35,524	344	37,696	302,771
Mountain big sagebrush/grassland	0	0	0	0	0	7,580
Misc. shrub/ grassland	10,071	2,864	0	851	6,902	46,064
Western juniper	1,245	2,184	7,504	181	104,804	92,358
Ponderosa pine	1	3,960	6,430	226	11,065	4,568
Mixed conifer	0	0	0	0	0	885
Quaking aspen	0	0	0	0	286	1,476
Riparian/wetlands	2,813	8	0	0	259	12,766
Salt desert shrub/ grassland	34,713	49,633	44,018	10,809	42,972	39,157
Vegetated lava/sand dunes	2,227	1,090	299	1,853	16,117	8,454
Agriculture	85	164	1,853	0	2,259	4,866
Unvegetated	632	2,008	730	560	2	3,158
Modified grassland	1,713	20,066	7,675	7,857	100,483	103,100
TOTAL	**101,226**	**154,266**	**368,372**	**45,632**	**692,169**	**1,497,680**

Note: Additional grazing systems of unknown, spring-fall, year-long, and season-long are not common in the planning area but are included under the discussions of each vegetation type. Unallotted, excluded, and custodial acres are discussed where appropriate.

would be improved or maintained and composition of palatable woody species (*e.g.* antelope bitterbrush) may decrease.

Livestock graze in the winter on 555 acres (13%) of this vegetation community, where the composition of the key perennial species would be expected to be maintained or improved. Approximately 228 acres are grazed under a rest-rotation grazing system, where the composition of the key perennial herbaceous species would significantly improve. The remainder of acres (6%) within this vegetation community are not grazed.

Silver Sagebrush/Grassland

This is not a common vegetation community and occurs on less than 1% of the acres in the planning area. Approximately 4,708 acres (35%) of this vegetation community, are grazed under the deferred rotation grazing system (Table 3-16) where composition of key perennial herbaceous and palatable woody species would be maintained. Approximately 35% of this vegetation community is grazed under a spring/summer grazing season where the composition of perennial species would be maintained or decrease. Approximately 27% of the acres within the silver sagebrush community type are included in exclosures where the composition of key perennial species would improve. The grazing system on 1,503 acres of this vegetation type are unknown.

Low Sagebrush/Grassland

The majority, 302,771 acres (74%) of this vegetation community, is grazed under a rest/rotation grazing system (Table 3-16). This grazing system would significantly improve the composition of the key perennial herbaceous species. Approximately 9% of this vegetation community, are grazed under the deferred rotation grazing system where composition of key perennial herbaceous species and composition of palatable woody species would be maintained. Approximately 9% of this vegetation community is grazed under a spring/summer grazing season where the composition of perennial species would be maintained or decrease. The grazing system on 6% acres of this vegetation type are unknown or unallotted. Approximately 2% of the acres within the low sagebrush community type are included in exclosures where the composition of key perennial species would improve.

Modified Grassland

These grasslands are primarily crested wheatgrass seeding and comprise about 8% of the lands within the planning area. The largest percentage (49%) of this vegetation community is grazed under winter, early spring, or deferred rotation grazing systems (Table 3-16) where the composition of key perennial herbaceous species would be maintained or improved. The rest-rotation grazing system would significantly improve the composition of the key perennial species on about 103,100 acres (41%) of the modified grassland community. Approximately, 7,675 (3%) of this vegetation community is grazed under a spring/summer grazing season where the composition of perennial species would be maintained or decrease over time. Approximately 5,231 acres (2%) are excluded or unallotted to livestock grazing. The grazing systems on 2,580 acres of this vegetation type are unknown.

Mountain Big Sagebrush/Grassland

This is not a common vegetation community and occurs on less than 1% of the acres in the planning area. The majority (7,580 acres; 93%) of this vegetation community is grazed under a rest/rotation grazing system (Table 3-16). This grazing system would continue to improve the composition of the key perennial herbaceous species. Approximately 6% of acres occur within exclosures and not grazed. The

remainder of acres of this vegetation community (1%) occur in custodial allotments where the grazing system is variable.

Salt Desert Shrub/Grassland

The winter, spring, and deferred rotation grazing systems would maintain or improve the composition of key perennial herbaceous species on about 140,713 acres (60%) of the salt desert shrub/grassland vegetation community. Approximately 44,018 (17%) of this vegetation community is grazed under a spring/summer grazing season (Table 3-16) where the composition of perennial species would be maintained or decrease over time. The rest-rotation grazing system would maintain the composition of the key perennial species on about 39,157 acres (15%) of the salt desert shrub community. Approximately 23,163 acres (9%) are excluded or unallotted to livestock grazing.

Miscellaneous Shrub/Grassland

This vegetation community occurs on approximately 2% of the acres in the planning area. The majority, 7,580 acres (65%) of this vegetation community, is grazed under a rest/rotation grazing system (Table 3-16). This grazing system would significantly improve the composition of the key perennial herbaceous species. The winter, spring, and deferred rotation grazing systems would maintain or improve the composition of key perennial herbaceous species on about 13,786 acres. Approximately 841 acres (1%) of this vegetation community are grazed under the deferred grazing system where composition of key perennial herbaceous species would be improved or maintained and composition of palatable woody species (*e.g.* antelope bitterbrush) could decrease. Approximately 6% of this vegetation community are located on scattered public lands within allotments where the grazing is excluded or not part of an allotment system (unallotted). These acres are generally not grazed by livestock.

Vegetated Lava and Sand Dunes

This vegetation community occurs on approximately 2% of the acres in the planning area. Most of this acreage is composed of small parcels of vegetated lava or sand dunes within a pasture and represents a very small portion of the vegetation within each pasture grazed. Approximately 42,639 acres (58%) of these vegetation communities are located on scattered public lands within allotments where the grazing system is excluded or not part of an allotment system (unallotted). These acres are generally not grazed by livestock. The winter, spring, and deferred rotation grazing systems would maintain or improve the composition of key perennial herbaceous species on about 19,434 acres (26%) of these vegetation communities. Approximately 8,454 acres (11%) of these vegetation communities are grazed under a rest/rotation grazing system (Table 3-16). This grazing system would significantly improve the composition of the key perennial herbaceous species. The grazing system on about 732 acres of this vegetation type are unknown.

Permit Relinquishment and Rangeland Health

Any relinquished permits would typically be acquired by another qualified applicant under this alternative. For this reason, there would likely be no net change in the amount of livestock grazing so future permit relinquishments would likely result in no change in existing negative impacts or benefits to sagebrush steppe vegetation communities from continued livestock grazing.

Continuing to have a full suite of appropriate range management methods and tools available to apply when an area fails to meet Rangeland Health Standards due to livestock grazing, would allow vegetation communities to meet or make significant progress toward meeting standards over time. The BLM has observed many places in the planning area where grazing management changes implemented in the recent past have proven effective in increasing density, diversity, and age classes of deep-rooted perennial grasses and native forbs and shrubs. However, an estimated 42,000 acres of various sagebrush steppe vegetation communities would continue to be negatively impacted by heavy livestock concentration around water developments and trailing along fences (Table 3-17).

Table 3-17. Potential Cumulative Impacts of Reasonably Foreseeable Livestock Facilities

Reasonably Foreseeable Future Actions	Common to All Alternatives (Past or On-Going Actions)	No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Facilities							
Water Developments	40,000 acres subject to concentrated livestock use associated with about 2,000 existing projects.	1,200-2,000 acres additional concentrated livestock use associated with 3-5 new projects/year	Same as No Action Alternative	400-800 additional acres associated with 1-2 new projects/year	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative
Fencing	2,000 acres subject to livestock trailing along 3,300 mi. of existing fence	12.2 ac associated with 10.1 miles in Abert Seeding, South Rabbit Hills, and 8.0 miles in O'Keeffe Individual Allotments (BLM 2019o, 2020h). 7.6 acres associated with 12.5 miles in Key RNAs (BLM 2015a). 24.2-121.2 acres associated with 1-5 miles/year in outyears (subject to trailing).	Same as No Action Alternative	12.2 ac associated with 10.1 miles in Abert Seeding, South Rabbit Hills, and 8.0 miles in O'Keeffe Individual Allotments (BLM 2019o, 2020h). 7.6 acres associated with 12.5 miles in Key RNAs (BLM 2015a). 24.2-48.4 acres associated with 1-2 miles/year in outyears (subject to trailing)	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative
TOTAL	42,000 acres	1,244-2,141 additional acres	1,244-2,141 additional acres	444-868 additional acres	1,244-2,141 additional acres	1,244-2,141 additional acres	1,244-2,141 additional acres

Impacts of Alternative A

Wilderness Characteristics Management Impacts

Under this alternative, vegetation, wildlife habitat, and prescribed fire and fuel treatments within the 106 wilderness characteristics units would not be constrained by having to avoid potential effects to wilderness characteristics. As a result, the BLM would have the greatest ability to treat vegetation to maintain or restore sagebrush steppe communities within wilderness characteristic units throughout the planning area. While a similar number of vegetation treatments would likely occur as described in the No Action Alternative, treatments would be less constrained and effective compared to the No Action Alternative and Alternatives B, C, D, and E, as the full suite of management tools could be utilized, and treatment areas would remain readily accessible over the long-term. Though these management activities would have short-term negative effects on vegetative cover, they would promote healthy, native sagebrush/grass communities within the treated areas over the long-term. In addition, since there would be no constraints or requirements to mitigate potential effects on naturalness or vegetative screening (opportunity for solitude), larger areas could be treated, minimizing threats (invasive annuals, juniper encroachment, and wildfire risk) to adjacent vegetation communities in good or excellent ecological condition (BLM 2003b, pages 23 to 25).

Implementing new and maintaining existing fuel breaks would have both positive and negative effects on sagebrush steppe communities within and adjacent to many wilderness characteristics units. While the effects of maintaining existing fuel breaks would be similar to those described for the No Action Alternative, implementing new fuel breaks would negatively impact additional sagebrush communities immediately adjacent to existing routes. However, the negative effects of this additional loss of sagebrush would be offset by reducing the potential for large, catastrophic wildfires in sagebrush steppe communities/habitats over a larger area compared to the No Action Alternative over the long-term.

Overall, this alternative would result in larger and more effective vegetation, fire, and fuels management treatments that would actively protect, maintain, or restore the most sagebrush-steppe communities compared to all other alternatives.

OHV and Travel Management Impacts

Under this alternative, the potential effects of OHV use and travel management on sagebrush steppe vegetation communities would be similar to those described for the No Action Alternative with one notable exception. Continuing current OHV allocations and travel management direction would result in BLM being able to maintain any existing open route when needed. This would preserve BLM's ability to access and implement vegetation/habitat restoration treatments and monitor vegetation conditions within the entire planning area over the long-term.

Livestock Grazing Management Impacts

Under this alternative, the potential effects of livestock grazing management on sagebrush steppe vegetation communities would be the same as those described for the No Action Alternative.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Under this alternative, the potential for future human-caused ground disturbing activities and associated negative impacts to sagebrush steppe communities would be substantially reduced within all Category C units and new Section 202 WSAs (as well as existing WSAs) because most discretionary ground-disturbing activities (*i.e.* salable and leasable mining, major, wind, and solar ROWs, and public cross-country motorized travel) would be prohibited. This would result in retaining adequate vegetative cover across about 2.1 million acres (66%) of the planning area. Although portions of wilderness characteristics units currently in good ecological condition (Table 3-15) would likely remain in this state for many years due to reduced potential for future ground disturbance, other natural disturbances such as wildfire, drought, or insect outbreaks (*i.e.* Aroga moth) could change ecological conditions over the long-term. For this reason, vegetation treatments could still be desirable within wilderness characteristics units to prevent invasion of non-native annual grasses or restore native vegetation following a natural disturbance.

Areas of low resistance (to invasive annual grasses) and resilience (recovery potential) would be especially prone to ecological degradation following disturbance and would require active management intervention. Areas already in a degraded state (C, D, Dual C, Dual D, and Dual E; Table 3-12; Map V-2, Appendix 1) would continue to degrade further or remain in their current undesirable ecological condition. Some units in fair condition (which BLM has the best opportunity to improve or maintain) would likely degrade due to current threats (invasive grasses or juniper encroachment) and some areas in poor condition would likely remain in poor condition because fewer acres could be actively treated/managed under this alternative due to a decline in the ability access degraded areas over the long-term (see *Off-Highway Vehicle Use and Travel Management* section). These undesirable ecological conditions would contribute to more frequent fire return intervals and/or more severe fires, which would also have a negative impact on native sagebrush steppe communities over the long-term.

Managing for wilderness characteristics in Category C units and new Section 202 WSAs could benefit vegetation communities currently in good ecological condition by reducing human disturbance, preserving natural processes, and maintaining habitat connectivity. While this management would offer a high degree of protection from human disturbance, these areas would still be vulnerable to wildfire, invasive species encroachment, and climate change which would alter ecosystem dynamics and degrade habitat quality over time. This management direction could also delay or limit the BLM's ability to implement proactive vegetation management strategies where the vegetation community has lower resilience to change and treatments would be beneficial for maintaining healthy vegetation communities and addressing ecological threats over the long-term.

In addition, the types of vegetation and fuel treatment methods that could be utilized would be more limited within Category C units and new Section 202 WSAs. Sagebrush steppe management would not be as successful as current management because of additional constraints on seeding, herbicide application, and loss of access for other ground-based vegetation treatment methods (see *Off-Highway Vehicle Use and Travel Management Impacts* section). Though seedings/plantings would reduce the risk of future weed invasion and would enhance the overall recovery rate of the treated area(s), hand broadcasting seed is labor-intensive and cannot be used to reseed large areas. Broadcast seeding methods are not as effective in establishing vegetation as drill seeding (Nelson *et al.* 1970, Hull 1970, Hudson 2016). Germination rates following aerial seeding are not as high as drill seeding, as the seed is not

covered by soil and can be eaten by insects and small animals prior to favorable conditions for germination.

Aerial application of herbicides may also not be as effective as ground-based herbicide treatments, especially for small infestations, due to the potential for over-spray, shadowing effect, and/or drift. This could result in less effective vegetation rehabilitation actions and more weeds in some of these areas over time.

While vegetation and fuel treatments would maintain or restore sagebrush-steppe communities within treated areas, fewer acres would be actively treated or managed by less effective treatment methods compared to all the other alternatives. In particular, reduced juniper treatment (due to the decrease in access over time, constrains on heavy equipment use, or the need to retain trees for vegetative screening/solitude opportunities) would result in the transition of more Dual C states (co-dominance of sagebrush and juniper) into Dual D or Juniper E states (juniper with invasive annuals/no understory) over time compared to all other alternatives. Plant community diversity would be greatly reduced in these areas, as approximately 88,000 acres of phase II juniper encroached sagebrush steppe would move toward phase III (Juniper E state).

For these reasons, the number of acres in the planning area that would not meet rangeland health standards due to causal factors other than grazing (noxious weed expansion, juniper encroachment or expansion, or large catastrophic wildfires) would likely increase compared to all other alternatives.

Maintaining existing fuel breaks within wilderness characteristics units would have similar effects on vegetation communities as described for the No Action Alternative. Due to the lack of management setbacks in Category C units and new Section 202 WSAs under this alternative, new fuel breaks would be more difficult to implement in appropriate locations across the planning area. This could result in larger wildfires and increased loss of sagebrush steppe communities within some Category C units and new Section 202 WSAs over the short and long-term compared to all other alternatives.

Overall, wilderness characteristic management under this alternative would result in degradation of sagebrush steppe communities in portions of some wilderness characteristics units over the long-term.

OHV and Travel Management Impacts

Closing all Category C units, new Section 202 WSAs, and existing WSAs to public motorized vehicle/OHV use (Map OHV-2, Appendix 5) would reduce or eliminate ground disturbance, vegetation trampling, risk of weed spread, and allow for natural vegetation recovery on large portions of the planning area (up to 2.1 million acres). However, the potential for increased demand for OHV opportunities could still increase vegetation trampling impacts on an estimated 20,460-50,460 acres within the remaining OHV Open area designations (outside of Category C units and WSAs) over the long-term.

Public motorized vehicle use, and associated vegetation disturbance would be eliminated on approximately 1,668 miles of internal closed routes. While BLM would retain legal administrative access to both closed routes and closed areas for vegetation monitoring and restoration management activities initially, over time some interior closed routes would become impassable. Though sagebrush steppe vegetation could recover on up to 2,115 acres of closed routes via natural revegetation over the long-term, some potential treatment areas could become inaccessible (see *Off-Highway Vehicle Use and Travel Management* section). Once this occurs, effective ground-based vegetation, habitat, and fuels

management would not be as feasible (see *Wilderness Characteristics Management Impacts* section above). In particular, treatment of encroaching juniper within sagebrush steppe communities inside wilderness characteristics units would not be as feasible as under other alternatives because motorized vehicle access for the BLM or its contractors would be reduced over the long-term as some interior routes become impassable due to lack of maintenance, making it more time consuming and costly to access and treat the interior of these areas. The number of acres of sagebrush steppe communities that could be actively managed would be substantially less than all other alternatives due to this decrease in access (see *Off-Highway Vehicle Use and Travel Management, Fire and Fuels Management,* and *Cumulative Impacts* sections). For these reasons, the amount of area treated, and the effectiveness of vegetation treatments could be substantially reduced over the long-term compared to Alternative A.

Livestock Grazing Management Impacts

Under this alternative, the overall impact to sagebrush steppe vegetation communities from permit relinquishments could be highly variable. Livestock grazing could potentially be relinquished on anywhere from 0 to 100% of the grazed portions of new Section 202 WSAs, existing WSAs, and Category C units in the planning area (up to 2,140,843 acres; Table 2-2) over the long-term. It is not possible to accurately predict what specific vegetation types could be affected. Should permit relinquishment occur in an area of good or excellent ecological condition, the composition, diversity, and biomass of native herbaceous vegetation and palatable woody species would likely be maintained or improved for many years in the absence of a major natural disturbance (Table 3-13). Over time, the lack of grazing could result in increased shrub cover, decline in forbs, and little to no detectable effect on grass cover. Forty-two years of grazing exclusion decreased biodiversity in mountain big sagebrush plant communities in Colorado (Manier and Hobbs 2006).

Livestock grazing closures could also occur on up to an estimated 126,614 acres failing to meet rangeland health standards due to livestock grazing. However, it is not possible to accurately predict what specific vegetation types or grazing systems would be affected by this management action. Removal of grazing would not necessarily facilitate the recovery of sagebrush steppe vegetation communities at a faster rate than the No Action or Alternative A (assuming at least moderate rest is occurring). Courtois *et al.* (2004) found that vegetation recovery rates between ungrazed and moderately grazed areas in the northern Great Basin can be similar. Long-term rest of areas that have already shifted to undesirable conditions is unlikely to reverse those shifts. Results of long-term rest are generally akin to those resulting from recommended grazing methods involving moderate utilization and proper rest rotation (Davis *et al*. 2014).

Removal of livestock grazing could result in reductions in concentrated livestock use/vegetation trampling on an estimated 10,000-20,500 acres around some water developments and fences. Some of these areas would recover with native sagebrush steppe vegetation over the long-term.

Grazing also acts as a disturbance that prevents buildup of dead plant material. Accumulation of dead plant material can pose a risk of higher severity and intensity of wildfire should it occur (Davies *et al*. 2014). Permit relinquishments could reduce BLM's ability to control non-native annual grasses in some areas by removing an effective management tool (targeted/outcome-based livestock grazing). In areas of low resistance to invasive annual grasses, especially those already in a State C (cheatgrass understory), ecological degradation would continue and ultimately could result in the loss of the sagebrush overstory through a wildfire, completely changing the vegetation community over the long-term. For these reasons, the effects of permit relinquishment and associated livestock grazing reductions on sagebrush steppe

vegetation communities in the planning area could vary from negligible to beneficial or detrimental depending on the duration of removal and baseline ecological condition of the particular area.

Compared to all other alternatives, Alternative B would have the least negative effects to vegetation communities from livestock due to the potential for the reduction or removal of livestock grazing from the largest number of acres in the planning area.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Under this alternative, the potential for future human-caused vegetation disturbance would be substantially reduced within Category C units (approximately 411,033 acres). The current ecological conditions of the upland vegetation communities within Category C units (44% good, 48% fair, and 7% poor) (Table 3-15) could change over the long-term. Although those portions of Category C units currently in good ecological condition would likely remain in this state for many years due to reduced potential for future human-caused ground disturbance, natural disturbances could still change ecological conditions over the long-term.

While vegetation/habitat monitoring, maintenance, and restoration activities would be more difficult to implement within Category C units compared to the No Action and Alternative A, it would be more feasible across a larger area than Alternative B because access to potential treatment areas would be limited to fewer Category C units than Alternative B. The types of effects would be similar to those described for Alternative B, but would occur on fewer total acres. As a result, an estimated 22,774 acres could have a reduction in plant species diversity as sagebrush steppe areas currently encroached by juniper move toward phase III and lose the native understory shrub/grass component.

An estimated 44% of Category B units are in a degraded ecological state with 16%, 14%, 8%, and 6% in STM States C, A-C, D, and Dual C, respectively. Less than 0.5% of Category B units under this alternative are in either a Dual D or Dual E state. These degraded Category B units could be more difficult to improve or prevent from declining further in ecological condition because the application of BMPs for wilderness characteristics (see Appendix 7) could result in a reduction in the total acres treated or the effectiveness of some vegetation restoration treatment methods.

Since vegetation treatments within Category A units would not have additional management constraints to protect wilderness characteristics and treatments within Category B units and Category C setbacks would have only a few additional constraints, the potential effects of this alternative on vegetation treatment/restoration effectiveness within sagebrush steppe communities in these areas would be similar to those described in Alternative A.

Being able to implement and maintain fuel breaks within Category A and B units, Category C unit setbacks, and adjacent lands would have similar positive and negative effects on sagebrush steppe communities as described for Alternative A.

OHV and Travel Management Impacts

Under Alternative C, public motorized vehicle use/access would be limited to existing or designated routes across most of the planning area, including the 106 wilderness characteristics units (Map OHV-3,

Appendix 1). Compared to the No Action Alternative, this would eliminate the potential for ground disturbance from public vehicles traveling off-road and help maintain vegetation communities currently in good ecological condition (Tables 3-13 to 3-15) by further minimizing the potential for vegetation trampling and weed invasion. For these reasons, the potential negative impacts from public off-road motorized vehicle on sagebrush-steppe vegetation communities would be substantially less than the No Action Alternative and Alternative A, and possibly less than Alternative B.

Vegetation impacts associated with BLM's existing road network and future potential road construction would be similar to those described for the No Action Alternative and Alternative A. The BLM would be able to maintain open interior routes within Category A and B units. In addition, all interior routes within Category C units would remain open to both BLM and public vehicle use, but the BLM would be prohibited from conducting mechanical road maintenance on these routes. In the short-term, the BLM would still be able to access most of the planning area to monitor vegetation conditions and implement vegetation maintenance and habitat restoration projects. However, over the long-term some interior routes within some Category C units could become impassable due to lack of maintenance and the interior of some units could become inaccessible, even though the BLM would retain legal administrative access. Once this occurs, active ground-based vegetation management in these units would not be feasible.

Livestock Grazing Management Impacts

Under this alternative, there would be the potential for permit relinquishments and subsequent reductions or removal of grazing on up to 409,415 acres of WSAs that overlap existing open grazing allotments. While it is not possible to determine what specific vegetation communities could experience a reduction, the composition, diversity, and biomass of herbaceous vegetation and palatable woody species across most native vegetation communities would likely be maintained or improved on those lands where grazing is reduced or removed, possibly more quickly than the No Action Alternative or Alternative A.

In addition, temporary livestock grazing closures could occur on up to an estimated 126,614 acres due to failure to meet rangeland health standards over the long-term. It is not possible to accurately predict what specific vegetation types would be affected by this management action. However, the potential effects on sagebrush steppe vegetation communities would be similar to those described for grazing closures under Alternative B. Livestock grazing would become available again as a management tool once an area meets rangeland health standards.

Reductions in livestock grazing could result in concentrated livestock use/trampling being reduced or eliminated on up to an estimated 5,000 acres around some existing water developments and fences. Some of these areas could recover with native sagebrush steppe vegetation over the long-term.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Under this alternative, the potential for future human-caused vegetation disturbance would be substantially reduced within the 2 Category C units (approximately 4,671 acres). The sagebrush steppe vegetation communities within these 2 Category C units are currently in good ecological condition (Table 3-15) and would likely remain so due to less potential for future human-caused ground disturbance but could still change over the long-term due to natural disturbances. If needed in the future, sagebrush steppe restoration management within these 2 Category C units would not be as effective because of additional

constraints on vegetation treatment methods. The types of effects on BLM's ability to effectively manage vegetation within these Category C units would be similar to those described for Alternative B because of similar constraints on seeding, herbicide application, other treatment methods, and fire suppression methods, but would occur on substantially fewer acres than Alternatives B, C, or E.

Within Category B units there are an estimated 167,000 acres in an STM State C (sagebrush with an understory dominated by invasive annual grasses), 87,350 acres in STM State D (invasive annual grassland) and 45,690 acres in STM Dual/Juniper State C (phase II juniper encroachment). These degraded Category B units could be more difficult to improve or prevent from declining further in ecological condition because the application of BMPs for wilderness characteristics (see Appendix 7) could result in a reduction in total acres treated or reduce the effectiveness of some vegetation restoration treatments.

Since vegetation treatments within Category A units would not have additional management constraints to protect wilderness characteristics and treatments within Category C setbacks would have few additional constraints, the vegetation treatment/restoration effectiveness within sagebrush steppe communities in these areas would be similar to those described in Alternative A.

Implementing new fuel breaks and maintaining existing fuel breaks in Category A, B, and C unit setbacks would have similar positive and negative effects on sagebrush steppe communities as described for Alternative A.

OHV and Travel Management Impacts

Under Alternative D, approximately 70,500 acres would remain open to public motorized off-road vehicle use and could be subject to concentrated trampling and loss of sagebrush steppe vegetation (Map OHV-4, Appendix 1) outside of Category C units over the long-term. Compared to the No Action Alternative, this would substantially reduce the potential for ground disturbance from vehicles traveling off-road and help maintain vegetation communities currently in good ecological condition (Tables 3-13 to 3-15) by further minimizing the potential for vegetation trampling and weed invasion across much of the planning area. Vegetation impacts associated with BLM's existing road network and future potential road construction would be similar to those described for the No Action Alternative and Alternative A.

Under this alternative, the BLM would be able to maintain open interior routes within Category A and B units. In addition, all interior routes within Category C units would remain open to both BLM and public vehicle use, but the BLM would be prohibited from conducting mechanical road maintenance on these routes. In the short-term, the BLM would still be able to access most of the planning area to monitor vegetation conditions and implement vegetation maintenance and habitat restoration projects. However, over the long-term some interior routes within the 2 Category C units could become impassable due to lack of maintenance. However, due to the small size of these 2 Category C units it is unlikely that this would result in these areas becoming inaccessible to potential future vegetation management activities.

Livestock Grazing Management Impacts

Impacts to sagebrush steppe vegetation communities resulting from rangeland health and permit relinquishment management direction, and concentrated livestock use around water developments and fences, would be the same as those described for the No Action and Alternative A.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Under this alternative, the potential for future human-caused vegetation disturbance would be substantially reduced within Category C units (approximately 372,218 acres). The current ecological conditions of the sagebrush steppe vegetation communities within the Category C units (69% good, 27% fair, and 4% poor (Table 3-15) could change over the long-term under this alternative. Portions of the Category C units that are currently in good ecological condition would remain in this state for many years due to reduced potential for future ground disturbance (from land use authorizations, mining, roads, and facilities). However, natural disturbances could change the ecological conditions over the long-term.

Sagebrush steppe habitat restoration management within Category C units would not be as effective because of additional constraints on vegetation treatment methods. The types of effects would be similar to those described for Alternative B, but would occur on fewer acres than either Alternatives B or C, and more acres than Alternatives A or D. As a result, an estimated 21,983 acres could have a reduction in plant species diversity as sagebrush steppe communities encroached by western juniper move toward phase III and lose the native understory shrub/grass component over the long-term.

An estimated 51% of Category B units are in a degraded ecological state with, 15%, 24%, 6%, and 6% in STM States C, A-C, D, and Dual C, respectively. Less than 1% of Category B units under this alternative are in either a Dual D or Dual E ecological state. These degraded Category B units could be more difficult to improve or prevent from declining further in ecological condition because the application of BMPs for wilderness characteristics (see Appendix 7) could result in a reduction in total acres treated or effectiveness of some vegetation restoration treatment methods.

Since vegetation treatments within Category A units would not have additional management constraints to protect wilderness characteristics and treatments within Category B units and Category C unit setbacks would have only a few additional constraints, the effectiveness of vegetation treatments/restoration on sagebrush steppe communities in these areas would be similar to those described in Alternative A.

Maintaining existing fuel breaks within Category A and B units, Category C unit setbacks, and adjacent lands would have similar positive and negative effects on sagebrush steppe communities as those described for the No Action Alternative and Alternative A.

OHV and Travel Management Impacts

Under this alternative, approximately 466,798 acres would remain open to public motorized off-road vehicle use (Table 3-32) and would be subject to potential trampling of vegetation. While public cross-country motorized vehicle use would be prohibited within all Category C units, this does not represent a substantial change from current OHV management (Maps OHV-1 and OHV-5, Appendix 1) specifically within these units. The potential for increased demand for OHV opportunities could increase vegetation

trampling impacts on up to an estimated 93,320 acres within Open OHV area designations under this alternative over the long-term, similar to the No Action Alternative/Alternative A.

Vegetation impacts associated with BLM's existing road network and future potential road construction would be similar to those described for the No Action Alternative and Alternative A. The BLM would be able to maintain open interior routes within Category A and B units. In addition, all interior routes within Category C units would remain open to both BLM and public vehicle use, but the BLM would be prohibited from conducting mechanical road maintenance on these routes. In the short-term, the BLM would still be able to access most of the planning area to monitor vegetation conditions and implement vegetation maintenance and habitat restoration projects. However, over the long-term some interior routes within some Category C units could become impassable due to lack of maintenance and the interior of these units could become inaccessible even though the BLM would retain legal administrative access. Once this occurs, active ground-based vegetation management in these units would not be feasible.

For these reasons, the impacts to sagebrush steppe communities associated with motorized vehicle use under this alternative would be similar to those described for the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts

Impacts to sagebrush steppe vegetation communities resulting from rangeland health and permit relinquishment management direction, and concentrated livestock use around existing water developments and fences, would be the same as those described for the No Action Alternative/Alternative A.

Affected Environment – Forest and Woodland Vegetation Communities

The major forest and woodland types in the planning area consist of ponderosa pine forest, mixed conifer forest, quaking aspen stands, and pre-settlement western juniper stands (old-growth) (Table 3-10; Map V-1, Appendix 1). Most ponderosa pine and mixed conifer forests are adjacent to the National Forests on the western edge of the planning area. The Lost Forest, in the northeast section of the planning area, is an area of isolated, disjunct ponderosa pine forest.

The BLM classifies both ponderosa pine and mixed conifer forest types as commercial forestland, but they represent "lands where Forest Management is for the Enhancement of Other Uses". Forest management activities occur for forest health or other resource uses or values. These two forest types total about 31,709 acres in the planning area. The two most extensive commercial stands occur at Lost Forest (4,153 acres) and Colvin Timbers (591 acres). Since the Lost Forest area was designated as an RNA in 1973 and the Colvin Timbers area sits within a WSA, these areas are not available for commercial timber harvest. The remaining acres of commercial forest lands are widely scattered on small, isolated tracts of land where it is difficult to conduct forest management activities because of physical land features (such as aspect, steep slopes, unstable soils). The majority of these commercial forest stands are over-stocked and at risk of insect and disease outbreaks and/or stand replacement fires. The current species composition on many of these sites is not typical of the historic vegetation types (Riegel *et al.* 2006; pages 247-249).

Due to scattered locations, small stand sizes, harsh site conditions, and low stand volumes per acre, the management of commercial forest stands for sustained yield of forest products not economically feasible.

Instead, in the current RMP (BLM 2003b), these lands have a protection area designation, which allows forest health treatments, but does not require an allowable sale quantity (ASQ). The only commercial timber sale that has occurred in the planning area in recent years was a 70-acre salvage sale following the Toolbox wildfire in 2002, with approximately 350,000 board feet produced. For these reasons, commercial forest production is not addressed in this analysis.

Treatments of forest stands within WSAs (approximately 7,657 acres) would be subject to meeting the non-impairment standard (BLM 2012h). Treatment of scattered forest stands would be further limited to areas outside of special management areas (WSAs, ACEC/RNAs, and WSRs) and would typically not be feasible unless combined with similar treatments on adjacent ownerships (BLM 2003a, page 4-23). Forest restoration treatments over the last twenty years have been limited to replanting a few small areas (280 acres) along the forest fringe that were subject to wildfire.

Western juniper distribution was historically limited to low productive sites or rocky areas with only light grasses and other low fuels incapable of carrying ground fires. These historic sites are where most old-growth western juniper stands are located today, containing trees hundreds of years old. However, juniper has expanded its historic range into sagebrush steppe habitats, riparian areas, and the transitional zones between pine/mixed conifer forest and sagebrush steppe communities. This is discussed further in the sagebrush-steppe vegetation section. From a forest management perspective, sites currently dominated by western juniper are designated as non-commercial forestlands. Production of wood products is not a main objective of managing these sites and no ASQ is assigned to these lands, but removal of wood products may be allowed to meet other resource objectives, such as reducing the density of younger trees to improve old-growth stand vigor.

Quaking aspen is widely scattered throughout the coniferous forest and sagebrush steppe of eastern Oregon. They are typically found in isolated pockets on sites that maintain high soil moistures throughout the year such as areas that hold snow drifts through spring or are subjected to elevated groundwater due to other factors such as foot slopes below rims facing northeast. Aspen stands occur inter-mixed with the ponderosa/mixed-conifer sites in the higher elevations, as well as in sagebrush steppe sites that border riparian areas. Although quaking aspen are a relatively small, scattered vegetative component within the planning area (approximately 2,053 acres; Table 3-10), its contribution to the diversity of flora and fauna communities is great.

Fire Ecology

Studies in southeastern Oregon have shown that prior to 1900 most ponderosa stands experienced low-severity surface fires at intervals ranging from 15 to 25 years (Table 3-12; Taylor and Skinner 1998). Because of its thick bark and self-pruning branches, ponderosa pine is resistant to mortality from low-intensity fire. Today's fire suppression techniques have been very successful at quickly controlling ponderosa pine fires while they are still small. However, suppression activities have also allowed the encroachment of white fir and western juniper, which has led to over-stocking, increased surface fuel loadings, and the potential for more intense wildland fire behavior. Fire history research performed by Miller *et al.* (2001, page 6) on 10 similar sagebrush-steppe/ponderosa pine ecotone sites in the planning area found that the historic mean fire return intervals (MFRI) averaged 14 years. Fire history research from the Warner Mountains in Northern California on Upper Montane forests (higher elevation mixed conifer stands) indicated the MFRI averaged 19.5 years (Riegel *et al.* 2006). Walking through a typical mixed forest stand in the planning area, observation of the stand dynamics (large old-growth trees or

stumps at low densities) indicates there were more frequent MFRIs in the past, as well as the absence of fire for the past 60+ years (high densities of younger, and more shade-tolerant species).

The range of western juniper continues to expand into ponderosa pine forest, mixed conifer, and other vegetation communities. It is difficult to determine fire histories associated with western juniper. Old-growth juniper stands are resistant to fire because the low site productivity/rocky surface limits understory fuel availability. Old-growth juniper stands that are isolated from other vegetation may not burn for over 300 years.

Forest and Woodland Vegetation Trends

Broad scale studies of forested lands in the planning area occurred as part of the Interior Columbia Basin Ecosystem Management Project (ICBEMP). The ICBEMP assessed forest conditions and trends on a region-wide basis in the mid-1990s and documented declines in the health of interior pine forests (FS and BLM 1996a). Exclusion of natural fire resulted in overstocked stands and a large increase in the western juniper and white fir components of these stands. As a result, forested lands are less resilient and are more susceptible to disturbances such as insect attack, drought, and wildland fires.

The ICBEMP also assessed forest conditions within smaller ecological reporting units (ERUs). Most of the conditions and trends reported within the ICBEMP's Northern Great Basin ERU also apply to the planning area. A summary of the ICBEMP findings and assessment can be found in *Appendix A* of BLM (2001a). This assessment identified substantial insect/disease issues within commercial forests in this ERU. Pursuant to 40 CFR § 1502.21, the BLM hereby incorporates this assessment by reference in its entirety. Forest health was also addressed in *Appendix Q* of BLM (2001a). Table 3-18 summarizes forest and woodland conditions for the Northern Great Basin ERU and for the planning area.

Special Forest Products

Special forest products include both commercial and personal collection of firewood, posts, poles, Christmas trees, boughs, seeds, cones, and berries. Approximately 4,478 acres of special forest products harvest has occurred across the planning area since 1990. Permitting and sales of special forest products have seen modest increases over the past 30 years. There are currently eight designated harvest areas scattered across the planning area (see Map V-3, BLM 2003b), but only four have been utilized to date. Between 2012-2019, the BLM issued a total of 138 permits with the largest demand (115) occurring in the permitting of firewood collection. Permitting and harvesting of boughs and fence posts also have seen a relatively steady demand in recent years. However, in relation to the wood resource available, there is an opportunity to meet an increase in future demand for personal and commercial harvest of juniper for firewood/biomass use in the planning area.

Environmental Effects – Forest and Woodland Vegetation Communities

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Under the No Action Alternative, the BLM would continue to manage forested lands within wilderness characteristics units under the existing land use plan (as maintained and amended; BLM 2003b, 2015a)

Table 3-18. Existing Forest and Woodland Vegetation Conditions and Trends

Northern Great Basin Ecological Reporting Unit	Planning Area
In contrast to basin-wide trends, the late-seral forest communities increased from 5% to 7% of the Northern Great Basin Ecological Reporting Unit. This net increase was dominated by a significant increase in late-seral multilayer forest types (FS and BLM 1997b, pages 714-718).	Conditions and trends identified at the basin and ecological reporting unit scale apply. The increase in multilayer stands is the result of encroachment by western juniper at the edges of ponderosa pine stands and a large increase in pine and white fir understory area and density. Timber harvest has resulted in the removal of nearly all old-growth pine from most private and many USFS forest stands. The increased number of understory trees has resulted in overstocking of many forest sites, with attendant insect and disease problems (mountain pine beetle and western pine beetle in ponderosa pine, fir engraver in white fir, and dwarf mistletoe in both) and the increase in ladder fuels. Local forests are now more vulnerable to large-scale, stand-replacing disturbances like epidemic-level insect attack and catastrophic wildland fire.
Traditional forestry practices and exclusion of fire have changed successional disturbance regimes and vegetative composition and structure. The change in disturbance regimes is toward longer intervals between more severe disturbances (FS and BLM, 1996a, page 92). In the dry forest vegetation group, lethal (stand-replacing) fires have increased substantially (FS and BLM 1996a, page 87; FS and BLM 1997b, pages 855-873).	As described above, forests have increased in density, resulting in overstocking on many sites. This has resulted in stressed stands more vulnerable to insect and disease attack, as well as a much higher fire hazard due to increased fuel loads and development of ladder fuels. Resiliency (positive response to disturbance events) of local forests has been reduced.
For the Northern Great Basin Ecological Reporting Unit, the area of the interior ponderosa pine cover type decreased 14.57% from its historical area (1850–1900), but this change is within its historical range of variability. The lodgepole pine type decreased 10.84% from its historical area, but this is also within its historical range of variability (FS and BLM 1997b, page 687).	Extensive areas of older lodgepole pine stands in the northwest portion of Lake County experienced considerable mortality from mountain pine beetle attack in the 1970s and 1980s. Many of these stands were salvage logged, and older lodgepole stands vulnerable to attack were also logged. These logged-over stands have normally been replanted to lodgepole pine, so the overall cover type change is minor. However, these stands have shifted in age class from late to early seral. Nonnative invasive species are a growing problem, especially in the dry ponderosa pine types. Quaking aspen and cottonwood in riparian areas have significantly decreased in the last 50 years.
The juniper/sagebrush cover type has increased nearly four-fold over its historical area. This is an ecologically significant change, which means this type is considerably outside its historic range of variability (FS and BLM 1997b, pages 684-685, 687, and 771-2483).	The finding of a nearly fourfold increase in areal extent of the western juniper/sagebrush type also applies directly to the planning area. Ecological site inventory (ESI) identifies juniper sites as old-growth sites on rocky ridges or other fire-protected areas and younger, invasive juniper occurring on non-juniper sites.

and Provisions 18 and 19 of the 2010 Settlement Agreement. The BLM does not manage forested lands for commercial timber production but would continue to manage these stands to promote ecosystem health, as long as the BLM deems the management action would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics.

The primary potential negative effects of treating forested stands would be limited to short-term ground disturbance. Over the long-term, treatments would result in juniper dominance being limited to rocky outcrops, ridges, and other historic (old growth) sites where wildland fire frequency is limited by low site productivity and sparse fuels (BLM 2003a, page 4-24). Pine and white fir tree densities would be reduced over time to desired future conditions. While natural disturbances such as wildfire could change existing ecological conditions within forested stands within wilderness characteristics units, fuel levels would be reduced within treated stands which would lower the risk of future, large catastrophic (stand-replacing) wildfires.

Aspen stands would continue to be a high priority for restoration treatments. Treated aspen stands would improve in condition through removal of competing invasive juniper and other conifer species, as well as the promotion of natural regeneration following prescribed fire (BLM 3003a, page 4-24), whereas untreated stands would continue to decline in condition (Wall *et al*. 2001).

Continuing forest health management actions would result in treated forest communities being more resistant to drought, pests, and wildfire, compared to untreated stands, which would allow them to continue to play important ecological roles and provide important habitat diversity for wildlife and other plant species. Some areas would undergo multiple treatments (*e.g.* conifer thinning followed by weed treatment). Seeding/planting would reduce the risk of future weed invasion and enhance the overall recovery rate of treated forest area(s). Collectively, these types of treatments would maintain or restore forest communities over the long-term.

While the BLM would only undertake vegetation treatments (*e.g.,* thinning or fuel treatments) in forest stands within wilderness characteristics units (approximately 14,232 acres) where it deemed such treatments would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics, some vegetation treatments have the potential for long-term negative impacts on naturalness (presence of stumps, mow lines, etc.) or opportunities for solitude (loss of tall vegetative screening). Including measures in the project design that reduce potential negative effects to these wilderness characteristics could reduce the number of acres that could feasibly be treated/restored or could reduce the effectiveness of the treatment measures utilized within a given project area (BLM 2011m, 2017e). This could affect the ability of the BLM to fully implement some needed restoration treatment actions within some forested wilderness characteristics units under this alternative.

The BLM would continue to issue personal use and commercial special forest product permits from designated harvest areas. Most firewood, post, and pole special forest product permits issued since 2003 have occurred outside of the 106 wilderness characteristics units. Issuing future firewood, post, pole, and bough harvest permits within these units could have potential negative impacts on naturalness (presence of stumps) or opportunities for solitude (loss of tall vegetative screening), whereas issuing cone and seed collection permits would have no impacts on wilderness characteristics. However, only 10-40 acres are open to harvest at any given point in time, and ponderosa pine, old-growth juniper, and other trees are typically retained for wildlife purposes which also retain vegetative screening. Any future permit(s) within a wilderness characteristics unit would only be issued if the BLM deemed the activity would not diminish the size or cause an entire BLM inventory unit to no longer meet the minimum wilderness characteristics criteria. For these reasons, continuing existing special forest product management under this alternative would have only minor impacts on BLM's ability to meet public demand for special forest products.

OHV and Travel Management Impacts

There would continue to be the potential for negative impacts from off-road motorized vehicle use within harvest areas under this alternative. While bough and cone harvest permits typically do not allow cross-country vehicle use (via a permit stipulation), firewood and pole cutting permits do allow vehicles to drive short distances off-road to load wood materials for transport. This could cause soil compaction and/or erosion, trampling damage to native vegetation, increased potential risk of weed invasion, and an increase in user-created routes in these areas. These impacts could persist even after the harvest activities have been completed.

Approximately 12,890 acres (60.2%) of forested lands in the planning area fall within the Limited OHV area designation and would not be subject to public off-road motorized vehicle use and potential impacts under this alternative. In particular, forested areas within WSAs (approximately 7,657 acres; 23.6%) fall within the Limited OHV area designation which would continue to prevent public off-road motorized vehicle use and associated impacts to forest communities in these areas. (Though a portion of the Sand

Dunes WSA would remain open to OHV use under this alternative, no forested lands occur in this area). Specifically, within wilderness characteristics units, approximately 11,870 acres (36.6%) of forested lands fall within the Open OHV area designation and would continue to be subject to off-road motorized vehicle use and potential impacts under this alternative. However, no Open OHV areas in forested areas have been documented to date as actually being subject to high concentrations of off-road motorized vehicle use or associated impacts to forest vegetation.

Livestock Grazing Management Impacts

Ponderosa Pine

This vegetation community occurs on approximately 1% of the acres in the planning area. The early spring and deferred rotation grazing systems would maintain or improve the composition of key perennial herbaceous species on about 15,025 acres (49%). Approximately, 6,430 (21%) of this vegetation community is grazed under a spring/summer grazing season where the composition of perennial species would be maintained or decrease. Approximately, 4,568 acres (43%) of this vegetation community, is grazed under a rest/rotation grazing system. This grazing system would significantly improve the composition of the key perennial herbaceous species. Approximately 226 acres (1%) of this vegetation community are grazed under the deferred grazing system where composition of key perennial herbaceous species would be improved or maintained and composition of palatable woody species (*e.g.* antelope bitterbrush) could decrease. The grazing system on about 581 (2%) acres of this vegetation type are unknown and another 779 acres (3%) occur in custodial allotments where the grazing system is variable. Approximately 2,710 acres (9%) of this vegetation community are located on scattered public lands within allotments where the grazing system is excluded or not part of an allotment system (unallotted). These acres are generally not grazed by livestock.

Mixed Conifer

This is not a common vegetation community and occurs on less than 1% of the acres in the planning area. The rest rotation grazing system would significantly improve the composition of the key perennial species on about 885 acres (66%) of the mixed conifer community. There are about 456 (34%) acres in the mixed conifer community that would continue to be unallotted for livestock grazing.

Quaking Aspen

This is not a common vegetation community and occurs on less than 1% of the acres in the planning area. The rest rotation grazing system would maintain the composition of the key perennial species on about 1,476 acres (73%) of the quaking aspen community. On about 286 (14%) acres under the deferred grazing system the composition of the key herbaceous species would be maintained, but the composition of the palatable woody species could decrease over time.

Western Juniper

Approximately 92,358 acres (43%) of this vegetation community is grazed under a rest/rotation grazing system. This grazing system would significantly improve the composition of the key perennial herbaceous species. The winter, spring, and deferred rotation grazing systems would maintain or improve the composition of key perennial herbaceous species on about 108,233 (51%) acres. Approximately 7,504 (3%) of this vegetation community is grazed under a spring/summer grazing season where the

composition of perennial species would be maintained or decrease. There are 3,828 (2%) acres of this vegetation community that occur in custodial allotments where the grazing system is variable. The grazing system on 1,444 acres of this vegetation type are unknown.

Impacts of Alternative A

Wilderness Characteristics Management Impacts

Under Alternative A, the BLM would continue to manage forested lands generally as outlined in the No Action Alternative, but with no constraints for wilderness characteristics under the 2010 Settlement Agreement. Impacts to forested communities would be similar to those described in the No Action Alternative. However, the implementation of future forest health/restoration management actions would be less constrained which would result in more effective treatments and/or being able to treat more forested acres compared to the No Action Alternative. As a result, treated forest communities would be more resistant to drought, pests, and wildfire, compared to untreated stands, which would allow them to continue to play an important ecological role providing important habitats for wildlife and other plant species.

Under this alternative, the BLM would continue to issue personal use and commercial special forest product permits from designated harvest areas and would be able to meet public demand for firewood, posts, poles, boughs, and other special forest products with fewer management constraints than the No Action Alternative. The potential effects of off-road motorized vehicle use associated with special forest product harvest activities would also be similar to those described for the No Action Alternative.

OHV and Livestock Grazing Management Impacts

The potential effects of continuing existing OHV area designations and livestock grazing under existing grazing systems within forest/woodland communities would be the same as those described for the No Action Alternative.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Under this alternative, any forested lands in Category C units and WSAs that are currently in good ecological condition (Table 3-15) would tend to remain in that condition due to the additional protections and limits on human-caused disturbances. While forested lands within Category C units and new Section 202 WSAs could be treated to maintain or improve ecological condition, there would be some limitations on the treatment methods used and additional measures would be incorporated into the treatment design, such as meeting VRM Class I or II management objectives (see Appendix 7), to reduce potential negative effects to naturalness or opportunities for solitude. These measures would result in retaining more tall vegetative screening (trees) to preserve solitude opportunities and meet visual objectives than what an eastside pine or aspen stand health treatment prescription would typically remove. Leaving more trees per acre would result in a failure to meet appropriate vegetation, habitat, and fuel loading management objectives for an eastside forested area and would result in a need for future treatment on a more frequent basis. Failure to reduce fuel loading to appropriate levels in an area would also leave the treated area subject to increased wildfire risk. These measures could also increase the per acre treatment costs and reduce the number of acres that could feasibly be treated/restored in a given area (BLM 2011m, 2017e;

see also *Fire and Fuels* section). In general, the potential short-term, negative effects of ground disturbance associated with forest health/restoration treatments would be offset by long-term improvements in forest/ecosystem health. Seeding/replanting treatments would reduce the risk of future weed invasion and enhance the overall recovery rate of the treated forest area(s).

In addition, due to a decrease in access over time (see *OHV and Travel Management Impacts* section below), the BLM would have less ability to effectively manage some forested stands to reduce the weed infestations, competing vegetation, pest outbreaks, fuel loads, and catastrophic wildfires over the long-term. As a result, untreated forest lands within Category C units and new Section 202 WSAs that are in poor ecological condition would continue to decline in condition over the long-term.

Under Alternative B, no personal or commercial special forest product permits would be issued within Category C units or new Section 202 WSAs. This would reduce the area available for special forest products across the planning area by an additional 1.6 million acres. More specifically, future firewood and other special forest product harvest would be precluded on portions of five of the eight existing designated firewood harvest areas. The harvest areas that would be impacted the most are Forest Boundary, Mill Creek, and Peter's Creek (where harvest would be eliminated on about 8,080, 1,537, and 6,456 acres, respectively). As a result, BLM would not be able to meet future public demand for firewood, posts, poles, boughs, and other special forest products under this alternative.

OHV and Travel Management Impacts

Under this alternative, all forested areas within Category C units (approximately 6,106 acres) new Section 202 WSAs, and existing WSAs (approximately 7,657 acres) would fall within the OHV Closed area designation and would not be subject to public off-road motorized vehicle use or associated negative impacts to forest soils and vegetation (13,763 acres total; 55.5%). Outside of these areas approximately 5,764 acres (17.8%) of forested lands would remain in the Open OHV area designation and would be subject to public off-road motorized vehicle use and potential negative impacts to forest soils and vegetation, similar to the No Action Alternative and Alternative A.

OHV area and road closures and lack of interior road maintenance under this alternative would effectively reduce BLM access to potential forested treatment areas over the long-term. In particular, the reduced ability to access and treat competing vegetation within aspen stands in Category C units (558 acres) and new Section 202 WSAs, and existing WSAs (about 235 acres) could lead to a decline in aspen vigor and recruitment in those specific stands (Wall *et al*. 2001) (approximately 793 acres; 39% of all stands) over the long-term. In addition, untreated forest and old-growth juniper stands would become denser and the risk of mortality from insects and disease would increase as competition increases and trees become more stressed. These areas would also accumulate higher fuels, and the risk of catastrophic loss of entire forest stands from wildfire would increase over time.

The potential negative effects of off-road motorized vehicle use associated with special forest product harvest activities on forest communities within Category C units and new Section 202 WSAs would be eliminated or substantially reduced. The potential effects of off-road motorized vehicle use associated with special forest product harvest activities in the remainder of the planning area would be similar to those described for the No Action Alternative.

Livestock Grazing Management Impacts

Approximately 75% of the forested stands (25,320 acres) on BLM-administered lands in the planning area fall within land use allocations subject to voluntary permit relinquishment (Table 2-2) under this alternative. The effects of reduced livestock grazing within forest communities would be an increase in the density and diversity of perennial grasses and forbs. This increase in understory fine fuels/biomass would increase the potential risk and rate of spread of future wildfires in these communities.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

In general, the potential short-term, negative effects of ground disturbance associated with forest health/ restoration treatments would be offset by long-term improvements in forest/ecosystem health. Under this alternative, approximately 7,897 acres (24.9%) of the forested stands and 110 acres (5.3%) of aspen stands on BLM-administered lands in the planning area fall within Category C units. Vegetation treatment constraints (meeting VRM Class II objectives, retaining trees to provide screening, applying BMPs from Appendix 7) in these units could increase forest treatment costs, reduce the number of acres that could feasibly be treated/restored, and reduce the effectiveness of the treatment measures utilized within a given forest treatment area in a similar fashion as described for treatments within Category C units under Alternative B. While the BLM would initially be able to access potential treatment areas (see *OHV and Travel Management Impacts* section below) to restore forest habitat and reduce fuel loading, access to some forested treatment areas could be lost over the long-term in some of these Category C units.

Since forest health/restoration treatments within Category A units would not have additional management constraints and treatments within Category B units would have very few additional constraints (applying BMPs from Appendix 7, meeting VRM Class III objectives) to protect wilderness characteristics, the effectiveness of treatments in these areas would be similar to those described for Alternative A.

The BLM would continue to issue personal and commercial special forest product permits from most designated harvest areas, but the entire Peter's Creek and most of the Forest Boundary harvest areas (about 14,500 acres) would no longer be available for special forest product harvest. Special forest product permits could also be issued in Category A and B units, and within the setbacks of Category C units adjacent to unit boundary roads to assist in creating fire/fuels breaks or meet other resource objectives. For these reasons, this alternative would be able to meet most public demand for firewood, posts, poles, boughs, and other special forest products over the long-term.

OHV and Travel Management Impacts

Under this alternative, all forested lands within the planning area (approximately 32,417 acres) would fall within the OHV Limited area designation and would not be subject to public off-road motorized vehicle use or associated impacts to forest soils or vegetation. The potential effects of off-road motorized vehicle use associated with special forest product harvest activities would be similar to those described for the No Action Alternative, but would be higher than Alternative B.

Livestock Grazing Management Impacts

The potential effects of reduced livestock grazing on forest communities would be similar to those described for Alternative B but would occur on fewer acres.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

There is no western juniper or forest habitat within the two Category C units managed under this alternative. For this reason, Category C management would not have any effects on forest/woodland management.

Since forest restoration treatments within Category A units would not have additional management constraints and treatments within Category B units would have only a few additional constraints (applying BMPs from Appendix 7, meeting VRM Class III objectives) to protect wilderness characteristics, the effectiveness of treatments in these areas would be similar to those described for Alternative A. Special forest product permits could be issued in Category A and Category B units to assist in creating fire/fuels breaks or meet other resource objectives. For these reasons, the BLM expects it would be able to meet the public demand for firewood, posts, poles, boughs, and other special forest products in the same manner as the No Action Alternative and Alternative A.

OHV and Livestock Grazing Management Impacts

The potential effects of livestock grazing management on forest communities under this alternative would be the same as those described for the No Action Alternative and Alternative A.

The potential effects of OHV area designations and off-road motorized vehicle use associated with special forest product harvest activities on forest communities would be similar to those described for the No Action Alternative and Alternative A.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Under this alternative, about 7,897 acres (24.9%) of forest lands and 106 acres (5.1%) of aspen stands fall within Category C units. Treatment constraints within Category C units (meeting VRM Class II objectives, applying BMPs from Appendix 7) could increase forest treatment costs, reduce the number of acres that could feasibly be treated/restored, and reduce the effectiveness of the treatment measures utilized within a given treatment area similar to Alternative B. The potential short-term, negative effects of ground disturbance associated with these types of treatments would be offset by long-term improvements in ecosystem health. While the BLM would be able to access potential treatment areas, the additional constraints could reduce the overall effectiveness of treatments in some of these Category C units in a similar fashion as described for Alternative B. However, these constraints would affect fewer forested acres than Alternatives B or C.

Since forest treatments within Category A units would not have additional management constraints and treatments within Category B units would have only a few additional constraints (applying BMPs from Appendix 7, meeting VRM Class III objectives) to protect wilderness characteristics, the effectiveness of treatments in these areas would be similar to those described for Alternative A.

The BLM would issue personal and commercial special forest product permits from designated harvest areas. Special forest product permits could also be issued in Category A and Category B units and within the setbacks of Category C units adjacent to boundary roads to assist in creating fire/fuels breaks similar to Alternative C. For these reasons, the BLM expects it would be able to meet the public demand for firewood, posts, poles, boughs, and other special forest products in a manner similar to Alternative C.

OHV and Travel Management Impacts

All forested areas within WSAs (approximately 7,657 acres; 23.6%) and about 19,794 acres (61.1%) of other forested lands in the planning area would fall within the OHV Limited area designation and would not be subject to public off-road motorized vehicle use and potential negative impacts to forest soils and vegetation. Approximately 11,858 acres (36.5%) of forested lands in the planning area would remain in the OHV Open area designation and would be subject to public off-road motorized vehicle use and potential negative impacts to forest soils and vegetation, similar to the No Action Alternative and Alternative A. The potential effects of off-road motorized vehicle use associated with special forest product harvest activities would be similar to those described for the No Action Alternative, but would be more than Alternative B.

Livestock Grazing Management Impacts

The potential impacts of livestock grazing management on forested communities under this alternative would be the same as the No Action Alternative and Alternative A.

Affected Environment – Riparian and Wetland Vegetation Communities

Riparian and wetland communities occur on approximately 1% of the planning area. Lotic riparian areas consist of running water systems, such as rivers, streams, and springs (BLM 1993a, 1998c). Riparian vegetation is dependent on the stream channel type, duration of water availability, soil type and depth, climate, and management history. Riparian areas are typically very narrow, and have not all been accurately mapped, but are assumed to be present along perennial streams in the planning area.

Lentic wetland systems consist of standing water systems, such as lakes, ponds, seeps, bogs, and meadows (BLM 1994a, 1999e). The large numbers of closed basins that typify the High Desert Province include dry (historic) lakebeds, lakebeds that are inundated infrequently and for short periods, perennial lakes that fluctuate in size, and wetlands and marshes that are reasonably perennial. Lentic riparian vegetation on these bottomlands varies according to the frequency, depth, and duration of inundation. The most significant and valuable wetlands in the High Desert Province, from an ecosystem viewpoint, are those associated with isolated springs and small streams scattered over the arid landscape.

More detail on existing riparian and wetland vegetation communities found in the planning area is contained in Appendix 6. The BLM has assessed the condition of both lotic and lentic wetlands in the planning area using the Proper Functioning Condition (PFC) Methodology (BLM 1993a, 1994a). The

results of these assessments are summarized in the following section. The PFC methodology is described in Appendix 6.

Riparian and Wetland Trends

Lotic Conditions

In 1996 and 1997, an inter-disciplinary team of resource specialists inventoried about 113 miles of streams in the planning area using the *Process for Assessing Proper Functioning Condition* (BLM 1993a). The team included specialists in the fields of hydrology, fisheries, range, botany, and wildlife. Streams were divided into reaches according to their structural and vegetative characteristics, based on management and channel type. Each reach was rated as proper functioning condition, functional-at-risk, or nonfunctional. The trend of the functional-at-risk category was also rated. Ephemeral (streams that flow only in direct response to precipitation, and whose channels are above the water table at all times) reaches of streams were not rated. The percentages of intermittent/ephemeral portions of reaches were rated for the intermittent reaches only. Table 3-19 summarizes the results of this lotic PFC stream survey, indicating the miles of each rating and that rating's percentage compared to the total miles rated. The table shows functional condition of streams in the planning area at the time of the survey. While conducting the field inspections, the team noted management change options or projects that would benefit the stream condition. Implementation of these recommendations has largely occurred.

Table 3-19. Summary of Lotic (Stream) Proper Functioning Condition Assessments

Functional Rating	Stream Miles (1996-1997)	Percent of Stream Miles Assessed (1996-1997)	Stream Miles (2012-2018)	Percent of Stream Miles Assessed (2012-2018)
Proper Functioning Condition	85.48	74.4	89.07	71.6
Functional at Risk - Upward Trend	13.3	12.1	16.38	13.2
Functional at Risk - No Apparent Trend	6.65	6.0	9.89	7.9
Functional at Risk - Downward Trend	0.5	0.4	1.51	1.2
Non-Functional	7.35	7.1	7.61	6.1
Unassessed	5.1	NA	0	NA
TOTAL	**113.3**	**100**	**124.5**	**100**

More recent stream surveys, photo monitoring (on file at Lakeview Field Office), field reconnaissance, and PFC assessment updates generally indicate improving trends in riparian conditions throughout theplanning area. Generally, retakes of photos occur every five years at photo points established in the 1970s through 1990s. Recent photos show increases in native riparian vegetation, including willows, sedges, and rushes, as well as stream channel narrowing and deepening, and increases in streambank stability. A re-inventory of those streams that were not at PFC in 1996 and 1997 began in 2012 as part of the rangeland health assessment process) and is ongoing. The results of PFC assessment updates completed from 2012 to 2018 are summarized in Table 3-19. Overall, stream and riparian conditions have generally shown improvement during this timeframe.

A riparian score card system was developed in 2010 to use to assess the current interaction of soils, vegetation, and stream channel. These cards have been used to compare current conditions to potential

conditions for riparian sites and determine if the desired range of conditions were met on a given riparian site.

Lentic Conditions

In the late 1990s, an inter-disciplinary (ID) team of resource specialists inventoried over 135,000 acres of lentic wetlands in the planning area using the *Process for Assessing Proper Functioning Condition* (BLM 1994a). The team included specialists in the fields of hydrology, fisheries, range, botany, and wildlife. Areas inventoried were generally those identified as wetland habitats on published National Wetland Inventory (NWI) maps. However, many of these wetland habitats were rated without field verification, based on general staff knowledge of the area.

In 2014, BLM staff began re-inventory of wetland habitats using the lentic PFC protocol (BLM *et al*. 2003) in support of the ongoing rangeland health assessment update process. This inventory was based on field reconnaissance and on-the-ground field verification. One notable result of the latest inventory was the finding that the NWI generally over-estimated the amount of wetland habitat present in the planning area. As a result of field verification, it was not uncommon to find that many of the wetland habitats identified by the NWI lack riparian/wetland vegetation, and therefore, do not actually meet the definition of a wetland. In such areas, the use of the lentic PFC protocol is not an appropriate inventory method. This is the main reason why fewer acres of wetlands were identified and assessed across the planning area as of 2018. Table 3-20 summarizes the results of these lentic PFC wetland surveys, indicating the acres of each rating and that rating's percentage compared to the total acres rated. The table shows functional condition of wetlands in the planning area at the time of the survey.

Table 3-20. Summary of Lentic (Wetland) Proper Functioning Condition Assessments

Functional Rating	Acres (1996-1999)	Percent of Acres Assessed (1996-1999)	Acres (2014-2018)	Percent of Acres Assessed (2014-2018)
Proper Functioning Condition (PFC)	134,530	99.4	85,492.4	99.72
Functional at Risk	257	0.19		
- Functional at Risk - Upward Trend			51.39	0.006
- Functional at Risk - No Apparent Trend			0.59	0
- Functional at Risk - Downward Trend			64.68	0.008
Non-Functional	127	0.09	123.1	0.14
TOTAL	**135,360**		**85,732.2**	

In recent years, the BLM has maintained an average of 1,000-2,000 acres annually of lentic wetland habitat in the south end of the Warner Wetlands area using prescribed burning, targeted grazing, and other methods (BLM 1990c, 1990d, 2016e, 2018b, 2018c).

Environmental Effects – Riparian and Wetland Vegetation Communities

Analysis Assumptions

- Active riparian/wetland restoration would move impaired areas toward desired future conditions faster than passive restoration methods. In some cases (*e.g.* weed infestation) active restoration would be the only way to achieve desired future conditions.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

While management actions that involve ground-disturbing activities within or near riparian or wetland areas have the most potential to negatively affect these habitats through soil disturbance, transport, and sediment delivery into waterbodies (Mebane 2001), implementing existing riparian/wetland management direction under the No Action Alternative would maintain or improve riparian and wetland conditions across the planning area (BLM 2003a, pages 4-14, 4-19 to 4-23).

The BLM could also continue to treat impaired riparian areas, stream channels, wetlands, juniper encroached riparian areas, etc., within wilderness characteristics units if it deemed such actions would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. Treated areas would return to a relatively natural condition over time. However, modifying a project to reduce potential negative effects to naturalness or opportunities for solitude could reduce the number of riparian/wetland acres that could be treated within a given project area or reduce the effectiveness of the treatment measures utilized (BLM 2011m, 2017e).

OHV and Travel Management Impacts

Off-road vehicle use would continue to cause ground disturbance and potentially cause negative impacts to riparian and wetland areas. Approximately 16.3 miles (24.8%) of perennial stream/riparian areas and 800 acres of wetlands (0.3%) are currently located within OHV Open area designations and would continue to be subject to cross-country motorized vehicle use and potential associated impacts under this alternative. However, no riparian or wetland areas have been documented to date through the PFC methodology, riparian photo point monitoring, riparian grazing monitoring, or general field reconnaissance and inventory as being negatively impacted by high concentrations of off-road motorized vehicle use. In addition, should the BLM identify areas in the future where specific existing roads are causing negative effects to riparian areas, the route would be removed or relocated (BLM 2003b, pp. 31-32, 44, 98-99, as maintained; BLM 2013ac, 2017f).

Livestock Grazing Management Impacts

Proper riparian livestock grazing systems can maintain sustainable plant communities and improve or maintain riparian/wetland function. The BLM has implemented active riparian grazing management on nearly all perennial and many intermittent streams in the planning area over the last 25 years, which has resulted in improved riparian conditions. Table 3-21 lists the streams and their corresponding riparian grazing management.

The rest rotation grazing system would maintain the composition of the key perennial species on about 12,766 acres (32%) of grazed riparian/wetland communities. The winter grazing system would maintain or improve the composition of key perennial herbaceous species on about 10,089 acres (25%) of grazed riparian/wetland communities. Continuing this current livestock management in riparian/wetland areas would ensure that grazing does not negatively affect the establishment or regrowth of riparian vegetation. By allowing early season grazing (winter/spring) in riparian areas and then removing the livestock, the vegetation has enough soil moisture to regrow, so that during the growing season, adequate cover is present on the banks to protect them from scouring during flooding events.

Table 3-21. Existing Livestock Management for Lotic Riparian Areas

Stream	Exclusion Areas			Riparian Pasture Management		
		Stream Miles			Stream Miles	
	Number	Public	Private	Number	Public	Private
Warner Lakes Basin						
Twentymile Creek	2	5.5	0	1	2.0	0
Twelvemile Creek	1	6.5	2.0	0	0	0
Fifteenmile Creek	5	2.5	0.75	1	2.5	0
Horse Creek	1	0	1.0	1	2.7	0.5
Honey Creek	2	4.25	4.5	0	0	0
Snyder Creek	2	1.5	0.5	0	0	0
Twelvemile Creek	1	2.25	0.25	0	0	0
Deep Creek	1	6.0	0	2	3.25	4.5
Camas Creek	2	2.25	0	1	1.5	0
Drake Creek	2	1.75	0	1	3.4	0
Parsnip Creek	2	1.35	0	1	1.1	0
Lake Abert Basin						
Chewaucan River	0	0	0	1	3.25	0.75
Dicks Creek	0	0	0	1	0.5	0
Willow Creek	3	2.0	0	1	0.5	0.75
Guano Basin						
Guano Creek	1	9.75	0	0	0	0
Summer Lake Basin						
Buck Creek	2	2.25	0	0	0	0
Bridge Creek[1]	2	0.75	0	2	0.5	0
Silver Creek	1	0.5	0	1	1.5	0
West Fork of Silver Creek	0	0	0	1	2.0	0
Duncan Creek	1	0.5	0	1	2.25	0

Source: BLM grazing files.
[1]Bridge Creek exclosure (0.5 mile) constructed in 2010 is not considered permanent.

Grazing exclosures have been implemented on many streams in the planning area (Table 2-2; see also Table 3-25). Approximately 15,985 riparian/wetland acres (39%) in the planning area would continue to be excluded from, or unallotted to, livestock grazing use. Key perennial and palatable woody vegetation (sedges, rushes, and willows) would be maintained or improved in these areas. Exclosures have mostly (>90%) been successful at controlling grazing use, but occasionally livestock find their way through an exclosure fence and limited grazing occurs. Additional exclosure fencing in Warner Sucker habitat, along with conducting extensive annual monitoring to locate and remove unauthorized grazing use have made most of the exclosures in the Warner Lakes Basin more effective in preventing livestock grazing use (see *Fish and Aquatic Habitat* section).

Summary

Monitoring, including stream surveys, photo monitoring (all on file at Lakeview BLM), and field reconnaissance, generally indicate improving trends in riparian and wetland habitat condition throughout the planning area as a result of current riparian/wetland management. This monitoring data, as well as recent PFC assessment updates (Tables 3-19 and 3-20) demonstrates that the current management direction in the *Lakeview RMP/ROD* (BLM 2003b) is adequate to protect, maintain, or restore riparian and wetland areas within the planning area. Based on the conditions the BLM has documented through monitoring in recent years (2010-present) riparian/wetland vegetation conditions would be maintained or

improved over the analysis timeframe. Overall, riparian/wetland juniper treatments would continue to move the few remaining degraded riparian and wetland areas toward desired future conditions at the most rapid rate of all the alternatives, with the exception of Alternative A.

Impacts of Alternative A

Wilderness Characteristics Management Impacts

Alternative A would enable BLM to treat impaired or juniper encroached riparian areas, stream channels, weed infestations, etc., within most wilderness characteristics units which would allow those areas to return to a relatively natural condition over time similar to the No Action Alternative. However, the BLM would not be constrained in its ability to conduct restoration management actions. This alternative would generally result in maintained or improved riparian and wetland area conditions across most wilderness characteristics units in the planning area, as evidenced by the conditions the BLM has documented through monitoring of current management in the recent years (2010 to present) within the planning area.

OHV and Livestock Grazing Management Impacts

The potential effects of livestock grazing and OHV use in riparian and wetland areas under this alternative would be the same as the No Action Alternative.

Summary

Overall, Alternative A would maintain riparian and wetland areas in PFC and allow the restoration of degraded, juniper-encroached riparian and wetland areas at the most rapid rate of all the alternatives.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Restrictions on ground disturbing management activities within wilderness characteristics and new Section 202 WSAs would generally protect or maintain riparian and wetland areas that are currently in desired condition (relatively good ecological health with little to no erosion, native vegetation intact, lack of weed infestations, etc.). However, over the long-term closed routes would revegetate and some degraded riparian and wetland areas would become inaccessible (see *OHV and Travel Management Impacts* section below).

In particular, the heavy equipment constraints within Category C units and new Section 202 WSAs could preclude or only allow partial implementation of some needed streambank stabilization actions in Deep and Camas Creeks, and head cut stabilization actions in the Juniper Mountain and Coyote-Colvin Allotments. Head cut stabilization work in the Juniper Mountain Allotment would require significant changes in order to be accomplished by hand. Implementing the action by hand would reduce the probability of success.

These constraints could hinder BLM's ability to actively restore some riparian and wetlands within some Category C units or new Section 202 WSAs that are not currently in desired conditions (impaired stream channels, weed infestations, juniper encroached areas, unstable areas, etc.) which would allow those areas to remain in a degraded condition for the foreseeable future.

OHV and Travel Management Impacts

Closing all Category C units and all WSAs to public motorized vehicle/OHV use (Map OHV-2, Appendix 5) would reduce or eliminate ground disturbance, vegetation trampling, and the risk of weed spread on many wetland/riparian areas. However, approximately 12.9 miles (19.6%) of perennial stream/riparian areas and 775 acres of wetlands (0.29%) would remain within OHV Open area designations under this alternative and would potentially be subject to cross-country motorized vehicle use and associated impacts. However, should the BLM identify areas in the future where existing roads are causing negative effects to riparian areas, the route would be removed or relocated (BLM 2003b, pages 31-32, 44, 98-99, as maintained) similar to the No Action Alternative.

This alternative would negatively impact the BLM's ability to access and implement effective habitat restoration treatments within many degraded riparian/wetland areas in Category C units many WSAs over the long-term. While BLM could continue to access all Category C units and all WSAs via motorized vehicles for administrative uses initially, over time some closed routes could become impassable, and the interior of some large areas could become inaccessible to the BLM and its contractors. Once this occurs, active ground-based riparian/wetland management would not be feasible. For this reason, the amount and effectiveness of riparian/wetland restoration treatments within Category C units and WSAs would be reduced over the long-term compared to Alternative A.

In areas where weed infestations become inaccessible over time, untreated areas would continue to spread throughout riparian and wetland areas, replacing native vegetation. Juniper would also continue to increase in inaccessible, untreated riparian areas, moving riparian conditions further from their natural state (desired condition). While passive restoration methods could eventually restore some stream channels within inaccessible, untreated areas to a stable condition, it would take decades, based on past, local experience. Passive restoration would not likely restore stable stream conditions in degraded areas over the long-term.

Livestock Grazing Management Impacts

While this alternative has the potential to remove or reduce livestock grazing on a substantial portion of the planning area due to permit relinquishment or rangeland health violations, it would not result in substantial benefits to perennial stream/riparian habitats because most of these areas are already excluded from livestock grazing under current management (Tables 2-2 and 3-25). In addition, over 99% of lentic riparian areas in the planning area are in Proper Functioning Condition, and nearly 85% of inventoried lotic riparian areas are in Proper Functioning Condition or are Functional at Risk with an Upward Trend. So, the vast majority of riparian and wetland areas in the planning area would not receive a large benefit from further reduction or removal of livestock grazing. Reductions in livestock grazing within the few remaining open riparian/wetland areas would likely result in improved riparian and wetland conditions, although not necessarily in all cases. The effects of removing livestock grazing would depend largely on current riparian condition and landscape setting.

Clary and Kinney (2000) found that virtually all measurements of streamside variables moved closer to those beneficial for salmonid fisheries when pastures were ungrazed in a 10-year study. In areas closed to grazing, plants would not be affected by cattle herbivory, and streambanks would not be affected by livestock trampling. Woody riparian plants would be allowed to reach escapement height. Residual vegetation could be used as cover by fish and wildlife. Skovlin (1984) found that exclusion of livestock

produced improved riparian and aquatic habitat following 4 to 7 years of rest, woody plant (shrub) recovery following 5 to 8 years of rest, and a doubling of fish biomass following 3 to 5 years of rest.

Conversely, over-resting can lead to deterioration of rangeland health (Wyman *et al*. 2006). Buckhouse *et al*. (1981) found no statistical difference in the amount of bank sloughing between a properly managed rest-rotation pasture and non-grazed control pastures. Once established, new plant communities that resulted from the disruption of ecological processes (e.g., Kentucky bluegrass, reed canary grass) can become very stable and will not return to one resembling the potential natural plant community through the use of extended rest alone (Stringham *et al*. 2003).

Livestock removal would limit the BLM's ability to use grazing as a tool to manage wildlife habitat, fuel loads, and weed infestations. Some weeds may flourish in the absence of grazing as a biological control; this has been documented locally, especially with Canada thistle. Plants may become decadent with rest. Nutrients can become tied up and residual plant material can impede light getting to young seedlings and sprouts. Without herbivory, some plants become less palatable, and residual dead vegetation can prevent wildlife foraging on live material (Wyman *et al*. 2006).

Summary

Overall, Alternative B would allow degraded riparian and wetland conditions within Category C units and WSAs to deteriorate at the most rapid rate of all the alternatives.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Riparian and wetland areas within Category C units that are in desired conditions (relatively good ecological health with little to no erosion, native vegetation intact, lack of weed infestations, etc.) would largely remain in the same condition or improve in ecological condition over time due to lack of disturbance.

While restoration treatments could occur in degraded areas, heavy equipment use could be constrained in some Category C units, which could reduce BLM's ability to conduct effective stream rehabilitation or stabilization work these units. In particular, some needed streambank stabilization work on Camas Creek within a Category C unit, could not occur unless heavy equipment can be utilized.

Management actions within Category B units would have similar effects on riparian/wetland management as within Category A units but could be more difficult or expensive to implement if BMPs (see Appendix 7) are applied. However, the BLM would be able to treat the majority of impaired stream channels, weed infestations, juniper encroached areas, unstable areas, etc., within riparian/wetlands in these units, which would allow those areas to return to a relatively natural condition over the long-term.

OHV and Travel Management Impacts

Under this alternative there would be no miles (0%) of stream/riparian areas and no wetlands (0%) located within OHV Open area designations. However, should the BLM identify existing roads in the future that are causing negative effects to riparian areas, the route would be removed or relocated (BLM 2003b, pages 31-32, 44, 98-99, as maintained) similar to the No Action Alternative. For these reasons,

this alternative would offer the most potential protection from motorized vehicle impacts to riparian/wetland areas across the entire planning area out of all of the alternatives.

Livestock Grazing Management Impacts

While this alternative could temporarily remove or reduce livestock grazing within some riparian/wetland areas, it would not result in substantial benefits to perennial stream/riparian habitats because most of these areas are already excluded from livestock grazing under current management (Tables 2-2 and 3-25). The effects of temporarily removing livestock grazing from the riparian/wetland areas in the planning area would be the same (likely some benefits, but highly variable) as those described for livestock removal under Alternative B. However, fewer riparian/wetland acres would potentially be impacted for a shorter period of time under this alternative.

Summary

Overall, riparian and wetland conditions within most Category C units would be maintained over time under Alternative C. Across the remainder of the planning area (outside of Category C units), riparian and wetland conditions would be maintained or improved similar to the No Action Alternative, as evidenced by the conditions observed from monitoring under current management in recent years (2010 to present).

Impacts of Alternative D

Wilderness Characteristics Management Impacts

While riparian/wetland restoration treatments could occur in wilderness characteristics units, the 2 units managed as Category C units under this alternative are small (4,671 acres) and contain no riparian or wetland habitats. For this reason, wilderness character management in those 2 Category C units would have no effects on riparian/wetland conditions or future restoration efforts.

Management actions within Category B units would have similar effects on riparian/wetland conditions and management as within Category A units but could be more difficult or expensive to implement if BMPs (see Appendix 7) are applied. However, the BLM would be able to treat the majority of impaired stream channels, weed infestations, juniper encroached areas, unstable areas, etc., within riparian/wetlands in these units, which would allow those areas to return to a relatively natural condition over time.

OHV and Travel Management Impacts

Under this alternative, approximately 0.001 miles of perennial stream/riparian areas (0.2%) and 64 acres of wetlands (0.002%) would be located within OHV Open area designations and would potentially be subject to off-road motorized vehicle use and associated negative impacts. However, should the BLM identify existing roads in the future that are causing negative effects to riparian areas, the route would be removed or relocated (BLM 2003b, p. 31-32, 44, 98-99, as maintained) similar to the No Action Alternative. Following Alternative C, this alternative would offer the most protection to riparian/wetland areas from the potential negative effects of off-road motorized vehicles.

Livestock Grazing Management

The effects of livestock grazing management on riparian and wetlands under this alternative would be the same as those described for the No Action Alternative and Alternative A.

Summary

Overall, Alternative D would result in maintained or improved riparian and wetland conditions across most of the planning area similar to the No Action Alternative.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

In general, Alternative E would have similar effects on riparian and wetland habitat management as those described for Alternative C. Riparian and wetland areas within Category C units that are in desired conditions (relatively good ecological health with little to no erosion, native vegetation intact, lack of weed infestations, etc.) would largely remain in the same ecological condition due to lack of disturbance.

While restoration treatments could occur in degraded areas, heavy equipment use could be constrained in some Category C units, which could reduce BLM's ability to conduct effective stream rehabilitation or stabilization work these units. In particular, needed head cut stabilization work in the Juniper Mountain Allotment within a Category C unit, could not occur unless heavy equipment can be utilized, or would require significant changes in order to be accomplished by hand. Implementing the action by hand would reduce the probability of success.

Management actions within Category B units would have similar effects on riparian/wetland management as within Category A units but could be more difficult or expensive to implement if BMPs (see Appendix 7) are applied. However, the BLM would be able to treat the majority of impaired stream channels, weed infestations, juniper encroached areas, unstable areas, etc., within riparian/wetlands in these units, which would allow those areas to return to a relatively natural condition over time.

OHV and Travel Management Impacts

Under this alternative, approximately 16.3 miles of perennial stream/riparian areas (24.8%) and 800 acres of wetlands (0.3%) would be located within OHV Open area designations and would potentially be subject to cross-country motorized vehicle use and associated impacts. However, should the BLM identify existing roads in the future that are causing negative effects to riparian areas, the route would be removed or relocated (BLM 2003b, p. 31-32, 44, 98-99, as maintained) similar to the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts

The effects of livestock grazing management on riparian and wetlands would be the same as those described for the No Action Alternative and Alternative A.

Summary

Riparian/wetland conditions within most Category C units would be maintained or improved over time similar to Alternative C (though in somewhat different geographic areas). On the remainder of the planning area, riparian and wetland conditions would be maintained or improved, as evidenced by the conditions observed from monitoring under the No Action Alternative in recent years (2010 to present).

Affected Environment – Non-Native Invasive Plants

Invasive plants are non-native, aggressive plants with the potential to cause significant damage to native ecosystems and/or cause significant economic losses. The Federal Noxious Weed Act (Public Law 91-2329) notes that the spread of non-native invasive plants contributes to the loss of site productivity, increased soil erosion, reduced species, and structural diversity, and loss of wildlife habitat. Some weed species are hazardous to human health and welfare and pose a significant threat to multiple-use public land management.

The BLM faces a wide array of invasive plants species and noxious weeds due to the diversity of vegetation types and conditions in the planning area. Many factors influence the establishment and spread of invasive plants, including community structures, proximity to currently infested areas, and biological traits of the invading species. The amount of pre-existing invasive plants, precipitation amount and timing, soil characteristics, disturbance type and severity, slope, aspect, and seed viability of both native and invasive plant species all contribute to weed abundance on a given site.

As of 2018, the planning area had over 30 invasive plant species occupying over 135,110 acres in approximately 5,156 separate documented locations (Table 3-22). These sites are primarily located along roads, in riparian areas, wetlands, recreation sites, water developments sites, and previously disturbed areas (*e.g.* wildfires). The size of individual sites ranges from a few plants to sites as large as 5,000-10,000 acres (perennial pepperweed in the Warner Lakes Basin). The most common noxious weed found across the planning area is Mediterranean sage. Invasive annual grasses (including cheatgrass) occupy hundreds of thousands of additional acres. Weeds can be introduced into vegetation communities via a variety of transport vectors such as wind, water, humans, livestock, and other animals (big game, rodents, and birds). One major pathway (vector) of invasive plant spread is water that moves across the Warner Lakes Basin, where invasive plants spread from landowner to landowner through both irrigation and natural water systems. Roads are another spread vector. Satellite infestations are often found along roads when just a single plant has appeared and can usually be controlled through manual methods. Many invasive species seeds are very hard and have the ability to pass through digestive tracts of animals unharmed. Other weeds have seeds or seedpods that cling to the fur of animals and the clothing of humans as a result of sticky hairs, hooked spines, or barbed awns. Other weeds present in the planning area such as thistles and knapweed species disperse their seeds via fluffy umbrella-like structures (puppus) which allow the seeds to be carried via wind anywhere from a few feet to many miles, depending on the species.

Existing sites are spreading at the edges, and by seed and other propagules to new sites creating satellite populations. The estimated spread rate for untreated noxious weeds in Oregon is about 12% per year. However, invasive annual grasses like cheatgrass are well established and may be spreading more rapidly (BLM 2010a, p. 132, 594-595). Since 1997, the BLM has treated an estimated 117,594 acres of weeds and invasive species sites in the planning area. Over the last five years, the BLM has treated between

Table 3-22. Existing Noxious Weeds and Invasive Species

Common Name/ Scientific Name	Current Documented Sites (#)	Current Documented (Acres)	Historic Documented Sites (#)	Historic Documented (Acres)	Primary Site Types and/or Locations (s)
Russian Knapweed *Acroptilon repens*	53	1,097	31	35	Warner Wetlands ACEC, Warner Valley, water developments, exclosures, along roads
Japanese Brome *Bromus japonicus*	24	12,018	0	0	South Warner
Cheatgrass *Bromus tectorum*	235	33,487	6	105.8	Past wildfires and burned areas
Lenspod Whitetop *Cardaria chaliepensis*	31	59	1	0	Roads, water developments, Warner Wetlands ACEC
Hoary Cress *Cardaria draba*	306	647	207	79	
Hairy Whitetop *Cardaraia Pubescens*	13	10.3	0	0	
Musk Thistle *Carduus nutans*	118	3,162	19	292	Juniper Mountain
Spotted Knapweed *Centaurea stoebe (C.maculosa)*	21	21	23	7.5	Fort Rock and Christmas Valley
Diffuse Knapweed *Centaurea diffusa*	1	2.1	7	1	Summer Lake
Yellow Starthistle *Centaurea solstitialis*	6	76	12	0.1	Paisley
Bur Buttercup *Ceratoephala testiculata*	10	8	1	0.5	Sunstone mines and parking locations
Canada Thistle *Cirsium arvense*	443	49,955	105	261	Riparian areas
Bull Thistle *Cirsium vulgare*	487	2,698	119	97	Riparian areas and disturbed sites
Field Bindweed *Convolvulus arvensis*	8	18.4	4	0.6	Roadsides
Teasel *Dipsacus fullonum*	10	26	1	0	Lake Abert
Russian Olive *Elaeagnus angustifolia*	30	182.4	1	0.1	Lake Abert
Halogeton *Halogeton glomeratus*	337	5,329	84	216	Warner Valley (salty soils)
Common St. Johnswort *Hypericum perforatum*	29	76	9	17.9	Springs
Dyer's Woad *Isatis tinctoria*	5	88	6	3.5	South Warner
Perennial Pepperweed *Lepidium latifolium*	591	6,703.7	52	11.4	Warner Valley, Warner Wetlands, Water Developments
Oxeye Daisy *Leucanthemum vulgare*	32	56	0	0	Deep Creek
Scotch Thistle *Onopordum acanthium*	34	1,986.9	23	13.6	South Warner, ROWs
Reed Canarygrass *Phalaris arundinacea*	23	132	1	0.1	Riparian areas
Mediterranean Sage *Salvia aethiopis*	571	7,618	232	1,409	Widespread across the planning area
Russian Thistle *Salsola kali L*	202	272	0	0	Roadsides and disturbed areas
Medusahead *Taeniatherum caputmedusae*	1,218	4,100	188	3,631	Clover Flat, Picture Rock, North Warner, Silver Lake
North Africa Grass *Ventenata dubia*	195	5,179	28	59	Clover Flat, Picture Rock, North Warner, Silver Lake, South Warner

Common Name/ Scientific Name	Current Documented Sites (#)	Current Documented (Acres)	Historic Documented Sites (#)	Historic Documented (Acres)	Primary Site Types and/or Locations (s)
Common Cocklebur *Xanthum strumarium*	33	46.7	0	0	Water developments, Warner Wetlands, Lake Abert
Spiny Cockleburr *Xanthium spinosum*	81	49	30	9.4	Water developments
TOTAL	**5,156**	**135,110**	**1,210**	**6,253**	

Source: BLM in prep. a.

12,630 and 32,030 acres of weeds and invasive species annually (BLM 2015e, 2015f, 2016a, 2016n, 2017d, 2018h, 2019m, 2020e). Many of these acres represent repeated treatments of the same area over multiple years.

Fire Ecology

Fire frequency has increased in drier locations where invasive annual grasses have established themselves. These changes in fire regimes have caused greater homogeneity of many landscapes, adding to continuous fuel beds. This allows fire to move through vegetation that are typically fire resistant in the early spring and late fall growing seasons, extending fire seasons. Alterations to the historic fire ecology of the area due to the introduction of non-native invasive species have resulted in larger fires occurring at shorter return intervals. When the interval becomes too short and energy reserves become depleted, native shrub and perennial bunchgrasses cannot recover; an area dominated by invasive annual grasses then occurs. Conversely, when intervals become too long, native shrubs become overly dense and decadent and reduce the health and productivity of the native herbaceous understory (Chambers *et al.* 2007; Mensing *et al.* 2006; Miller and Heyerdahl 2008).

Cheatgrass is an invasive annual grass that represents a fine fuel that creates a fire hazard in portions of the planning area. Cheatgrass thrives in disturbed environments; overgrazing of native species or wildland fires provide opportunity for cheatgrass establishment. The species outcompetes native grasses, forbs, and shrubs and replaces native vegetation, leaving large expanses of cheatgrass. Areas dominated by cheatgrass have the tendency to burn up to 4 times more frequently than native shrublands and grasslands (Balch *et al.* 2012). Repeated burning encourages future cheatgrass production at the expense of native grasses, forbs, and shrubs.

Crested wheatgrass is an introduced perennial grass that is often planted during wildland fire restoration. Planting crested wheatgrass in areas formerly dominated by shrubs may alter the fire regime. Crested wheatgrass plantings tend to predominate on the site for long durations, and native plants may become co-dominant over time. While crested wheatgrass is also used for developing "green strips" to aid in fire suppression efforts in other parts of the west because of its resistance to burning, it is not currently used in this fashion within the planning area.

Environmental Effects – Non-Native Invasive Plants

Analysis Assumptions

- New introductions of invasive species would continue to occur and spread into and out of the planning area as result of common vectors of spread including vehicle use, recreation activities, wildland fire, wildlife and livestock movements, and other surface-disturbing activities. The

relative risk of introduction, establishment, and spread of invasive species would be directly related to the amount of disturbance on a given landscape, success of on-going invasive species treatments, and success of restoration actions to establish desirable competitive vegetation.

- The annual spread rate is estimated to be 7% in area where effective treatments occur and approximately 12% in untreated areas (BLM 2010a, 2015e).
- Livestock grazing can be an effective tool to manage the spread of invasive annual grasses (Foster *et al*. 2015) and augment other treatments to control invasive species.
- Based on professional experience in the planning area, the BLM assumes for analytical purposes that up to 20% of any open OHV area designations could receive high, concentrated motorized vehicle use resulting in loss of vegetation, bare ground, and higher risk of weed invasion over the long-term.

Impacts Common to All Alternatives

BLM would continue to manage non-native invasive plants under the direction of an approved integrated weed management plan (*e.g*. BLM 2015e, 2015f, 2016a) under all alternatives. Current management would substantially improve the chances that invasive plants would be controlled with fewer retreatments (BLM 2010a, p. 135-136). With the current herbicides available, all of the noxious weed species known to be within the planning area could be effectively managed. Although large invasive species treatments have been implemented since 2015 which have helped deplete the invasive seed bank within treatment areas, large infestations of perennial pepperweed and annual invasive grasses would continue to be difficult to manage. The BLM would continue to focus on non-herbicide methods where they are most effective. In addition, the BLM would continue to participate in the Lake County Cooperative Weed Management Area (LCCWMA) which is a partnership of federal, state, and local government agencies, tribes, individuals, and various interested groups that coordinates the management of nonnative invasive species using a watershed-based approach. As a result of these efforts, invasive species would continue to be more effectively controlled at the watershed or landscape level under all alternatives.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Under this alternative, invasive plant treatments could continue to occur in wilderness characteristics units using all approved treatment methods, and large-scale treatments of invasive annual grasses could continue to be completed by both aerial and ground-based herbicide application methods, as long as the BLM deems such treatments would not diminish size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. This would result in the continued removal of undesirable, non-native vegetation and promote recovery of native vegetation across the planning area (BLM 2015e), including within wilderness characteristics units.

Post-wildfire or habitat restoration seedings/plantings could also occur under this alternative using aerial, broadcast, or drill seeding methods. While drill seeding is effective in establishing desirable vegetation, it typically results in vegetation growing in uniform drill rows that can appear unnatural for a long period of time. For this reason, drill seeding of large portions of a wilderness characteristics unit would be precluded under this alternative if the BLM deemed it would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics.

Ground-based broadcast seeding, including the use of a harrow or drag, would be more effective in re-establishing desirable vegetation in an area compared to aerial seeding. This method could also reduce or remove tracks left by ground-based herbicide application.

Most invasive species treatments would continue to occur in degraded sagebrush-steppe communities as long as the BLM deems such treatments would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. Some of these areas would undergo multiple treatments (e.g., weed treatment followed by seeding). The potential negative effects of these types of treatments would include short-term ground disturbance followed by recovery of desirable vegetation. However, seeding/planting treatments would enhance or speed up the overall recovery rate of the treated area(s) and would reduce the risk of future weed invasion. Invasive species treatments would continue to maintain or restore native vegetation communities across the planning area, including within wilderness characteristics units over the short and long-term.

OHV and Travel Management Impacts

Motorized vehicles are recognized as a vector for invasive plant movement/seed dispersal. Under this alternative, there would be about 10,802 acres in four scattered parcels that would continue to be closed to public motorized vehicle use/access. In addition, public motorized vehicle use on about 2,727,176 acres would continue to be limited to existing or designated routes (Table 3-32; Map OHV-1, Appendix 1). Cross-country motorized travel by the public would continue to be prohibited under both of these OHV area designations, which would reduce the risk of introducing or spreading weed species within the interior of these areas compared to Open OHV area designation. However, the lack of motorized access within the four small Closed OHV areas could also prevent early detection-rapid response (EDRR), as small/isolated sites would not likely be detected or treated until they become larger infestations.

While existing Open OHV area designations would continue to allow for public off-road motorized use and associated ground disturbance in these areas on about 467,104 acres under this alternative (Table 3-32; Map OHV-1, Appendix 1), an estimated 30,000-93,320 acres of these Open OHV areas would be expected to have concentrated vehicle use to the point of causing bare ground disturbance and a higher risk for introductions of non-native invasive species over the long-term. To counteract this risk, the BLM would continue to prioritize these Open OHV use areas for strategic survey and treatment of potential new weed invasions (BLM 2015e, 2015f, 2016a).

Invasive, non-native plants growing along existing open routes would continue to be relatively easy to detect, control, and monitor from a vehicle. Many of the currently known small, isolated infestations have been detected and reported by the public or BLM staff working along or driving on open routes in the planning area. Maintained roads would also continue to provide many ground-based vantage points to view more remote areas when surveying for weed sites. As a result, BLM would continue to be able to conduct effective EDRR treatments (while a site is small, has not spread outside of the immediate area, has not yet caused ecosystem damage, and can be easily and economically treated) along many routes in the planning area over the long-term under this alternative.

Livestock Grazing Management Impacts

The BLM expects that current levels of grazing use would continue to control fine fuel buildup (Foster *et al*. 2015) and reduce the risk of future high-intensity wildfire and subsequent weed establishment and spread across most of the planning area.

Targeted grazing would continue to be available as an invasive species treatment method throughout the planning area under this alternative. Targeted grazing can be effective in controlling some annual and biennial non-native invasive species (Smith and Sheley 2011). Animals would be brought into an infested area at a time when they would be most likely to damage the invasive plants without causing unacceptable damage to desirable native species or other elements of the environment. For example, early season grazing of cheatgrass prior to emergence of native grasses can allow native grasses to take advantage of the reduced cheatgrass competition. If sufficient removal of cheatgrass biomass is achieved, reduction in cheatgrass density over time may be possible (Foster *et al*. 2015, Hempy-Mayer and Pyke 2008). However, targeted grazing usually does not kill the plants, just suppresses growth, spread, and reproduction. While targeted grazing can reduce invasive plant abundance at a particular site, it would rarely, eradicate all invasive plants (BLM 2015e, p. 78-79).

Grazing animals could be particularly useful in areas with limited access or severe slopes, where herbicides cannot be applied (e.g., near water), or inside exclosures. As with many other treatments, targeted grazing would be most effective when used in combination with other treatments (BLM 2010a, p. 75) and could be used together with seeding (where hoof action would improve seed/soil contact and germination) to restore native habitats. Cattle are currently the only animals that have been used for targeted livestock grazing within the planning area, though sheep and goats could be used in limited circumstances (where there is little risk of contact/disease transmission with local bighorn sheep herds) to selectively graze shrub, forb, and woody invasive plants. (BLM 2015e, p. 78-79).

Where livestock are determined to be a causal factor in not meeting rangeland health standards, changes in grazing timing, duration, or reduction in AUMs would be used to improve vegetation communities and would likely be more effective in controlling invasive plants than complete removal of livestock.

Continuing the existing permit relinquishment process would result in little change in the total acres grazed or the risk of invasive species introduction or spread, because these permits are typically transferred to a new permittee. If the new permittee is local to the area, there would be little risk of introducing new invasive species by livestock, vehicles, or equipment. However, if a new permittee from outside of the area takes over the permit, this could increase the risk of introductions of new invasive species from outside the planning area.

Impacts of Alternative A

Wilderness Characteristics Management Impacts

All approved weed/invasive species management tools would continue to be used to control non-native invasive plants all across the planning area, similar to the No Action Alternative. The number of acres of invasive species treatments and potential effects of these treatments would be similar to the No Action Alternative.

Weed treatment methods would not be constrained under this alternative. In particular, large-scale ground-based treatments, including the use of drill seeding, could be implemented to control weeds and for other habitat restoration projects. As a result, this alternative would provide a more effective weed/invasive species treatment program than either the No Action Alternative or Alternatives B-E.

OHV and Travel Management Impacts

The effects of OHV management on weeds and invasive species under this alternative would be the same as those described for the No Action Alternative.

Livestock Grazing Management Impacts

Under this alternative, the potential effects of livestock grazing management, including management changes in response to rangeland health issues or permit relinquishments, on weeds and invasive species would be similar to the No Action Alternative.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Currently, about 65,474 acres of weeds/invasive species sites fall within the interior of Category C units and new Section 202 WSAs. Most of these acres occur in degraded sagebrush-steppe vegetation communities. Logistically, invasive species survey and treatment would become much more difficult within these areas due to implementation of OHV area and route closures under this alternative (see *OHV and Travel Management Impacts* section below).

Administrative motorized access for the BLM, its partners, or its contractors would be allowed on closed routes and in closed areas to conduct invasive/non-native species surveys and treatments. However, over time some closed routes would deteriorate due to lack of use or maintenance, erosion, and regrowth of vegetation in the roadbed, and would become impassable (see *Off-Highway Vehicle Use and Travel Management* section). At that point, access for ground-based treatments would be limited to Category C unit, new Section 202 WSA, and existing WSA boundary roads, or could only be conducted through more expensive backpack spraying with long hike-ins to the interior of these areas on foot. This would result in less ground-based treatments taking place within the interior of these areas over the long-term.

Though aerial herbicide application could be used within the interior of Category C units, new Section 202 WSAs, and existing WSAs, this method is typically used for large treatment areas with the average application being about 5,000 acres. For aerial herbicide application to be feasible the contractor needs open, well-maintained access roads close to the treatment area(s) so that equipment and supplies can be brought into the area (staged) without being damaged. In addition, aerial application would not be feasible for small infestations of just a few plants, as it could cause unnecessary use of herbicides on non-target species due to over-spray.

Some areas could require multiple treatments (*e.g.* weed treatment followed by seeding). The potential negative effects of these types of treatments would include short-term ground disturbance. Seeding and planting treatments would enhance the overall recovery rate of the treated area(s) and would reduce the risk of future weed invasion. These treatments would maintain or restore native vegetation communities in the planning area over time. However, vegetation treatments in Category C units would need to meet VRM Class II management objectives and treatments in new Section 202 WSAs would need to meet VRM I Class I objectives. The use of heavy equipment and drill seeding methods would be constrained in some Category C units which could reduce the potential for additional ground disturbing impacts to naturalness or noise impacts to solitude opportunities during the implementation of reclamation,

rehabilitation, and restoration actions. However, these effects would be short-term and would be offset by more natural appearing landscapes over the long-term.

Regardless of the treatment method used, it would not be feasible or as cost-effective for the BLM or its contractors to manage all infestations within the interior of Category C units or new Section 202 WSAs on an annual basis under this alternative. For this reason, the rate of spread from existing, untreated sites would be approximately 12% annually (BLM 2010a, 2015e) and could exceed the benefits of fewer new infestations occurring along closed routes.

OHV and Travel Management Impacts

The OHV Closed area designations and route closures would be substantially greater under Alternative B (about 2.1 million acres and 1,665 miles respectively) than all other alternatives. In addition, public motorized vehicle use on about 805,312 acres would be Limited to Existing or Designated Routes (Table 3-32; Map OHV-2, Appendix 1). Public cross-country motorized travel would be prohibited under both of these OHV area designations, which would reduce the risk of introducing or spreading some weed species compared to Open OHV area designations. Closing routes to motorized use would also reduce the amount of lands susceptible to weed introduction from vehicles transporting weed seed and propagules, and from new weed establishment along routes. Due to the large number of area/route closures, Alternative B would provide the least risk of new invasive species introduction from motorized vehicles. However, invasive plant movement/dispersal could still occur via wind, water, BLM administrative vehicle use, animal movements, and other vectors.

Open OHV area designations under this alternative would be reduced to about 252,569 acres of the planning area (Table 3-32; Map OHV-2, Appendix 1). An estimated 30,000-50,460 acres of these Open OHV areas would be expected to have concentrated use to the point of causing bare ground disturbance and a higher risk for more introductions of non-native invasive species over the long-term. However, to counteract this risk, the BLM would prioritize these Open OHV use areas for more strategic survey and treatment of new weed invasions.

While closing routes could result in natural revegetation and less bare ground (up to 2, 115 acres) potentially susceptible to future weed invasion, it could also result in some small, isolated weed sites not being detected until they become much larger infestations visible from the air. For this reason, the ability to locate new sites and conduct effective EDRR treatments while a site is small, has not spread outside of the immediate area, has not yet caused ecosystem damage, and can be easily and economically treated, would be substantially reduced on up to 2.1 million acres of the planning area over the long-term when compared to the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts

Reductions or removal of livestock under this alternative (due to rangeland health problems or permit relinquishments) would eliminate or reduce one potential vector (livestock transport) of weed introduction and spread within portions of the planning area, but there would also be other management trade-offs.

Ecological conditions for areas with intact, functioning native plant communities with minimal invasive species would be maintained or improved in the absence of disturbance. However, disturbed livestock concentration areas around water developments and trailing areas could re-vegetate with invasive annual species such as various mustards, annual grasses, and chenopods, if present in the disturbed area prior to

livestock removal. For this reason, control of invasive species in and around range improvement projects would continue to be a priority. However, since weed treatments are partially funded through the range improvement funds which come from the collection of grazing fees, reductions in grazing could result in less funding being available to treat weeds and invasive, non-native species under this alternative over the long-term.

In areas not meeting standards due to domination by invasive annual grasses, removing livestock could be detrimental. In one study, targeted cattle grazing removed 80-90% of the cheatgrass biomass, which resulted in flame length reductions and rate of spread during subsequent prescribed burning (Diamond *et al.* 2009). In addition, targeted grazing, would not be available as a potential invasive species treatment method within areas where livestock grazing is removed. In these areas invasive grasses would reseed and persist unchecked by grazing, which would lead to an increase in fine fuels (Foster *et al*. 2015) and contribute to higher risk of wildfire and subsequent weed expansion.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Most weed/invasive species treatments would occur in degraded sagebrush-steppe communities. The potential effects on weeds and invasive species and native vegetation recovery in most treatment areas would be similar to those described under the No Action Alternative. However, the additional constraints on vegetation restoration treatment methods (VRM Class II objectives, heavy equipment and drill seeding restrictions, etc.), and application of BMPs (see Appendix 7) within Category C units could negatively affect the BLM's ability to actively control weeds and invasive plants within portions of these units (up to 411,033 acres).

This alternative would allow off-road administrative access for invasive plant survey and treatment throughout the planning area (see *OHV and Travel Management Impacts* section below), including all Category A, B, and C units, and C unit setbacks. Though primitive routes within the interior of Category C units would remain open, none of these routes would be maintained under this alternative. This would result in some routes within Category C units becoming impassable over time due to lack of maintenance, erosion, and/or regrowth of vegetation in the roadbed. At that point, ground-based treatments could be limited to open wilderness characteristic unit boundary roads, or could only be conducted through more expensive backpack spraying with long hike-ins to the interior of these areas on foot. This would result in less ground-based treatments taking place within the interior of some Category C units over the long-term.

Areas within Category C units with low amounts of invasive plants would likely remain low due to the limits on new ground disturbing activities. However, small unknown weed infestation within the interior of Category C units could increase in size before being detected because of less staff access to the interior of some units. Areas with heavy infestations of noxious/invasive plants would not recover without active restoration management and weeds could spread in untreated, inaccessible areas at an estimated annual rate of 12% (BLM 2010a).

Active weed management could also occur within the Category C unit setbacks along roads. Due to the number of infestations located along roads, many existing weed sites could continue to be actively managed using the most appropriate treatment method. The impacts of the conducting integrated weed

management activities within the Category C unit setbacks would be similar to those described for Alternative A.

Though weed treatments within Category B units could include BMPs for wilderness characteristics (see Appendix 7), this would not likely result in a reduction in the amount of area treated or the effectiveness of the treatment employed.

The impacts of Category A unit management on weed management would be similar to those described for Alternative A, as the BLM would be able to access and effectively treat most existing weed/invasive species sites within these units.

OHV and Travel Management Impacts

There would be no Open OHV area designations under this alternative and public motorized vehicle use on about 3,194,461 acres of the planning area would be Limited to Existing or Designated routes. About 11,285 acres would continue to be closed to public motorized vehicle use/access (Map OHV-3, Appendix 1). Public cross-country motorized travel would be prohibited under both the Limited and Closed OHV area designations. This would result in less ground disturbance and less risk for introductions of weeds and invasive species from cross-country motorized vehicle use in these areas when compared to alternatives with more Open OHV area designations.

However, the BLM and its contractors would retain administrative access to travel off-road to monitor and treat invasive species in Open, Limited, and Closed OHV areas, as well as along open routes throughout the planning area. For this reason, the impacts of increasing the Limited OHV area designations on BLM's ability to monitor and treat weeds and non-native species under this alternative would be similar in most respects to those described for the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts

The potential effects of reducing or removing livestock on weed/invasive species management under this alternative (due to rangeland health problems or permit relinquishments) would be similar to those described for Alternative B. One potential vector (livestock transport) of weed introduction and spread would be reduced or eliminated within portions of the planning area. However, the acres where grazing could potentially be removed/reduced would be far fewer and of a more temporary nature than under Alternative B. In addition, the beneficial effects of grazing on weeds/invasive species management would be unavailable on fewer acres as Alternative B.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Most noxious weed/invasive species treatments would occur in degraded sagebrush-steppe communities. The potential effects on weeds and invasive species and native vegetation recovery in most treatment areas would be similar to those described under the No Action Alternative. This alternative would allow off-road administrative access for invasive plant management throughout the planning area, including within Category C units. However, the additional constraints on vegetation restoration treatment methods (VRM Class II, heavy equipment and drill seeding restrictions, etc.) and application of BMPs

(see Appendix 7) within Category C units would negatively affect the BLM's ability to actively control weeds and invasive plants within about 4,671 acres.

The impacts of conducting integrated weed management activities within the Category C unit boundary setbacks under this alternative would be similar to those described under the No Action Alternative and Alternative A.

Though weed treatments within Category B units could include BMPs for wilderness characteristics (see Appendix 7), this would not likely result in a reduction in the amount of area treated or the effectiveness of the treatment employed.

The impacts of Category A unit management on weed management would be similar to those described for Alternative A, as the BLM would be able to access and effectively treat most existing weed/invasive species sites within these units.

OHV and Travel Management Impacts

Under this alternative, about 11,285 acres would be closed to public motorized vehicle use/access (Table 3-32; Map OHV-4, Appendix 1). This would result in less ground disturbance and less risk for introductions of weeds and invasive species from motorized vehicle use in these areas.

Public motorized vehicle use on about 3,121,499 acres would be limited to existing or designated routes (Table 3-32; Map OHV-4, Appendix 1). Public cross-country motorized travel would be prohibited under both the Limited and Closed OHV area designations, which would substantially reduce the risk of introducing or spreading weed species compared to Open OHV area designations. However, the BLM and its contractors would still have administrative access to travel on open routes to monitor and treat invasive species, as well as drive off-road in Limited and Closed OHV areas to treat weeds and invasive species.

Open OHV area designations under this alternative would be reduced to about 70,500 acres of the planning area. Concentrated motorized vehicle use, to the point of causing bare ground disturbance and a higher risk for more introductions of non-native invasive species would occur within 30,000-70,500 acres of these Open OHV areas over the long-term. However, to counteract this risk, the BLM would prioritize these remaining Open OHV use areas for more strategic survey and treatment of new weed invasions. The risk of weed introduction or spread within Open OHV areas would be less than the No Action Alternative or Alternatives A or E, but more than Alternatives C or B.

Livestock Grazing Management Impacts

Under this alternative, the potential effects of livestock grazing management, including management changes in response to rangeland health issues or permit relinquishments, and concentrated livestock use around water developments and fences, on weeds and invasive species management would be similar to those described for the No Action Alternative and Alternative A.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Most noxious weed/invasive species treatments would occur in degraded sagebrush-steppe communities. The potential effects on weeds and invasive species and native vegetation recovery in most treatment areas would be similar to those described under the No Action Alternative. This alternative would allow off-road administrative access for invasive plant management throughout the planning area, including within Category C units. However, the additional constraints on vegetation restoration treatment methods (VRM Class II objectives, heavy equipment and drill seeding restrictions, etc.) and application of BMPs (see Appendix 7) within Category C units would negatively affect the BLM's ability to actively control weeds and invasive plants across about 370,210 acres.

This alternative would allow off-road administrative access for invasive plant survey and treatment throughout the planning area (see *OHV and Travel Management Impacts* section below), including all Category A, B, and C units, and C unit setbacks. Though primitive routes within the interior of Category C units would remain open, none of these routes would be maintained under this alternative. This could result in some routes within Category C units becoming impassable over time due to lack of maintenance, erosion, and/or regrowth of vegetation in the roadbed. Invasive plant management in these Category C units would become limited to backpack spraying with long hike-ins on foot from boundary roads or by aerial herbicide application. This could lead to less treatments taking place within the interior of some Category C units over the long-term.

Areas within Category C units with low amounts of weeds/invasive plants would likely remain low amounts due to the limits on new ground disturbing activities. However, small unknown weed infestation within the interior of Category C units could increase in size before being detected because of less staff access to the interior of some units. Areas with heavy infestations of weeds/invasive plants would not recover without active restoration management and weeds could continue to spread in untreated, inaccessible areas at an estimated annual rate of 12% (BLM 2010a).

Active weed/invasive species management would also occur within Category C unit setbacks along roads. Due to the number of existing infestations located along roads, many existing weed sites would continue to be actively managed using the most appropriate treatment method. The impacts of the conducting integrated weed management activities within the Category C unit boundary setbacks under this alternative would be similar to those described for the No Action Alternative and Alternative A.

Though weed treatments within Category B units could include BMPs for wilderness characteristics (see Appendix 7), this would not likely result in a reduction in the amount of area treated or a reduction in the effectiveness of the treatment employed.

The impacts of Category A unit management would be similar to those described for Alternative A, as the BLM would be able to access and effectively treat most existing weeds/invasive species sites within these units.

OHV and Travel Management Impacts

About 11,285 acres would be closed to public motorized vehicle use/access (Table 3-32; Map OHV-5, Appendix 1). This would result in less ground disturbance and less risk for introductions of

weeds/invasive species from motorized vehicle use in these areas. Public motorized vehicle use on about 2,725,298 acres would be Limited to Existing or Designated routes (Table 3-32; Map OHV-5, Appendix 1). Public cross-country motorized travel would be prohibited under both the Limited and Closed OHV area designations, which would reduce the risk of introducing or spreading weed/invasive species compared to the Open OHV area designation. However, the BLM and its contractors would still retain administrative access to travel on open routes to monitor and treat weeds and invasive species, as well as off-road in Limited and Closed OHV area designations to treat weeds and invasive species.

Open OHV area designations under this alternative would concentrate motorized OHV use within about 466,798 acres of the planning area (Table 3-32; Map OHV-5, Appendix 1). An estimated 30,000-93,320 acres of these Open OHV areas would be expected to have concentrated use to the point of causing bare ground disturbance and a higher risk for more introductions of non-native, invasive species over the long-term. To counteract this risk, the BLM would prioritize these Open OHV use areas for more strategic survey and treatment of new weed invasions. Overall, the risk for introduction of weeds/invasive species in Open OHV areas would be very similar to the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts

Under this alternative, the potential effects of livestock grazing management, including management changes in response to rangeland health issues or permit relinquishments, and concentrated livestock use around water developments and fences, on weed and invasive species management would be similar to those described for the No Action Alternative and Alternative A.

Affected Environment – Special Status Plants

The BLM, using criteria provided by the Oregon Biodiversity Information Center (ORBIC) and following guidance from BLM Manual 6840 (BLM 2008i), has designated their own lists and guidelines into criteria for classifying plants on BLM-administered lands as: Federal threatened or endangered, proposed threatened or endangered, candidate threatened or endangered, State threatened or endangered and Bureau sensitive, which are all managed as Special Status Species.

Special status plant species occur in a variety of plant associations and on a variety of physical habitats, many of which have distinct soil types. Several special status species often occur together. Energy Use Intensity analysis suggested that the various volcanic ash substrates found in southeastern Oregon have promoted a high degree of plant endemism (a large number of plant species that are found only in certain sites or areas). Numerous species and subspecies have arisen that can occupy these harsh ash sites.

There are no federally listed threatened, endangered, proposed, or candidate plant species, or designated critical habitat for such species on BLM-administered lands in the planning area. Therefore, these species will not be addressed further in this plan amendment.

As of June 2022, there were a total of 30 documented and 23 suspected Special Status plant species on BLM-administered lands in the planning area, all of which are classified as BLM Sensitive species (Table 3-23). Approximately 135,110 acres of special status plant habitat has been documented on BLM-administered lands in the planning area.

Table 3-23. Existing BLM Special Status Plants

Common Name	Species	Habitat	Occurrence[3]
Cusick giant-hyssop	*Agastache cusickii*	Rocky places on margins of playas and dry stream beds, and on talus slopes, at mid to high elevations; 2300-3200 m	D
Aloina moss	*Aloina bifrons*	Sandy soil and walls, among calcareous or basaltic rocks of dry areas; 300-800 meters elevation	S
Geyer milk-vetch	*Astragalus geyeri var. geyeri*	Depressions in mobile or stabilized dunes, sandy flats, and valley floors; along draws in gullied hills, and on margins of alkaline sandy playas; below 1850-2150 meters elevation	S
Pauper milk-vetch	*Astragalus misellus var. misellus*	No information available	S
Bastard kentrophyta	*Astragalus tegetarioides*	Primarily in cracks of welder tuffaceous rock outcrops or sandy soils, in dry pine forests and sagebrush communities; 1350 to 1550 meters elevation	D
Crenulate moonwort	*Botrychium crenulatum*	Moist meadows, streambanks, shrub dominated wetlands, continuous springs, wet roadside areas; 1500 to 3600 meters elevation	D
Pumice grapefern	*Botrychium pumicola*	Pumice gravel without humus, usually on moderate to steep slopes. Areas deeply covered with snow in winter and bone dry in summer; above 2400 meters elevation	S
Lewis River suncup	*Camissonia parvula*	Sandy soils, generally sagebrush scrub, sagebrush-juniper zone; 1100-2700 meters elevation	D
Washoe suncup	*Camissonia pusilla*	No information available	S
Capitate sedge	*Carex capitate*	Open, dry, or wet places at high altitude in mountains, generally above timberline; up to 3400 meters elevation	S
Russet sedge	*Carex saxatilis*	No information available	D
Dark Alpine sedge	*Carex subnigricans*	In wet or dry soil or talus at high elevations; Steens Mountains; above 2500 meters elevation	S
Native sedge	*Carex vernacula*	Moist or wet places at high elevations, at or above timberline; 2000-3800 meters elevation	S
Green-tinged paintbrush	*Castilleja chlorotica*	Mid-elevation open forest to subalpine slopes, associated with juniper/big sagebrush, ponderosa/bitterbrush, and mountain mahogany stands; up to 2500 meters elevation	S
Desert chaenactis	*Chaenactis xantiana*	Open, deep, loose, sandy (rarely gravelly) soils, arid and semiarid shrublands, chaparral; 800 to 2500 meters elevation	D
Fee's lip-fern	*Cheilanthes feei*	Generally, limestone crevices, slopes, cliffs; 1500-3000 meters elevation	S
Snowline spring-parsley	*Cymopterus nivalis*	Ash flow soils or open rocky places in juniper/sagebrush communities with varying slopes and elevations, often associated with *Eriogonum prociduum, E. cusickii*; 1550-3300 meters elevation	D
Short seeded waterwort	*Elatine brachysperma*	Mud or shallow water on the banks of streams and at the edges of ponds and reservoirs; 1200 to 1500 meters elevation	D
Bolander's spikerush	*Eleocharis bolanderi*	Fresh, often summer-dry meadows, springs, seeps stream margins; 1000-3400 meters elevation	D
Ephemerum moss	*Ephemerum crassinervium*	Occurs on damp disturbed soil, often in old fields, paths, river banks, or spots of open bare ground	D
Crosby's buckwheat	*Eriogonum crosbyae var. crosbyae*	Slopes comprised of light-tan to white volcanic ash deposits, sandstone or tuffaceous shale outcrops stratified with rhyolite in sparse saltbush/sagebrush/rabbitbrush communities; 1400 to 2400 meters elevation	D
Cusick's buckwheat	*Eriogonum cusickii*	Barren, rocky areas with dry gravelly volcanic soil in open flats in mixed grassland and sagebrush communities; exposed areas along subalpine ridges; 1300-1500 meters	D
Prostrate buckwheat	*Eriogonum prociduum*	Barren, dry volcanic gravelly slopes in mixed grassland, sagebrush, and juniper communities; 1400 to 2400 meters elevation	D
Green buckwheat	*Eriogonum umbellatum var. glaberrimum*	Sandy to gravelly slopes in big sagebrush communities; Warner Mountains; 1600-2300 meters elevation	S

Common Name	Species	Habitat	Occurrence[3]
Disappearing monkeyflower	*Erythranthe inflatula* (= *Mimulus evanescens*)	Vernally wet, gravelly, rocky areas, and low, wet fields, in sagebrush-juniper zones; 1200 to 1700 meters elevation	D
Broadtooth monkeyflower	*Erythranthe latidens* (= *Mimulus latidens*)	Vernally wet depressions, drainages; less than 1700 meters elevation	D
Warner Mountain bedstraw	*Galium serpenticum ssp. warnerense*	Steep slopes, rocky scree areas and talus slopes, at bases or rock outcrops, along road cuts; Warner Mountains; 1450-2750 meters elevation	D
Boggs Lake hedge-hyssop	*Gratiola heterosepala*	Shallow water, mud, or damp soil at edges of lakes and vernal pools; 1600-2400 meters elevation	D
Salt heliotrope	*Heliotropium curassavicum*	Saline plains, on or around the margins of alkaline lakes and playas in mid-elevation valleys	D
Cooper's goldflower	*Hymenoxys cooperi var. canescens*	No information available	D
Grimy ivesia	*Ivesia rhypara var. rhypara*	Soils ranging from reddish tuff to loose light-colored volcanic ash, shallow on gravelly, light-colored soil derived from vitric ash flow pumice with antelope bitterbrush; 1300 to 1600 meters elevation	D
Shelly's ivesia	*Ivesia rhypara var. shellyi*	Cracks and crevices in bare rock and outcrops of pumiceous welded ash-flow tuff along walls of canyons in bunchgrass-sagebrush hills; 1300-1600 meters	D
Shockley's ivesia	*Ivesia shockleyi*	Andesite rocky outcrops in low sagebrush, Sandberg bluegrass/Idaho fescue communities; 2800-3600 meters elevation	S
Aristulate lipocarpha	*Lipocarpha aristulata*	Wetlands, riparian area, occasionally non-riparian areas; up to 1500 meters elevation	S
Nevada lupine	*Lupinus nevadensis*	Hillsides and valley floors, in dry sandy or gravelly soils among sagebrush, 1350-2270 meters elevation	S
Lyrate malachothrix	*Malacothrix sonchoides*	Sandy or very sandy soil, sometimes on or about dunes; 700-2100 meters elevation	S
Blue-leaved penstemon	*Penstemon glaucinus*	At mid-elevations in open understory of pine forests, usually lodgepole or white-bark, occasionally ponderosa; open areas dominated by shrub-grasses on exposed slopes, rims, and ridges at higher elevations; 2000-3000 meters	S
Playa phacelia	*Phacelia inundata*	Alkali flats, margins of playas, sinks, and fluctuating lakes, in places that are likely to be submerged for part of the year, only seldom on slopes; low elevations	D
Dwarf phacelia	*Phacelia tetramera*	Alkaline flats, washes, meadows; often sandy soil; 1500-2400 meters elevation	D
Desert allocarya	*Plagiobothrys salsus*	Alkaline playas, sinks at low elevations	D
Oregon semaphoregrass	*Pleuropogon oregonus*	Wet meadows, marshes, streambanks, 750-1200 meters elevation	D
Profuse-flowered mesa mint	*Pogogyne floribunda*	Vernal pools, to summer-dry playa lake beds and ephemeral channels in silver sagebrush communities; 1000-1500 meters elevation	D
Rafinesque's pondweed	*Potamogeton diversifolius*	No information available	S
Columbia cress	*Rorippa columbiae*	Moist places along streams, vernally wet meadows, and lake playas with mostly clay soils; 1300-1600 meters elevation	D
Lowland toothcup	*Rotala ramosior*	Wet, low ground, lake and pond margins, streams; 1900 meters elevation	S
Wolf's willow	*Salix wolfii*	Streambanks and moist or wet meadows in mountains; 1800-3550 meters elevation	S
Achistidium moss	*Schistidium cinclidodonteum*	Occurs on bare rock/talus/scree; grows on wet rocks or dry rocks, often along intermittent water courses; 2000-3500 meters elevation	D
Water clubrush	*Schoenoplectus subterminalis*	Shallow water of ponds and streams; up to 2200 meters elevation	S
Verrucose sea-purslane	*Sesuvium verrucosum*	Mud flats, saline or alkaline soil on margins of seasonal lakes, often with *Heliotropium curassavicum* var. *obovatum* and black greasewood; 1100-1600 meters elevation	D

Common Name	Species	Habitat	Occurrence[3]
Long-flower snowberry	*Symphoricarpos longiflorus*	Open, rocky slopes and washes in sagebrush and juniper communities, occasionally in ponderosa pine; up to 2200 meters elevation	S
Woven-spored lichen	*Texosporium sancti-jacobi*	Found in arid to semi-arid grasslands, shrublands, or savannas. Parent materials are noncalcareous, including basalt, granite, and mixed noncalcareous alluvium; up to 1000 meters elevation	S
Mucronleaf tortula moss	*Tortula mucronifolia*	Soil, calcareous soil, silt, rock, cliffs, walls; up to 2700 meters elevation	S
Leiberg's clover	*Trifolium leibergii*	Barren tuffaceous hillsides, bare shaley crests and talus, reddish ash-flow; 1200 to 2400 meters elevation	S

[1] In an agreement between the BLM and the Oregon Biodiversity Information Center (ORBIC), ORBIC maintains a database on Oregon's rare, threatened, and endangered plants, animals, and ecosystems. Inclusion of any given taxon on these lists is contingent on specific criteria: the most important factors are the total number of known, extant populations in Oregon and worldwide and the degree to which they are potentially or actively threatened with destruction. Other criteria include the number of known populations considered securely protected, size of various populations, and the ability of the taxon to persist at a known site. Amendment of these lists occur every other year as inventory/monitoring provides new information (ORBIC 2016).

[2] Data for all of the special status species in the Planning Area is located on the Interagency Special Status /Sensitive Species Program (ISSSSP) website (https://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/).

[3] D = Documented; S = Suspected.

Environmental Effects – Special Status Plants

Impacts Common to All Alternatives

According to *Rare Plant Monitoring in Lakeview Resource Area* (Institute for Applied Ecology 2018), special status plant species that were present in 2018 occurred at a similar level of abundance as were observed during previous surveys. Potential threats that were identified included invasion and competition from non-native annual grasses, grazing by livestock, wild horses, and native ungulates, and man-made activities including roads and off-road vehicle use. The report also noted that tuffaceous soils are prone to erosion and suggested that populations of special status species found in these areas could be particularly threatened by soil disturbances, including trampling and vehicle activity.

Under all alternatives, grazing of special status plants by wild horses and native ungulates could occur and the potential effects would be similar. Several special status plant species sites are protected from grazing by exclosures or occur in inaccessible areas, such as steep terrain. While livestock use would have the potential to affect special status plants under all alternatives, the number of sites and potential magnitude of impacts would vary across the range of alternatives, particularly under Alternatives B and C.

Under all alternatives, a total of 20 special status plant species and their associated habitats would continue to be protected by existing WSA and ACEC designations and associated special management direction, which generally limits potential human-caused ground-disturbing activities (Table 3-24).

Under all alternatives, the BLM would continue to monitor known special status plant populations and their habitat, as well as conduct site-specific plant surveys prior to implementing ground-disturbing management actions and incorporating appropriate mitigation measures (see Appendix 7) to minimize potential negative impacts to special status plant populations and their habitat. Proposed management actions/projects in special status plant habitat would continue to incorporate appropriate mitigation measures (see Appendix 7) to minimize potential negative impacts to special status plant populations and their habitat. For this reason, none of the management alternatives would result in a downward trend that would lead a special status plant species population toward Federal listing.

Table 3-24. Number of Special Status Plant Species within Areas with Protective Designations

Designation	No Action	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Existing WSA	6	6	6	6	6	6
ACEC	14	14	14	14	14	14
Wilderness Characteristics Units (Category C/Section 202 WSA)	19	0	19	5	1	4
Total	**39**	**20**	**39**	**25**	**21**	**24**

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Under this alternative, the current management of special status plants and their habitats would continue as long as the BLM deems such management would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. Current population trends would be expected to continue (see *Impacts Common to All Alternatives* section above). Continuing to implement Provisions 18 and 19 of the Settlement Agreement could prevent some future ground disturbing activities at or near 19 special status plant sites (Table 3-24).

OHV and Travel Management Impacts

A total of 15 special status plant species sites within Open OHV area designations would continue to be subject to potential ground disturbance or trampling from motorized vehicle use under this alternative. The remainder of the special status plant species in the planning area fall within closed or limited OHV area designations which would continue to provide protection from potential negative trampling impacts of cross-country OHV activity.

Livestock Grazing Management Impacts

While direct impacts to special status plants from livestock grazing have not been documented within the planning area, there are 85 known occurrences in areas where grazing would continue and could be subject to potential grazing or trampling effects. The potential for livestock grazing impacts on special status plant habitat depends on many factors including the timing and intensity of grazing, as well as plant species composition. Those habitats that are dominated by perennial grasses could experience more potential negative impacts than special status plant habitat that is dominated by woody plants. There are 36 special status plant occurrences within areas that are currently excluded from livestock grazing and would not be subject to potential grazing or trampling effects.

Impacts of Alternative A

Current management of special status plants and their habitats would continue. Potential OHV, grazing and trampling effects, and current special status species population trends would be expected to continue over the long-term similar to the No Action Alternative.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Alternative B could reduce or eliminate potential impacts on 19 special status plants and their habitat by limiting potential future ground disturbance from salable/leasable mineral development and land use authorizations within all Category C units and new Section 202 WSAs.

OHV and Travel Management Impacts

While most special status plants and their habitat would be located within Closed or Limited OHV area designations under this alternative, six special status species sites would remain within Open OHV area designations and could be subject to potential ground disturbance or trampling from public cross-country motorized vehicle use. Overall, OHV management under this alternative would provide the second highest level of protection to special status plants and their habitats from motorized vehicle use of all the alternatives. However, the closure of large areas and existing routes within the interior of all Category C units, new Section 202 WSAs and existing WSA could also hinder the BLM's ability to access areas to inventory and monitor special status plants and their habitat inside these areas over the long-term.

Livestock Grazing Management Impacts

While direct impacts to special status plants from livestock grazing have not been documented within the planning area, reductions in livestock grazing (including exclosures) could provide additional protection to special status plants by preventing loss or damage from trampling and/or direct grazing of individual plants. Any reductions in livestock grazing under this alternative that occur in special status plant habitat would likely have positive overall impact to special status plants.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Under this alternative, an additional 2 special status plant species and their associated habitats would be protected from potential future ground disturbance from such actions as salable/leasable mineral development and land use authorizations within Category C units (Table 3-24) compared to the Alternative A. These protections would help limit potential negative impacts to special status plant species and their habitats in these areas.

Special status plant sites and their associated habitats within Category A and B units would not receive additional benefits or protections above the typical survey, monitoring, and mitigation measures provided by existing special status species management policy (see *Impacts Common to All Alternatives* section above).

OHV and Travel Management Impacts

Due to the fact that OHV use would be limited to existing routes across the entire planning area (about 3.2 million acres), there would be no special status plant species subject to potential ground disturbance or trampling from public motorized vehicle use under this alternative. In this respect, this alternative would provide the highest level of protection from potential OHV impacts of all of the alternatives.

Livestock Grazing Management Impacts

Any temporary reductions in livestock grazing that could occur in special status plant habitat under this alternative would provide positive impacts to special status plants similar to those described for Alternative B.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Under this alternative, one additional special status plant species site would be protected from potential future ground disturbance associated with salable/leasable mineral development and new land use authorizations within Category C units (Table 3-24) compared to Alternative A.

Special status plant sites and their associated habitats within Category A and B units would not receive additional benefits or protections above the typical survey, monitoring, and mitigation measures provided by existing special status species management policy (see *Impacts Common to All Alternatives* section above).

OHV and Travel Management Impacts

A total of three special status plant species and their habitat would continue to be subject to potential ground disturbance or trampling from public motorized vehicle use within Open OHV area designations under this alternative. The remainder of the special status plant species in the planning area would fall within Closed or Limited OHV area designations which would provide protection from the potential trampling impacts of public cross-country OHV activity.

Livestock Grazing Management Impacts

The potential impacts of this alternative on special status plants and their habitat from livestock grazing would be similar to the No Action Alternative and Alternative A.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Under this alternative, an additional four special status plants and their associated habitats would be protected from potential future ground disturbance by such actions as salable/leasable mineral development and new land use authorizations within Category C units (Table 3-24) compared to Alternative A.

Special status plant sites and their associated habitats within Category A and B units would not receive additional benefits or protections above the typical survey, monitoring, and mitigation measures provided by existing special status species management policy (see *Impacts Common to All Alternatives* section above).

OHV and Travel Management Impacts

A total of 15 special status plant species and their habitat would continue to be subject to potential ground disturbance or trampling from motorized vehicle use within Open OHV area designations under this alternative. The remainder of the special status plant sites in the planning area would fall within existing Closed or Limited OHV area designations which would provide protection from the potential impacts of public cross-country OHV use.

Livestock Grazing Management Impacts

The potential impacts from livestock grazing on special status plants under this alternative would be similar to the No Action Alternative and Alternative A.

Cumulative Impacts Common to All Alternatives

Locatable Minerals

The potential additive, incremental negative effects of future locatable mineral exploration and development on vegetation communities (upland, forest, riparian and wetlands, etc.) within the planning area, including vegetation communities within wilderness characteristics units, would be similar under all alternatives. Locatable mining is equally likely to occur under all alternatives and would cause ground disturbance and remove existing vegetation communities on a given mine site. Mine operators would be required to prepare a reclamation plan and, in many instances a plan of operations, to incorporate measures that would prevent unnecessary and undue degradation of the public lands (43 CFR § 3809). The BLM would be required to prepare a separate NEPA analysis and approve the reclamation plan and/or plan of operations for locatable mineral development. Impacted areas would be reclaimed either concurrently or at the conclusion of mining activities. During reclamation, vegetation would be restored to a given mine site, but the plant species composition and relative abundance of species would likely be different from what existed on-site prior to locatable mining activities. In particular, it would take many years following reclamation for mature shrub and tree species to re-establish on a mine site and this would not likely occur in either the short or long-term. These requirements would not eliminate or completely mitigate all potential negative effects of future locatable mining development but would minimize negative impacts to vegetation communities the extent possible under the General Mining Law of 1872 (as amended) and the 43 CFR § 3809 regulations.

Upland Vegetation Communities

Under all alternatives, an estimated 8,227 acres of upland sagebrush steppe communities in the planning area would remain in a relatively permanent disturbed condition due to continuation of on-going management actions, including existing land use authorizations, mining, facilities, and recreation sites (Tables 3-6, 3-9, 3-31, and 3-51).

Upland vegetation community (sagebrush steppe and forest) structure, composition, diversity, and ecological condition within the majority of the planning area would not remain static but would change over the long-term in response to natural succession, climatic variation, and natural disturbance (*e.g.* disease, insect, foraging by wild horses and wildlife, wildfire, etc.) under all alternatives. For example, an outbreak of the larval stage of the Aroga moth (*Aroga websteri*) could defoliate sagebrush over large

areas during years of population eruptions, which are associated with changes in precipitation and temperature patterns that result in greater palatability and nutritional value of sagebrush and leads to increases in larval survival (Bolshakova 2013).

The inherent uncertainties of predicting localized consequences of climate change on plant species make it difficult to forecast future conditions with enough precision to be actionable to managers, in part due to the of the uncertainties in climate model results coupled with complex interactions, feedbacks, and cascading impacts inherent in all vegetation ecosystems (Dukes *et al*. 2009, Kemp *et al*. 2015). Brice *et al*. (2020) synthesized recent studies that modeled vegetation changes in the Inter- Mountain West (which included the Northern Great Basin portion of the planning area) attributed to climate change. The models employed a range of methods and incorporated multiple future GHG emission scenarios. Overall, the model results showed a high degree of consistency in the direction of projected impacts to several vegetation communities, though they did not address the potential magnitude of change. The models predicted pinyon-juniper communities would likely decline, while cheatgrass and sagebrush would not change in the region. However, the authors noted that most of the models did not consider the potential effects of future changes in wildland fire regimes which other studies indicate could potentially cause greater declines in pinyon-juniper, decreases in sagebrush, and increases in cheatgrass. These contradictory findings, along with the authors' own admission that different model inputs promoted variance in the model results, limit these models' relevance in BLM land use planning.

In cold desert ecosystems, the resilience of native plant communities to stress and disturbance varies along climatic and topographic gradients (Chambers *et al*. 2014). Wyoming big sagebrush, mountain big sagebrush, snowberry, and bitterbrush occur at progressively higher elevations and are associated with decreasing temperatures and increasing amounts of precipitation, site productivity, and fuels (West and Young 2000). Resilience to disturbance, including wildland fire, increases along elevation gradients (Condon *et al*. 2011, Davies *et al*. 2012, Chambers *et al*. 2014b; Chambers *et al*. In Prep.). Higher precipitation and cooler temperatures, coupled with greater soil development and plant productivity at mid to high elevations, can result in greater resources and more favorable environmental conditions for plant growth and reproduction (Alexander *et al*. 1993; Dahlgren *et al*. 1997). In contrast, minimal precipitation and higher temperatures at low elevations result in lower resource availability for plant growth (West 1983a ,1983b, Smith and Nowak 1990).

The two potential climate change scenarios (see *Climate* section) could have different potential effects on native vegetation and invasive species over the long-term. Should climate change result in a future warmer/dryer environment where most of the precipitation occurs in the late winter/spring, this would likely favor invasive annual grasses with less resistance to wildfires. If climate change results in a future warmer/wetter environment and more of the precipitation occurs during the summer, this would favor native plants that would be more resistant to wildfire and invasive annual grasses and could also lead to less intense wildfires and vegetation disturbances in the future.

Changes in fire frequency could have even more pronounced effects on sagebrush steppe communities than changes in precipitation. Sagebrush steppe is tolerant of summer drought and sagebrush coverage and density are relatively unresponsive to shifts in the seasonality of precipitation. Shifts in climate would likely have more effects on what species would become direct competition or companion species with sagebrush. Warmer temperatures with more summer precipitation could reduce summer drought stress on competing trees leading to the conversion of sagebrush to woodlands (Peterson *et al.* 2011). Decreased fire frequency and intensity tends to increase rates of juniper encroachment into sagebrush

(Miller *et al.* 2005), whereas increased fire frequency tends to increase conversion to invasive annual grassland (Whisenant 1990). While sagebrush is adapted to infrequent (Table 3-12), patchy fires, it is not well adapted to intense or frequent fires. If climate warming leads to more frequent fires, this would open areas up to a higher risk of establishment of non-native invasive species where native grasses, forbs, and sagebrush may not be able to reestablish dominance. Increased temperatures and atmospheric carbon dioxide concentrations could also provide a fertilization effect that could increase plant growth rates and change competitive relationships (Svejar *et al*. 2008).

Increased atmospheric carbon dioxide concentration could also increase water-use efficiency for some plant species, particularly those that exhibit the C_3 photosynthetic pathway (see *Glossary* in Appendix 8), such as sagebrush (Peterson *et al*. 2011, Morgan *et al.* 2001, Chambers and Pellant 2008). Carbon dioxide enrichment could have the greatest effect on plants at sites that are highly water-limited, but not nitrogen-limited (McMurtrie *et al*. 2008). However, increased growth of sagebrush due to elevated atmospheric carbon dioxide may have already reached a plateau due to other environmental limitations in the Pacific Northwest.

Since the modelling predicts that the most substantial changes in climate could occur 50-100 years out into the future, it is uncertain if many of the potential effects to vegetation communities described in this section would be measurable over the long-term, particularly among sagebrush species.

Wetland and Riparian Communities

Continuing to repeatedly treat 500-3,500 acres of wetland vegetation (via prescribed fire or targeted grazing) annually within the south end of the Warner Wetlands (Table 3-25) (BLM 1990b, 1990e, 1990h, 2003r, 2015z, 2018b, 2018c, 2020h, 2021a, 2021b) over a 5 to 10-year treatment cycle would control invasive species and maintain native wetland vegetation communities in a similar fashion under all alternatives.

Noxious Weeds/Invasive Species

Climate change could alter the future distribution and extent of invasive annual grasses by affecting fire regimes (with which invasive grasses have a reciprocal relationship) and by affecting competitive relationships that are sensitive to the amount of seasonality of precipitation (Brown *et al*. 2012). The BLM has documented the relationship between recent wildfires and increases in invasive annual grasses across the planning area. Without active restoration management burned areas often become dominated by invasive annual grasses. Invasive annual grasses have altered the historic fire frequency in some locations within the planning area from 20-30 years to as frequent as every year. These frequent fire disturbances perpetuate not only invasive annual grasses, but also provide conditions favorable for other invasive plants such as musk thistle, Mediterranean sage, Canada thistle, and yellow starthistle.

In general, the amount and seasonal timing of precipitation are important to cheatgrass growth and its competitive ability. Growth of cheatgrass varies with seasonal and interannual weather patterns more so than perennial grasses (Knapp 1996). Spring water availability is important to cheatgrass success due to its phenology as a cool-season annual. During fall and winter, cold temperatures limit its growth, and by summer, growth has ceased. Therefore, only in spring does water availability affect its growth and only then is it able to reduce water availability for its competitors. In contrast, should total or summer

Table 3-25. Potential Cumulative Impacts of Reasonably Foreseeable Vegetation, Fire, and Fuels Management

Reasonably Foreseeable Future Actions[1]	Common to All Alternatives (Past or On-going Actions)	No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Vegetation							
Weeds/Invasive Species (All Methods)	117,594 ac. since 1997	12,630-32,030 acres/year (BLM 2015e, 2015f, 2016a)	Same as No Action Alternative	8,000-12,000 acres/year (BLM In prep. a)	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative
Phase I Juniper and Shrub Cut/Thin in Sagebrush Steppe	Mechanical: 56,891 acres [3] Prescribed Fire: 85,194 acres [3]	10,000 acres/year (BLM In prep. a)	Same as No Action Alternative	7,000-8,000 acres/year (BLM In prep. a)	8,000-10,000 acres/year	Same as No Action Alternative	Same as Alternative C
Phase II and III Juniper Cut, Pile, and Burn in Sagebrush Steppe		3,000-5,000 acres/year (BLM In prep. a)	Same as No Action Alternative	1,000-2,000 acres/year (BLM In prep. a)	3,000-4,000 acres/year	Same as No Action Alternative	Same as Alternative C
Sagebrush Steppe Restoration Seedings/Plantings		15,000 acres/year (BLM In prep. a)	Same as No Action Alternative	5,000-6,000 acres/year (BLM In prep. a)	8,000-10,000 acres/year	Same as No Action Alternative	Same as Alternative C
Forest Restoration	279 acres [3]	500 acres/year (BLM In prep. a)	Same as No Action Alternative	200 acres/year (BLM In prep. a)	300-400 acres/year	Same as No Action Alternative	Same as Alternative C
Riparian/Wetland Restoration		Riparian Area: 200 acres/year Buffer: 1,500 acres/year (BLM In prep. a)	Same as No Action Alternative	Riparian Area: 100 acres/year Buffer: 500 acres/year (BLM In prep. a)	Riparian Area: 100-150 acres/year Buffer: 1,200 acres/year	Same as No Action Alternative	Same as Alternative C
Wetland Maintenance (Warner Wetlands)	1,000-2,000 acres per year (BLM 1990c, 1990d)	Prescribed Fire for wildlife: 2,000–3,500 acres/year (BLM In prep. a) Targeted Grazing for wildlife: 500-750 acres/year (BLM 2016e, 2018b, 2018c, In prep. a)	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative
Special Forest Product Harvest	4,478 acres harvested since 1990 [3]	50-75 acres/year (BLM In prep. a)	Same as No Action Alternative	15-30 acres/year (BLM In prep. a)	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative
Fire and Fuels							
Wildfire	400,758 acres since 1980 [2]	10,020-19,450 acres/year (based on comparison of 40-year and past 10-year averages) [2]	Same as No Action Alternative	19,000-25,000 acres/year	15,000-19,450 acres/year	Same as No Action Alternative	Same as Alternative C
Emergency Fire Rehabilitation Seedings	172,600 acres in wildland fire areas since 1980 [3]	4,300 [3] – 8,000 acres/year	Same as No Action Alternative	5,000-9,000 acres/year	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative
Fuel Break/Reduction Treatments	670 miles maintained via mowing.	Mowing: up to 2,550 additional miles (92,730 acres) total (BLM In prep. a)	Same as No Action Alternative	Mowing: up to 1,300 additional miles (50,000 acres) total (BLM In prep. a)	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative

Reasonably Foreseeable Future Actions[1]	Common to All Alternatives (Past or On-going Actions)	No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
	(5,350 acres) [3] Targeted Grazing: 6 miles (2,500 acres) total (BLM 2020i)						

[1] These estimates are for analytical purposes and do not represent specific management targets.
[2] Source: BLM Wildfire GIS dataset.
[3] Source: BLM Treatments GIS dataset.

precipitation increase, native perennial vegetation would be favored and would outcompete invasive annual grasses. Most of the planning area falls within the cool/dry or warm/dry soil temperature and moisture regimes (Chambers *et al*. 2014a). In cold desert ecosystems, resistance to annual invasive grasses is strongly influenced by soil temperature and moisture regimes. Germination, growth, and reproduction of cheatgrass is physiologically limited at low elevations by frequent, low precipitation years, constrained at high elevations by low soil temperatures, and optimal at mid elevations under relatively moderate temperature and water availability (Chambers *et al*. 2007).

The risk of weed seed being transported and introduced into native vegetation communities via a variety of transport vectors outside of BLM's control including wind, water, and wildlife, would continue in a similar manner under all alternatives.

Special Status Plants

Meinke (2015) evaluated 15 BLM special status plant species in the planning area that fell into three groupings, based on environment and vulnerability to climate change. These included (1) three upland species with moderate edaphic restrictions and no relationship to wetland habitats; (2) four xerophytic specialist species that are restricted to unusual geologic formations or substrates; (3) eight species with life histories tied to wetland or aquatic habitats.

This evaluation found that the upland special status plant species were classified as moderately vulnerable to potential climate change, but extinction was not expected. However, the abundance and geographic range of these species would likely decrease somewhat by the mid-21st century, due to increasing temperatures in combination with elevated rates of evaporation and evapo-transpiration.

Xerophytic plant specialists and wetland/aquatic species were classified as extremely vulnerable to potential climate change. The abundance and geographic range of these species are extremely likely to substantially decrease or disappear by the mid-21st century due to increasing temperatures and elevated rates of evaporation and evapo-transpiration in combination with various other life-history and dispersibility factors.

The phenology of life history events represents a central mechanism by which plant species respond to environmental change. Phenological responses to climate change would not be uniform, as some plant taxa could fail to respond, or respond in ways that are maladaptive, while others could undergo evolutionary change or respond via phenotypic plasticity (Zografou *et al.* 2021). Generalist plant species have a wider niche and an ecological survival advantage in areas with unpredictable or changing environment compared to many of the BLM special status species (Table 3-23). However, under the warmer wetter model, the growing season would likely increase and in the absence of water stress, warmer temperatures would increase plant metabolism, reproductive rates, and survival. This could increase overall rangeland productivity (Brice *et al*. 2020) and possibly allow sensitive plants to adapt to a changing environment via phenotypic plasticity.

Change in fire frequency and severity due to changing climate may not increase risk of extirpations among xerophyitc specialist plant species, as these particular plants occur in dry, low vegetative cover which are not as likely to carry fire.

Cumulative Impacts of No Action Alternative

Under the No Action Alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 1,944-2,289 additional acres of vegetation communities (on top of the existing 8,227 acres associated with these activities) over the long-term (Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a). Most of these effects would occur elsewhere in the planning area outside of wilderness characteristics units, as these activities would not occur if the BLM deemed they would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics.

Future vegetation/habitat restoration treatments could cause short-term loss of vegetation on an estimated 907,600-1,371,100 acres throughout the planning area (Table 3-25; BLM 2007b, 2010a, 2015e, 2015f, 2015u, 2016a, 2017d, 2018h, 2019m, In prep.a). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. However, the short-term effects would decrease following treatment and would be offset as undesirable, non-native/invasive species decline, and the treated areas recover to native or desired vegetation communities and improve in ecological condition and resiliency over the long-term. Treatments would not occur within wilderness characteristics units if the BLM deemed they would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics.

New fuel breaks could be created on up to an estimated 95,230 acres (on top of maintaining 5,350 acres of existing fuel breaks; Table 3-25; BLM 2020e, In prep. a) over the long-term. While this action would reduce total vegetative cover, particularly woody vegetation, it would not completely remove all vegetation within the fuel break. Though climate change could contribute to a higher probability of wildland fire in the future, the creation and maintenance of a comprehensive fuel break system would result in fewer fire starts along roads, direct modification of fire behavior within the fuel breaks themselves and would increase the likelihood for future wildfires to burn fewer acres (BLM 2020e, p. 58). Fuel breaks would not be created within wilderness characteristics units if the BLM deemed it would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics.

Since vegetation/fuel reduction treatments can also reduce the intensity and/or size of future wildfires in the treated area (due to lower fuel loads), the short-term, collective negative effects of both fuel breaks and fuel reduction treatments on existing sagebrush steppe, forest, and riparian/wetland vegetation communities would be offset by keeping the total acres burned by future wildland fires from growing larger over the long-term. Though the specific location, timing, and severity of future wildland fires are not reasonably predictable, the BLM estimates that the average total acres burned in the planning area on an annual basis where fuel treatments are implemented would not increase (estimated at 200,400-389,000 acres total on top of the estimated 400,758 acres that have burned since 1980; Table 3-25) and could potentially be reduced over the long-term (see *Fire and Fuels* section). While this would result in short-term loss of vegetation communities and areas of bare ground subject to increased soil erosion potential, these negative effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Soil* and *Fire and Fuels - Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of sagebrush-steppe communities could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Tables 3-1 and 3-17) (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative A

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 2,170-2,310 additional acres of mostly sagebrush steppe vegetation throughout the planning area over the long-term (on top of the existing 8,277 acres; Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a).

Vegetation/habitat restoration, wildland fire, and fuels management could cause similar additive, incremental cumulative effects on vegetation communities within the planning area as the No Action Alternative (Table 3-25; BLM 2020e, In prep. a) (see *Soil,* and *Fire and Fuels - Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of vegetation could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17) resulting in similar potential cumulative impacts to vegetation communities as described for the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative B

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 1,862-1,961 additional acres of vegetation throughout the planning area over the long-term (on top of the existing 8,277 acres of disturbance associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a). These disturbances would occur elsewhere in the planning area outside of Category C units and new Section 202 WSAs where less restrictive management would apply.

Vegetation/habitat restoration treatments could cause short-term loss of vegetative cover on an estimated 497,000-672,500 acres across the planning area (Table 3-25). Many of these areas could undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. However, these effects would decrease as the treated areas recover to native or desired vegetation communities over the long-term and would occur on fewer acres than the No Action Alternative.

Since fuel breaks would be precluded in all new Section 202 WSAs and Category C units, and there would be no Category C management setbacks under this alternative, the potential negative effects to vegetation communities from creating new fuel breaks would occur on fewer (up to 52,500) acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25; BLM In prep. a) over the long-term compared to all other alternatives (see *Soil - Cumulative Effects* section).

Fewer fuel breaks, coupled with fewer, less-effective fuel reduction treatments (see *Vegetation* and *Fire and Fuels* sections), and a warmer climate would likely result in greater fuel loading, greater wildfire risk,

higher intensity wildfires, and more total acres burned within untreated areas (*e.g.* Category C units and new Section 202 WSAs) over the long-term of all the alternatives analyzed. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that the average annual acres burned would increase (an additional 380,400-500,000 acres total on top of the estimated 400,758 acres that have burned since 1980) within the planning area over the long-term. This would result in loss of vegetation communities and larger areas of bare ground subject to increased soil erosion potential compared to the No Action Alternative and Alternative A. However, these negative effects would decline over the long-term due to natural revegetation and emergency rehabilitation (estimated 100,000-180,000 acres of seeding/planting) actions (Table 3-25) (see *Soil* and *Fire and Fuels - Cumulative Effects* sections).

An additional 444 to 868 acres of vegetation could be disturbed by livestock concentration or trailing use associated with new range improvements over the long-term (on top of an estimated 21,500-32,000 acres of concentrated use; Table 3-17) (see *Livestock Grazing – Cumulative Effects* section) resulting in slightly less potential cumulative impacts to vegetation communities compared to the No Action Alternative.

Cumulative Impacts of Alternative C

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 1,961-2,206 additional acres of vegetation over the long-term (on top of the existing 8,227 acres associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a) outside of Category C units.

Vegetation/habitat restoration treatments could cause short-term loss of vegetative cover on an estimated 935,600-1,202,100 acres throughout the planning area (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g.* juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. However, these effects would decrease as the treated areas recover to native or desired vegetation communities over the long-term.

New fuel breaks could be created on up to an estimated 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25; BLM 2020e, In prep. a) over the long-term, including within Category C unit setbacks. While this action would reduce total vegetative cover, particularly woody vegetation, and temporarily increase soil erosion potential, it would not completely remove all vegetation within the fuel break. Though climate change could contribute to a higher probability of wildland fire in the future, the creation and maintenance of a comprehensive fuel break system would result in fewer fire starts along roads, direct modification of fire behavior within the fuel breaks themselves and would increase the likelihood for future wildfires to burn fewer acres (BLM 2020e, p. 58).

Since vegetation/fuel reduction treatments can also reduce the intensity and/or size of future wildfires in the treated area (due to lower fuel loads), the short-term, collective negative effects of both fuel breaks and fuel reduction treatments on existing sagebrush steppe, forest, and riparian/wetland vegetation communities would be offset by keeping the total acres burned by future wildland fires from growing larger over the long-term. Though the specific location, timing, and severity of future wildland fires are not reasonably predictable, the BLM estimates that an additional 300,000-389,000 acres of sagebrush steppe, forest, and riparian/wetland vegetation communities within the planning area (on top of the estimated 400,758 acres that have burned since 1980) could burn over the long-term. While this would result in short-term loss of vegetation communities and areas of bare ground subject to increased soil

erosion potential, these negative effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Soil* and *Fire and Fuels - Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of vegetation could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17) resulting in the same potential cumulative impacts to vegetation communities as described for the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative D

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 2,065-2,310 additional acres over the long-term (on top of the existing 8,227 acres associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a) outside of Category C units.

Vegetation/habitat restoration treatments could cause a similar level of short-term loss of vegetative cover as the No Action Alternative (907,600-1,371,100 acres; Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. However, these negative effects would decrease as the areas recover to native or desired vegetation communities over the long term.

New fuel breaks could be created on up to an estimated 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25; BLM 2020e, In prep. a) over the long-term, including within Category C unit setbacks. While this action would reduce total vegetative cover, particularly woody vegetation, and temporarily increase soil erosion potential, it would not completely remove all vegetation within the fuel break. Though climate change could contribute to a higher probability of wildland fire in the future, the creation and maintenance of a comprehensive fuel break system would result in fewer fire starts along roads, direct modification of fire behavior within the fuel breaks themselves and would increase the likelihood for future wildfires to burn fewer acres (BLM 2020e, p. 58).

Since vegetation/fuel reduction treatments can also reduce the intensity and/or size of future wildfires in the treated area (due to lower fuel loads), the short-term, collective negative effects of both fuel breaks and fuel reduction treatments on existing sagebrush steppe, forest, and riparian/wetland vegetation communities would be offset by keeping the total acres burned by future wildland fires from growing larger over the long-term. Though the specific location, timing, and severity of future wildland fires are not reasonably predictable, the BLM estimates that an additional 300,000-389,000 acres of sagebrush steppe, forest, and riparian/wetland vegetation communities within the planning area (on top of the estimated 400,758 acres that have burned since 1980) could burn over the long-term. While this would result in short-term loss of vegetation communities and areas of bare ground subject to increased soil erosion potential, these negative effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Soil* and *Fire and Fuels - Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of vegetation could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (on top of the existing

42,000 acres of concentrated use; Table 3-17) resulting in the same potential cumulative impacts to vegetation communities as described for the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative E

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 1,965-2,210 additional acres of vegetation over the long-term (on top of the existing 8,227 acres associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a) outside of Category C units.

Vegetation/habitat restoration treatments could cause short-term loss of vegetative cover on approximately 935,600-1,202,100 acres throughout the planning area (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g.* juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. However, these negative effects would decrease as the treated areas recover to native or desired vegetation communities over the long term.

The potential negative effects to vegetative cover from creating new fuel breaks could occur on up to 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25; BLM 2020e, In prep. a) over the long-term, including within Category C unit setbacks. While this action would reduce total vegetative cover, particularly woody vegetation, it would not completely remove all vegetation within the fuel break. Though climate change could contribute to a higher probability of wildland fire in the future, the creation and maintenance of a comprehensive fuel break system would result in fewer fire starts along roads, direct modification of fire behavior within the fuel breaks themselves and would increase the likelihood for future wildfires to burn fewer acres (BLM 2020e, p. 58).

Since vegetation/fuel reduction treatments can also reduce the intensity and/or size of future wildfires in the treated area (due to lower fuel loads), the short-term, collective negative effects of both fuel breaks and fuel reduction treatments on existing sagebrush steppe, forest, and riparian/wetland vegetation communities would be offset by keeping the total acres burned by future wildland fires from growing larger over the long-term. Though the specific location, timing, and severity of future wildland fires are not reasonably predictable, the BLM estimates that an additional 300,000-389,000 acres of sagebrush steppe, forest, and riparian/wetland vegetation communities within the planning area (on top of the estimated 400,758 acres that have burned since 1980) could burn over the long-term. While this would result in short-term loss of vegetation communities and areas of bare ground subject to increased soil erosion potential, these negative effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Soil* and *Fire and Fuels - Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of vegetation could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (Table 3-17) resulting in the same potential cumulative impacts to vegetation communities as described for the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Fire and Fuels

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect fuel loading and risk of future wildfire in the planning area?*

Affected Environment

BLM fire management is part of an inter-agency wildland fire and prescribed fire program that works closely with the U.S. Forest Service, U.S. Fish and Wildlife Service, and Oregon Department of Forestry because wildland fires do not respect property boundaries. In many locations, the frequency of wildfire has decreased because of fire suppression activities and removal of fine fuels (grasses) by grazing. The wildland fire season generally runs from mid-May through September. The planning area has averaged about 50 wildland fires per year over the past 40 years, encompassing approximately 10,000 acres per year (Table 3-26). About 90% of the fires are the result of lightning strikes, with human or unknown causes for the remaining 10%.

Most wildfires are typically limited to small portions of the planning area (Table 3-26) due to aggressive initial attack strategies. Since 1980, about 400,758 acres within the planning area have been subject to wildfire (Map F-1, Appendix 1). Some of these acres have burned more than once. There have been an average of 50 wildland fires a year where most of these fires have burned less than 10 acres. Based on the past 40-year average, a total of about 10,020 acres of wildland fire has occurred annually in the planning area. However, the average total number of acres burned annually has increased over the last 30 years. About 172,060 of these acres have been rehabilitated by seeding with native or introduced grasses and forbs. An additional 1,075 acres have been replanted with native shrubs or trees.

Fuel continuity also plays an important role in fire size. Invasive annual grass conversion is changing a historically perennial bunchgrass fuel bed to an annual grass fuel bed. The result is landscapes with continuous fuels that are more susceptible to large fire growth (Balch *et al.* 2012). These areas are very limited to small portions of the planning area largely due to aggressive initial attack strategies. Many studies indicate that climate change will intensify wildfire risk particularly in the summer, extending the wildfire season from spring to winter (An *et al.* 2015), calling for more effective wildfire management strategies.

Various fuels in the planning area, including those in interspersed county lands, communities, private ranches, and structures can create challenges for fire protection. Human life and welfare are values that would also be at risk from wildfire in the planning area because of hazardous fuels buildup around communities and structures, poor emergency vehicle ingress and egress, and the constant need for training fire-fighting personnel and/or upgrading equipment. Throughout the planning area, there are scattered small communities and ranches with houses and outbuildings without structural fire protection. Other economic values at risk include businesses, farmland, ranchland, grazing land, hunting and other recreational land, historic and cultural sites, and critical infrastructure.

Table 3-26. Wildland Fire Occurrence by Size Class (1980-2021)

Year	Number of Wildfires Each Year by Size (in Acres)						
	0-.24	.25-9.9	10-99.9	100-299.9	300-999.9	1000-4999.9	5000+
1980	48	3	4	0	0	0	0
1981	34	4	2	1	2	1	1
1982	15	7	0	1	0	0	0
1983	18	9	3	2	0	3	3
1984	35	3	10	1	0	6	6
1985	29	9	3	1	3	2	1
1986	54	5	8	5	1	1	3
1987	67	2	7	1	3	1	0
1988	50	3	4	0	0	1	0
1989	18	6	2	0	1	0	0
1990	45	19	1	2	0	0	0
1991	66	4	0	0	0	0	0
1992	159	12	4	1	2	1	0
1993	38	7	0	0	0	0	0
1994	57	7	2	0	0	1	0
1995	37	6	1	2	1	0	0
1996	67	22	4	2	3	0	0
1997	100	7	1	0	0	0	0
1998	30	5	7	0	1	0	0
1999	17	12	2	1	0	2	0
2000	9	4	1	1	0	1	2
2001	25	5	3	0	1	0	2
2002	27	2	0	0	0	2	0
2003	12	8	1	0	0	0	0
2004	65	8	0	0	0	0	0
2005	10	2	1	1	0	0	0
2006	32	12	3	1	1	0	0
2007	10	3	3	1	0	0	0
2008	14	2	0	0	0	0	0
2009	31	5	1	0	1	0	0
2010	26	7	2	2	0	0	0
2011	15	6	0	1	0	1	1
2012	12	4	1	0	1	0	1
2013	36	9	0	1	0	0	0
2014	47	10	0	2	0	1	0
2015	41	6	1	1	0	0	0
2016	13	3	1	0	0	1	0
2017	31	11	8	4	3	0	0
2018	27	1	0	0	1	0	0
2019	18	7	0	2	0	1	0
2020	21	11	2	0	1	0	1
2021	34	9	4	1	0	0	1
Average	**38.1**	**7.0**	**2.4**	**0.9**	**0.7**	**0.7**	**0.5**

Source: Lakeview Interagency Fire Center Dispatch Fire Records

Resource management policies and changing ecological conditions have also interacted in a manner that has resulted in the buildup of hazardous fuels throughout the planning area. Fire suppression has altered vegetation composition and fire regimes, allowing sagebrush and western juniper to dominate large areas, and has resulted in reduced grass and forb production. As western juniper invades a sagebrush site and increases in density, it can gradually eliminate the understory vegetation, making the area highly resistant to low-intensity fire. Fires occurring in juniper-invaded shrublands may only carry during strong wind

conditions, resulting in high-intensity wildland fire. Miller and Tausch (2001) found that once semi-arid woodland canopy cover reaches 50% the area becomes more susceptible to high-intensity wildfire and subsequent weed invasion.

However, noticeable changes to the landscape also occur when there are no fires at all and could result in impacts to other resources that is more negative than fire suppression activities. Changes in vegetation, fuels, and fire regimes are the direct or indirect result of fire exclusion. For example, past fire suppression practices have allowed the encroachment of white fir and western juniper into Ponderosa pine stands, which has led to over-stocking, increased surface fuel loadings, and the potential for more intense wildland fire behavior in this vegetation community. The accumulation of hazardous fuels, invasive weeds, and changing climatic patterns may set the stage for more frequent catastrophic wildfire occurrence in the planning area, resulting in the loss of important economic and ecological values.

Fuels management within the planning area began following the implementation of the *National Fire Plan* in 2001 (USDI and USEPA 2001). The focus since then has been on vegetation management, resource protection, and hazardous fuels reduction projects in conjunction with prescribed fire, with emphasis in the wildland urban interface (WUI), Greater Sage-Grouse habitat, and areas not meeting desired future conditions. Because the predominant fuel types in the planning area are grass, sagebrush, and juniper, the number of fires and the amount of land burned can be directly linked to the amount and timing of spring moisture. Higher levels of spring precipitation result in increases in vegetative growth, particularly herbaceous vegetation, leading to increases in fuels present during the summer fire season. Fire ecology and typical fire return intervals for the main vegetation communities in the planning area are discussed further in the *Vegetation* section.

During the past 15 years, the BLM has completed approximately 670 miles of mowed fuel breaks at strategic locations along existing roads across the planning area (BLM 2010l, 2020f) to provide fire fighters defendable locations to conduct back burning and reduce future wildfire size, as well as several other sagebrush mowing projects designed to meet multiple resource objectives including fuel reduction and Greater Sage-Grouse habitat protection (Table 3-27). In addition, the BLM is actively implementing an experimental fuel break project in the Beaty Butte Allotment (approximately 6 miles in length) using targeted grazing (BLM 2019c).

The BLM has implemented many projects in recent years that removed encroaching post-settlement western juniper to reduce fuel levels and restore degraded wildlife habitats (Greater Sage-Grouse, mule deer, bighorn sheep, and pronghorn) within portions of the planning area. The BLM has also implemented a number of juniper thinning projects that have maintained or enhanced old-growth juniper stands and reduced fuel levels (Table 3-28).

The BLM has used prescribed fire as a tool to manage fuel loads and vegetation communities within the planning area. Implementation of prescribed fires in a given year is dependent on funding, staffing, and weather conditions. Prescribed burns are typically planned for periods before and after the wildland fire season (spring/fall). Since 1975, the BLM has implemented about 152,867 acres of prescribed fire in the planning area. Table 3-29 outlines the historic use of prescribed fire in the planning area. Over the past 20 years the BLM has averaged approximately 4,260 acres of prescribed burning annually. Methods have included a combination of hand-pile burning, single tree burning, and broadcast burning. These acres do not include wildfires that have been used in the past to meet resource management objectives.

The *Healthy Forests Restoration Act* (HFRA) of 2003 and the *Oregon Forestland – Urban Interface Fire Protection Act of 1997* (Oregon Senate Bill 360) provide the impetus for cooperative wildfire risk

Table 3-27. Fuel Break or Fuel Reduction Treatments using Mowing (2004-Present)

Project Name	Treatment Year(s)	Fuels Objectives	Other Resource Objectives	Acres
Brown's Valley Fuel Breaks	2006	Mowing along roads for fuel breaks	Minimize risk from large fire for Sage-Grouse habitat protection	777
Orejana Fuel Breaks	2005-2012	Mowing along roads for fuel breaks	Minimize risk from large fire for Sage-Grouse habitat protection	3,555
Paisley Desert Fuel Breaks	2006	Mowing along roads for fuel breaks	Minimize risk from large fire for Sage-Grouse habitat protection	1,328
Willow Creek Maintenance	2005	Fuels Reduction and creating mosaic in fuel continuity	Livestock forage and wildlife habitat	200
Bridge Well Maintenance	2009	Fuels Reduction and creating mosaic in fuel continuity	Improve rangeland vegetation and livestock forage	565
Beeler Maintenance	2006	Fuels Reduction and creating mosaic in fuel continuity	Improve rangeland vegetation and livestock forage	210
Coleman Lake Mowing	2014	Fuels Reduction and creating mosaic in fuel continuity	Improve rangeland vegetation and livestock forage	545
Paisley Flat Mowing	2005-2007	Fuels Reduction and creating mosaic in fuel continuity	Improve rangeland vegetation and livestock forage	1,484
Fort Rock Maintenance	2007	Fuels Reduction and creating mosaic in fuel continuity	Improve rangeland vegetation and livestock forage	308
Paisley Study Plots	2004	Research	Research on rangeland vegetation response	34
TOTAL				**9,006**
Average				**643**

assessment and planning at the county and community level in Oregon. HFRA refers to this level of planning as *Community Wildfire Protection Plans* (CWPP). The CWPP allows a community to evaluate its current wildfire risk and ways to reduce risk for protection of human welfare and other important economic or ecological values. The CWPP addresses issues such as community wildfire risk, structure flammability, hazardous fuels/non-fuels mitigation, community preparedness, and emergency procedures. The focus of the CWPP for the planning area covers Lake County with an emphasis on the communities of Adel, Alkali Lake, Anna Estates, Christmas Valley, Fort Rock, Plush, Silver Lake, and Summer Lake.

Environmental Effects

Analysis Assumptions

- Wildfire prevention activities would reduce the risk of human caused wildfire ignitions in a similar manner under all alternatives.
- Air quality regulations would not become so stringent as to hamper the use of modified fire suppression strategies or prescribed burning as tools to meet resource management objectives.

Table 3-28. Juniper Thinning Treatments (2003-Present)

Project Name	Treatment Years	Fuels Objectives	Other Resource Objectives	Acres
South Warner Sagebrush Restoration	2012-2018	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	24,670
Anna North Fuel Reduction	2009-2010	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	1,368
BalBeach South	2006	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	203
Bridge Creek Habitat Restoration	2009-2010	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	1,515
Buck Creek Juniper Thin	2006	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	849
Chewaucan Fuel Treatment	2003-2004	Fuels Reduction	Improve sagebrush, aspen stands, and wildlife habitat	3,232
Christmas Valley Thinning	2011	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	1,672
Clover Flat Sagebrush Restoration	2018-2020	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	4,851
Coleman Rim Juniper Thinning	2007	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	4,511
Colvin Timbers Fuel Reduction	2004	Fuels Reduction	Improve forest stand health and wildlife	152
Crack-in-Ground Fuel Reduction	2007	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	887
DI Duncan Juniper Treatment	2006-2007	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	4,373
Drake Creek Juniper Management	2005	Fuels Reduction	Improve and restore riparian vegetation	133
Fifteen Mile Juniper Treatment	2006-2007	Fuels Reduction	Improve and restore riparian vegetation	701
Hayes Butte Fuels Reduction	2011	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	1109
Joint Fire Science Project	2006	Fuels Reduction	Research on sagebrush steppe vegetation	46
West Worlow Juniper Thin	2005	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	458
Snyder Creek Fuels Reduction	2008-2009	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	4,640
Oatman Flat Juniper Treatment	2006	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	1,260
OHA Juniper Removal	2012	Human Safety	Human and wildlife safety along Highway 31	100
Silver Lake Juniper Thin	2009	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	28
South Green Mountain Fuel Reduction	2003	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	113
Twelvemile Creek Juniper Treatment	2006-2007	Fuels Reduction	Improve and restore riparian vegetation and fish habitat	463
Ward Lake Juniper Thinning	2007-2008	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	685
West Fork Silver Creek Juniper Treatment	2013-2014	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	2,391
TOTAL				**60,410**
Average				**3,356**

Table 3-29. Prescribed Fire Treatments (1998-Present)

Project Name	Prescribed Fire Type	Treatment Date	Fuels Objective	Other Resource Objectives	Acres
Ana Fuels Reduction	Single Tree	2012	Fuels Reduction/ WUI	Improve sagebrush steppe and wildlife habitat	1,405
BalBeach South	Single Tree	2008	Fuels Reduction/ WUI	Improve sagebrush steppe and wildlife habitat	203
Beaty Butte Prescribed Burn	Broadcast	1998-1999	Fuels Reduction	Improve rangeland and wildlife habitat	22,235
Bridge Creek Prescribed Burn	Single Tree/ Machine Pile	2009-2014	Fuels Reduction/ WUI	Improve sagebrush steppe and wildlife habitat	3,689
Cave Springs Prescribed Burn	Broadcast	2006	Fuels Reduction	Improve fire dependent plant species	5
Chewaucan Fuels Treatment	Single Tree	2007	Fuels Reduction/ WUI	Improve sagebrush steppe and wildlife habitat	5,997
Clover Flat	Hand Pile	2019-2020	Fuels Reduction/ WUI	Improve sagebrush steppe and wildlife	2,100
Coleman Rim Bighorn Sheep Habitat Restoration	Single Tree/ Broadcast	2008	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	5,651
Colvin Timbers Fuel Reduction	Hand-Pile	2004	Fuels Reduction	Improve forest stand and wildlife habitat	152
Crack-in-Ground Fuel Reduction	Single Tree	2008	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	887
DI Duncan Juniper Treatment	Single Tree	2006-2007	Fuels Reduction/ WUI	Improve sagebrush steppe and wildlife habitat	4,373
Fifteenmile Creek	Broadcast	2008-2010	Fuels Reduction	Improve and restore riparian vegetation and fish habitat	677
Fort Rock Fringe Fuel Reduction	Single Tree	2004	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	414
Foskett Dace Habitat Improvement	Broadcast	2012	Fuels Reduction	Improve and restore riparian vegetation and fish habitat	22
Hayes Butte Fuels Reduction	Single Tree	2014	Fuels Reduction/ WUI	Improve sagebrush steppe and wildlife habitat	1109
Hillcamp	Single Tree	2011	Fuels Reduction	Improve sagebrush steppe and wildlife	2,316
Joint Fire Science	Broadcast	2006	Fuels Reduction	Research on sagebrush steppe vegetation	99
Long Canyon Prescribed Fire	Broadcast	2001	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	1,205
Snyder Creek Prescribed Fire	Single Tree	2010	Fuels Reduction/ WUI	Improve sagebrush steppe and wildlife habitat	1,750
Oatman Flat Fuel Reduction	Single Tree	2009	Fuels Reduction/ WUI	Improve sagebrush steppe and wildlife habitat	1,286
OHA Juniper Removal	Single Tree	2014	Fuels Reduction/ WUI	Public and wildlife safety along Hwy. 31	100
North Lake-Green Mountain Prescribed Fire	Single Tree/ Machine Pile	2015-2016	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	3,139
South Warner Prescribed Fire	Hand-Pile/ Machine-Pile/ Single Tree	2012-2018	Fuels Reduction/ WUI	Improve sagebrush steppe and wildlife habitat	21,179
Silver Lake Buck Creek	Single Tree	2009	Fuels Reduction/WUI	Improve sagebrush steppe and wildlife habitat	954
Snyder Creek	Single Tree	2008-2011	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	2,891
South Green Mountain Prescribed Fire	Single Tree	2004	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	107
Sq__ Butte Prescribed Fire	Single Tree	2015	Fuels Reduction	Post-Treatment Cleanup	205

Project Name	Prescribed Fire Type	Treatment Date	Fuels Objective	Other Resource Objectives	Acres
Warner Wetlands Prescribed Fire	Broadcast	2004/2015	Fuels Reduction	Improve and restore riparian vegetation/ Invasive plant control	2,998
West Fork Silver Creek Prescribed Fire	Hand-Pile	2013	Fuels Reduction	Improve sagebrush steppe and wildlife habitat	146
TOTAL					**87,294**
Average					**3,795**

Impacts Common to All Alternatives

Vegetation management projects designed to restore native plant communities and composition can reduce or counter the effects of wildfire by implementing restoration and rehabilitation treatments in areas that have been experiencing disturbances outside the vegetation's natural range of historic variability (Blank and Morgan 2012; Booth *et al.* 2003).

Building fire lines during wildfire suppression operations, especially dozer lines, may increase soil compaction, erosion, potential damage to cultural resources, and increased risk of weed/invasive species establishment. Limits on the use of heavy equipment in the *Fire Management Plan* would mitigate some of these resource impacts during initial attack activities.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Under this alternative, the BLM would continue to suppress wildfires in the planning area, including within wilderness characteristics units, to limit wildfire size using a combination of direct and indirect suppression methods that are selected based on individual fire behavior. As wildfire size increases, the suppression costs, resource damage, and rehabilitation costs increase as well.

Wildfire emergency stabilization and rehabilitation actions would continue and are typically designed to stabilize slopes, streambanks, and soils, repair damaged areas, and encourage the re-establishment of vegetation and wildlife habitats. These types of actions would generally maintain or improve apparent naturalness within the burned area over both the short and long-term.

While the BLM would be able to continue to maintain existing mowed fuel breaks around the perimeter of wilderness characteristics units, it would not be able to create new fuel breaks if it deemed they would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. Existing fuel breaks would continue to act as fire-anchor points and fire-fighter staging areas, assist in quicker and earlier fire suppression response times, and provide protection of on-going and future habitat restoration project areas. By reducing the flame intensity and the rate of spread, a fuel break serves as a fire suppression tool and allows firefighters to focus on areas of greater concern (e.g., key sagebrush habitat). Fuels breaks would continue to provide safer access for firefighters and reduce the risk of large catastrophic wildfires, aid in the protection of human life and property, and protect taxpayer investment in habitat restoration projects. Mowed fuel breaks have been shown to be effective in limiting the size of one recent wildfire in the planning area (BLM 2006n) and reduced the potential loss of sagebrush habitat and rangeland productivity in this area. Fuel breaks would also aid in decreasing

potential habitat loss from wildfires and combatting the spread of invasive species (BLM 2017b), making native vegetation communities more resistant to future wildfires.

Continuing to implement the BLM's hazardous fuels reduction program would meet a number of existing management goals including hazardous fuels reduction, resource protection, and habitat restoration particularly within the wildland urban interface (WUI) and Greater Sage-Grouse habitats. Reducing areas of high fuel loading would also reduce extreme wildfire behavior in treated areas. However, the BLM would not implement fuels treatments in wilderness characteristics units (Table 3-30) if it deems they would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics.

Table 3-30. CWPP Acreages Affected by Wilderness Characteristics Management

Alternative	Management Category	No. of Units that Overlap CWPP WUI	Acres in CWPP WUI within Category
No Action	Settlement Agreement	63	620,826
A	A	63	620,826
B	C	63	620,826
C	A	5	3,880
	B	56	491,425
	C	12	125,521
D	A	39	280,754
	B	40	338,609
	C	1	1,463
E	A	10	93,858
	B	45	416,008
	C	8	110,960

The thinning of encroaching western juniper would also limit crown fire establishment and lower fire spotting distances. This would augment fire initial attack suppression efforts while increasing safety for fire-fighters. When these objectives are met, wildland fires are generally caught during the initial attack phase and are much less detrimental to the landscape and less expensive to contain using mechanical treatment methods (chainsaw cutting of western juniper or sagebrush) in conjunction with prescribed fire would reduce fuel loads created by an initial mechanical treatment. Prescribed burns are usually planned for periods before or after fire season, depending on weather conditions, and would be used to meet fire management and other resource objectives, including stimulation of plant growth, changes in species composition, or reduction in amounts of fuels and slash.

Sagebrush habitat restoration projects have typically involved single juniper tree cut and burn, or multiple trees cut, hand pile, and burn methods. However, broadcast burning has been used effectively in the Warner Wetlands and Foskett Spring areas to restore or maintain herbaceous riparian vegetation and fish and wildlife habitat (BLM 1990b, 1990e, 2003r, 2015z, 2016k; FWS 1998, 2018a; FWS *et al*. 2015). Similar projects would be implemented under this alternative in the future, as long as the BLM deems it would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics and would result in reducing fuels and maintaining/improving habitat within treated areas.

Some wilderness characteristics units contain areas that are currently degraded by invasive annual grasses (*e.g.,* cheatgrass) and would be at a higher risk of more frequent wildland fire. Using herbicides to treat invasive annual grasses would reduce fine fuel loading and future fire return intervals in treated areas

(BLM 2015e). In addition, using herbicides after a wildfire or as a follow-up to a fuel treatment would reduce the risk of invasion by non-native annual grasses (see *Invasive Species* section).

Under this alternative, all approved fuel/vegetation treatment methods would continue to be utilized within wilderness characteristics units to reduce fuel loading and increase the probability that a future wildland fire could be controlled during initial attack (at a time when the fire is small), as long as the BLM deems the treatment would not diminish the size or cause the entire inventory unit to no longer meet the criteria for wilderness characteristics. However, applying measures to mitigate/reduce potential long-term negative effects to naturalness (*e.g.* presence of stumps) or opportunities for solitude (*e.g.* loss of tall vegetative screening) could make it more difficult to conduct safe prescribed burns, increase treatment costs, reduce the number of acres that could be treated within a given project area, and/or reduce the overall effectiveness of the treatment. As a result, some juniper and sagebrush thinning and fuel break projects in WUI/FIAT areas would not fully meet fuel reduction (leaving higher fuel loads) or other resource management objectives (e.g., leaving more than 5% juniper cover in sage-grouse habitat) following treatment (BLM 2011m, 2017e).

OHV and Travel Management Impacts

Concentrated OHV use within Open OHV area designations under this alternative would substantially reduce vegetation/fuel loading within an estimated 30,000-93,200 acres across the planning area over the long-term.

Current OHV area and road management would continue to provide adequate vehicle/equipment access for wildfire suppression, post-fire rehabilitation, and fuel reduction activities in most cases.

Livestock Grazing Management Impacts

Authorized livestock grazing would continue to occur on about 92% of the public lands within the planning area (Tables A5-2 and A5-3, Appendix 5; Map G-1, Appendix 1). Continuing the existing livestock grazing management program would reduce fine fuels from annual (Foster *et al*. 2015) and perennial grasses across most of the planning area, which would continue to reduce the risk of both low and high-intensity wildfire (Strand *et al*. 2014). Concentrated livestock use would continue to substantially reduce fuel loads around existing water developments and along fences on about 42,000 acres across the planning area (Table 3-17). Maintaining existing water sources and developing new water sources for livestock management purposes would also increase the availability of water for use in wildfire suppression. These activities would contribute to less intense and/or decreased wildfire size.

Impacts of Alternative A

Wilderness Characteristics Management Impacts

Under this alternative, the BLM would continue to take an aggressive approach to wildland fire suppression in the planning area to limit fire size using a combination of direct and indirect suppression methods selected based on fire behavior. The effects of management under this alternative on fire and fuels management would be similar to those described for the No Action Alternative. However, this alternative would allow the BLM the greatest flexibility to place future fuel break and hazardous fuels reduction projects in the most strategic locations compared to all other alternatives. In addition, cooperative fuel reduction projects (CWPP) would be the least constrained by wilderness characteristics

management of all the alternatives (Table 3-30). As a result, the BLM would be able to more fully implement proposed fuels reduction projects and fuels breaks identified in WUI, FIAT, or other areas that would reduce the risk of large-scale, catastrophic wildfires when compared to the No Action Alternative. This would also help fire-fighters contain flanking and backing fires to a higher degree, while using fewer fire-fighting resources and providing safe anchor points to conduct burnout operations for combating head fires.

OHV and Travel Management Impacts

Concentrated OHV use within Open OHV area designations under this alternative would substantially reduce vegetation/fuel loading within an estimated 30,000-93,200 acres across the planning area over the long-term, similar to the No Action Alternative.

Existing OHV/motorized vehicle and equipment access for conducting fuels treatments and wildland fire suppression activities would continue to be available, similar to the No Action Alternative.

Livestock Grazing Management Impacts

The effects of livestock grazing management on fire and fuels management under this alternative would be the same as those described for the No Action Alternative.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Over time, management to protect wilderness characteristics would negatively affect BLM's ability to access and constrain the severity or stop the spread of wildland fires on up to 2.1 million acres (see *Off-Highway Vehicle Use and Travel Management* section). This could lead to larger fires that threaten adjacent private, state, and other federal lands, and result in decreased public and fire fighter safety over the long-term.

Under this alternative, there would also be about 2.1 million acres in the planning area (Category C units, new Section 202 WSAs, and existing WSAs) where the BLM would be more limited in its ability to implement fuel breaks and hazardous fuels reduction projects. In addition, the types of treatment methods that could be utilized would be more limited (see *Vegetation* section). While vegetation/fuel treatment methods allowed under this alternative would reduce fuel loading, reduce the risk of future wildfire, and maintain some existing defendable fuel breaks for fire suppression activities in treated areas, they would do so on fewer acres than all of the other alternatives.

Under this alternative, there are a total of 63 Category C units and new Section 202 WSAs or portions thereof (approximately 620,826 acres), as well as portions of existing WSAs (about 191,076 acres) that overlap cooperative CWPP WUI designated areas that Federal, state, county, and private land managers have identified as areas where hazardous fuels projects and fuels breaks are currently needed to protect the surrounding communities and private lands (Table 3-30). The addition of new Section 202 WSAs would further complicate the design and implementation of hazardous fuels projects and fire suppression/restoration activities (to meet the non-impairment standard), as well as prohibit new fuel breaks in these areas. Cooperative fuel reduction projects would be the most constrained by wilderness characteristics (and OHV) management of all the alternatives analyzed.

In Category C units, the BLM would be able to perform fuel reduction projects using most treatment methods, but heavy equipment use could be constrained in some units. Within the new Section 202 WSAs, heavy equipment could only be used where the treatment met an exception to the non-impairment standard (e.g., would protect or enhance naturalness) and where the BLM determined that the use of heavy equipment would be the least disturbing method to carry out the treatment. Using only manual/hand fuel reduction methods would increase treatment costs in these areas. Based on recent contracted cost estimates the manual cut, pile, and burn method costs 2-3 times as much per acre as similar treatments using heavy equipment. Manual treatments are also less efficient in that they require 2-3 times more time and substantially more personnel to implement. In areas where closed routes become impassable, treatment areas would become less accessible by vehicle. Based on recent contract prices, treatment areas that require foot access cost up to 50% more per acre and sites requiring over a mile of walk in from an access route can double the cost per acre. Higher costs would likely result in fewer acres being treated annually.

The limitations on treatment methods and additional project design measures (meeting VRM Class II objectives, BMPs in Appendix 7, etc.) and reduced access would make implementation in high-priority areas so ineffective in lowering fire behavior (due to the retention of tall vegetative screening and leaving higher fuel loading) or so expensive that such projects would become a low priority for future funding. As a result, the BLM would not be able to actively treat/manage as many acres or conduct as effective fuels and habitat restoration treatments within Category C units compared to the No Action Alternative or Alternative A.

As described in the *Vegetation* section, the ecological conditions within some of the Category C units, new Section 202 WSAs, and existing WSAs could continue to degrade without active ecological restoration. Large infestations of cheatgrass currently plague several Category C units and are in danger of undergoing a complete vegetation/fuel type conversion. Annual invasive grass conversion trends in these areas would continue under this alternative. The restrictions on treatment methods under this alternative would result in an increase in total cost and time needed to complete fuel reduction tasks, which could ultimately reduce the success of rehabilitation/restoration treatments. The restrictions on treatment methods would also result in fewer treatments being completed, as most projects require a combination of methods to be effective and some successive treatments may not be feasible.

This would be particularly true for the new Section 202 WSAs. While it could be possible to meet VRM Class I objectives and meet an exception to the non-impairment standard (if the project would protect or enhance the WSA's naturalness), meeting these design criteria would make it challenging to achieve the primary hazardous fuels reduction objective or implement effective fuel breaks, making it unlikely for the BLM to undertake such endeavors within the new Section 202 WSAs. This would further exacerbate the risk of future catastrophic wildfires for adjacent federal, state, and private properties. If these areas are adversely affected by wildfires, limited options for rehabilitation and repair, coupled with the likelihood of vegetation converting to invasive annual grass species, would alter the wildfire return interval, perpetuating their decline and increasing the risk of future catastrophic wildfires over the long-term. While the BLM could treat fuels within Category C units and new Section 202 WSAs, this would be more expensive and difficult to implement and coordinate due to larger unit size, geographic location in relation to existing WSAs, and application of appropriate BMPs (see Appendix 7). Though aerial ignition would be possible within the interior of Category C units and new Section 202 WSAs, the BLM's burning capabilities within units would be limited to an estimated 1,000-2,000 acres per year. The average unit is roughly 12,500 acres in size, with some units as large as 74,560 acres. The sheer size of the units would

make the feasibility of treating fuels within the interior of most units impossible under this alternative due to the inability to install interior control lines to make treatment units smaller and more manageable. Further, the work required to prepare units for ignition (*e.g*. constructing fire lines) would not be allowable.

Failure to conduct treatments would result in significant reductions in fire-fighter and public safety across large portions of the planning area over time as initial attack capabilities would be hampered, resulting in larger and more frequent catastrophic wildfires. These fires also would be harder to contain on BLM-administered land and would negatively affect neighboring state and Federal lands.

Overall, management actions under this alternative would result in an increase in fuel loading in some wilderness characteristics units and WSAs (up to 2.1 million acres), which would increase the risk of more frequent, intense, and/or larger wildfires and require a larger investment in emergency rehabilitation following wildland fire. Indirect effects would include a reduced amount of land restored in areas of moderate and high resistance/resilience, resulting in a much greater chance of vegetation and fuel load departure from desired conditions over the long-term. Areas with lower resistance/resilience would have a higher risk of annual invasive grass conversion (Chambers *et al*. 2014) with a resulting shorter fire return intervals.

OHV and Travel Management Impacts

Concentrated OHV use within Open OHV area designations under this alternative would substantially reduce vegetation/fuel loading within an estimated 20,460-50,460 acres area over the long-term.

During early implementation of this alternative, the administrative motorized vehicle and equipment access would be adequate to allow fire suppression resources to access wildland fire areas. However, as the primitive roads within the interior of Category C units, existing WSAs, and new Section 202 WSAs degrade from lack of use and/or maintenance, erosion, and begin to revegetate (see *Off-Highway Vehicle Use and Travel Management* section), this could hamper ingress/egress to active wildland fire areas and result in slower fire suppression resource response times, making containment of wildland fires within some Category C units, new Section 202 WSAs, and existing WSAs (up to 2.1 million acres) more difficult, particularly during initial attack. Over the long-term some closed routes (which are often used as an anchor point and/or escape routes for fire suppression resources) could become compromised and would no longer be drivable. This would increase fire-fighter risks on BLM-administered lands and other adjacent ownerships. This would also contribute to larger, more expensive containment efforts and increase the possibility of catastrophic damage to other resources and adjacent properties over the long-term. This would be particularly likely within the new Section 202 WSAs. This would also impact BLM's ability to implement wildlife/sage-grouse habitat protections approved in the *Oregon Greater Sage-Grouse Approved RMPA* (BLM 2015a, as amended). Such a scenario could also lead to further ecological disruption of BLM and adjacent federal, state, and private properties, along with their associated wildlife habitats.

Livestock Grazing Management Impacts

Anywhere from 0 to 100% of Category C units, new Section 202 WSAs, and existing WSAs in the planning area could experience a reduction or complete removal of livestock grazing over the long-term due to voluntary permit relinquishment or rangeland health issues. Reducing or eliminating livestock

grazing would increase fine fuel loading from annual (Foster *et al*. 2015) and perennial grasses which would increase the risk of both low and high intensity fires (Strand *et al*. 2014).

In areas where livestock grazing is eliminated or relinquished there would be a reduction of concentrated livestock use on an estimated 10,000-20,500 acres near water developments and fences, with an associated increase in fuel loading in these areas over the long-term. There would also be a reduction of maintained water sources that could have a negative impact on water availability for wildland fire suppression activities.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

The management of Category C units under this alternative could affect the ability to constrain the severity or stop the spread of wildland fires on about 411,033 acres in the planning area. In addition, the ability to conduct cooperative fuel reduction projects (CCWP) within Category C units would be constrained by Category C unit management (Table 3-30). This could lead to fires threatening adjacent private, state, and other federal lands, and result in decreased public and fire-fighter safety in those areas.

There are about 125,521 acres of the CWPP WUI area that overlap Category C units under this alternative. The BLM could establish fuels breaks within the WUI, including within Category C unit boundary setbacks, and Category A and B units. For fuel types found across the majority of the planning area, 100 to 300 feet would be sufficient under almost all fire season conditions to create effective fuel breaks. Fuel breaks would reduce the risk of future wildfire impacts to adjacent properties, infrastructure, and wildlife habitat.

The effects on fuels treatments within Category C units would be similar to those described for Alternative B but would occur on fewer (411,033) acres. The BLM would not be able to actively treat/manage as many acres or conduct as effective fuels and habitat restoration treatments compared to the No Action Alternative or Alternatives A, D, or C, respectively, but could conduct more of these types of treatments than Alternative B.

Some Category C units could continue to degrade without active ecological restoration after fuels treatments. These areas could be reseeded by using aerial or broadcast methods which are less effective than mechanical drill seeding. Annual grass conversion trends in these areas would continue to increase, allowing for higher fine fuel loading and higher fire intensities in some units. Because the BLM uses a combination of fuels treatments in conjunction with successive restoration/rehabilitation activities, some fuels treatments may not happen, allowing for more large-scale catastrophic wildfire in Category C units. Increased wildfire intensity and risk could negatively impact public and firefighter safety within these units, compromising surrounding private property, other federal property, wildlife habitats, or other resource values.

Some fuel treatments within Category B units (about 1,161,199 acres) could apply BMPs for wilderness characteristics (see Appendix 7). This could include leaving groups or clumps of trees for screening, blending treatments to reduce form, line, and color contrast. This would increase implementation and administrative costs and may not be as effective as desired. This would also decrease the total amount of fuel breaks and fuel reduction projects completed over the long-term. The effects of implementing fuel

treatments within Category A units (about 81,805 acres) would be similar to those described for Alternative A.

OHV and Travel Management Impacts

Concentrated OHV use would be eliminated under this alternative. As a result, vegetation/fuel loading within an estimated 30,000 acres of the planning area where concentrated use has occurred historically would increase substantially over the long-term.

Since all existing routes would remain open under this alternative, administrative access would be adequate to provide appropriate fire suppression response throughout the planning area in a similar manner as the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts

Reducing or removing livestock grazing on a temporary basis (as a result of rangeland health failing to meet a standard due to livestock grazing) or permit relinquishment (in existing WSAs) would increase fine fuel loading from annual (Foster *et al*. 2015) and perennial grasses which would increase the risk of both low and high intensity fires (Strand *et al*. 2014), and potentially increase future wildland fire size in those areas.

In areas where livestock grazing is eliminated or relinquished there would be a reduction of concentrated livestock use on an estimated 5,000 acres near water developments and fences, with an associated increase in fuel loading in these areas over the long-term. There could be a reduction of maintained water sources, which could have a negative impact on water availability for wildfire suppression activities in these areas. All of these factors would contribute to an increased risk of larger average wildfire sizes in portions of the planning area.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Management of the two Category C units under this alternative could affect the BLM's ability to constrain the severity or stop the spread of future wildland fires on about 4,671 acres within the planning area. This could lead to a slight increase in the risk of wildfires in these areas that could threaten state and other federal lands in the general vicinity.

About 1,463 acres in one of the Category C units falls within a cooperative CWPP WUI area (Table 3-30). Fuel breaks could occur within the boundary setbacks of the two Category C units, as well as in both Category A and B units. Since the BLM typically uses a combination of fuel treatment methods, successive restoration/ rehabilitation activities or fuel treatments could happen in Category C units but would be limited to more costly hand methods and meeting VRM Class II objectives. However, these units represent such a small percentage of the planning area that any risk of wildland fire impacts to surrounding properties would be minimal, as long as the fire can be contained within the units. For this reason, these effects would not be substantially different from the No Action Alternative or Alternative A.

Some fuel treatments within Category B units (about 1,066,919 acres) could include BMPs for wilderness character that could include leaving groups or clumps of trees for screening, and blending treatments to

reduce form, line, and color contrast (see Appendix 7). This could increase implementation costs and may not be as effective as desired. This could also decrease the total amount of fuel breaks and fuel reduction projects completed in these units over the long-term. The ability to implement fuel treatments within Category A units (about 583,332 acres) would be similar to those described for Alternative A.

OHV and Travel Management Impacts

Concentrated OHV use within Open OHV area designations would substantially reduce vegetation/fuel loading within an estimated 30,000-70,500 acres area over the long-term.

The effects of retaining administrative access on existing routes for fuel treatments and wildland fire suppression activities would be similar to those described for the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts

The potential effects of livestock grazing management under this alternative on fire and fuels would be the same as those described for the No Action Alternative.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Management of Category C units under this alternative could affect the BLM's ability to constrain the severity or stop the spread of wildfires on about 370,210 acres within the planning area. This could lead to wildland fires that threaten adjacent private, state, and other Federal lands, and result in decreased public and firefighter safety in those areas.

All or portions of eight Category C units overlap cooperative CWPP WUI areas (about 110,960 acres) (Table 3-30). Under this alternative, BLM could establish fuels breaks within the WUIs, including within Category C unit boundary setbacks, and both Category A and B units. For fuel types found across the majority of the planning area, 100 to 300 feet would be sufficient under almost all fire season conditions to create effective fuels breaks. Fuel breaks would reduce the risk of wildfire impacts to adjacent properties, infrastructure, and wildlife habitat.

The effects on fuels treatments within Category C units would be similar to those described for Alternative B but would occur on fewer (370,210) acres. The BLM would not be able to actively treat/manage as many acres or conduct as effective fuels and habitat restoration treatments compared to the No Action Alternative or Alternatives A or D, respectively, but could conduct more of these types of treatments than Alternatives B or C, respectively.

Some Category C units could continue to degrade without active ecological restoration after fuel treatments. These areas could be reseeded by using aerial or broadcast methods which are less effective than mechanical drill seeding. Annual grass conversion trends would continue to increase, allowing for higher fine fuel loading and higher fire intensities in some units. Because the BLM uses a combination of fuel treatments in conjunction with successive restoration/rehabilitation activities, fuels treatments may not happen, allowing for more large-scale catastrophic wildfire. Increased wildfire intensity and risk

would impact public and firefighter safety within these units, compromising surrounding private property, other Federal property, wildlife habitats, or other resource values.

Some fuel treatments within Category B units (about 1,117,244 acres) could include BMPs for wilderness characteristics (see Appendix 7). This would increase implementation and administrative costs and may not be as effective as desired. This could also decrease the total amount of fuel breaks and fuel reduction projects completed in these areas over the long-term. The ability to implement fuel treatments within Category A units (about 172,648 acres) would be similar to those described for Alternative A.

OHV and Travel Management Impacts

Concentrated OHV use within Open OHV area designations under this alternative would substantially reduce vegetation/fuel loading within an estimated 30,000-93,200 acres across the planning area over the long-term the same as the No Action Alternative and Alternative A.

Administrative access under this alternative would be adequate to implement fuel treatments and wildfire suppression, similar to the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts

The potential effects of livestock grazing management on fire and fuels under this alternative would be the same as those described for the No Action Alternative.

Cumulative Impacts Common to All Alternatives

Climate Change

The potential effects of climate change on vegetation and fuels would be the same under all alternatives (see *Watershed and Water Quality* and *Cumulative Impacts - All Vegetation Communities* sections). Fuels on rangelands tend to be limited and discontinuous. Annual weather patterns influence the amount of fine fuel produced by recent plant growth. It also influences the moisture content of both live and dead fuel, which in turn affects the ease of ignition, rate of spread, and amount of fuel available for combustion (Brown *et al*. 2012). For fuel limited rangelands there is a strong correlation between years of widespread fire and low precipitation immediately following a period of greater precipitation and greater fuel production (Littell *et al*. 2009). Many studies indicate that climate change will intensify wildfire risk, particularly in the summer, extending the wildfire season from spring to winter (An *et al.* 2015).

Weather and climate are determinants for wildfires along with fuel properties and topography (Pyne *et al*. 1996). Climate variability and fire weather influence wildfire behavior and account for the variability in fire severity at various time scales. The effects of climate variability are apparent as summer temperatures increase and the region experience long-term droughts. Pro-longed periods of drought would result in additional plant mortality and drier fuel loads, which could result in more frequent, intense, and/or larger wildfires. While the different climate change scenarios could increase the length of the fire season and daily burning periods, whether wildfire size and fire season severity will actually change during the long-term, and in what direction, is not clear. In addition, the specific location and timing of future wildfires are not reasonably predictable at the planning area scale.

Under a warmer-drier climate change scenario, the semi-arid ecosystems in the planning area are fuel-limited and would require one or more years of average to above-average grass production to create sufficient fine fuel quantity and continuity to carry ground fires. Even invasive annual grasses, which create continuous fuel beds, do not always produce enough fuel to readily carry a fire every year, although the threshold amount needed is not known. If warmer-drier conditions occur and lead to increased drought frequency, severity, and/or duration, then the annual acres burned could potentially decline as more drier years lack sufficient fuel to support fires. Conversely, these same droughts could also reduce the abundance of perennial grasses and promote the expansion of invasive annual grasses, which could increase fuel continuity and risk of future wildfire (Halofsky *et al.* 2020).

A warmer and wetter climate change scenario could increase both perennial and annual grass production, which would lead to increased fine fuel loading and continuity (as grasses fill in the voids between sagebrush). While tree and sagebrush species could also benefit from wetter conditions (less drought stress), the main factor influencing rangeland fire spread and size is the continuity of grasses in the understory (Abatzoglou and Kolden 2011). These conditions would make rangelands in the planning area more susceptible to larger and/or more intense wildland fires in times of drought in between periods of higher precipitation.

Widespread climate change under either scenario could result in the lengthening of the freeze-free growing season that could favor cold-intolerant invasive annual grasses and increase fine fuel loading. Changes in the frequency of wet winters could alter the potential for the establishment of invasive annual grasses, resulting in an earlier onset of fire season and a lengthening of the window during which conditions would be conducive to fire ignition and growth which would further exacerbate the fire-invasive feedback loop. Conversely, drought stress would increase the potential for mortality of native vegetation from insect/disease. This would increase dead fuel loading and exacerbate future wildland fire effects (Abatzoglou and Kolden 2011).

Cumulative Impacts Common to No Action Alternative and Alternative A

Under these alternatives, new land use authorizations, mining, facilities, and recreation sites could potentially disturb or remove an estimated 1,944-2,310 additional acres of vegetation/fuels (on top of the existing 8,227 acres associated with these activities) over the long-term (Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a). However, this could also result in an increase in man-made structures scattered across the landscape that could become a high priority for protection during future wildland fire suppression activities. Most of these effects would occur outside of wilderness characteristics units as the BLM would not implement or authorize any new facilities that it deems would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics.

Future vegetation, habitat restoration, and fuel reduction treatments would cause a short-term reduction of fuels on an estimated 907,600-1,371,100 acres throughout the planning area (Table 3-25; BLM 2007b, 2010a, 2015e, 2015f, 2015u, 2016a, 2017d, 2018h, 2019m, In prep. a). Since many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by prescribed burning or seeding), these estimates may double-count the total acres actually treated on the ground. Though fuel loads would increase over time following treatments as vegetation communities recover, native communities would improve in ecological condition and resiliency to fire over the long-term.

New fuel breaks could be created on up to an estimated 95,230 acres (on top of maintaining 5,350 acres of existing fuel breaks; Table 3-25; BLM 2020e, In prep. a) over the long-term. This action would substantially reduce fuel loads specifically within the fuel break. Though climate change could result in higher fine fuel loading and/or drier fuel conditions with a higher probability of wildfire in the future (as described in the preceding section), the creation and maintenance of a comprehensive fuel break system would result in fewer fire starts along roads, direct modification of fire behavior within the fuel breaks themselves, and would increase the likelihood for future wildfires to burn fewer acres (BLM 2020e, p. 58).

The cumulative effects of vegetation/fuel reduction treatments and fuel breaks would be a reduction in the intensity and/or size of future wildland fires in the treated areas due to lower fuel loads. This management would keep the total acres burned by future wildland fires from growing larger over the long-term. Though the specific location, timing, and severity of future wildland fires are not reasonably predictable, the BLM estimates that the average total acres burned in the planning area on an annual basis where fuel treatments are implemented would not increase (estimated at 200,400-389,000 acres total on top of the estimated 400,758 acres that have burned since 1980; Table 3-26) and could potentially be reduced over the long-term (see *Vegetation – Cumulative Effects* section).

An additional estimated 1,244 to 2,141 acres of vegetation/fuels could be reduced by livestock concentration or trailing associated with new range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17) (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative B

Under the No Action Alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb or remove an estimated 1,862-1,961 additional acres of vegetation/fuels (on top of the existing 8,227 acres associated with these activities) over the long-term (Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a). However, this could also result in an increase in man-made structures scattered across the landscape that could become a high priority for protection during future wildland fire suppression activities. These effects would occur outside of Category C, units, new Section 202 WSAs, and existing WSAs where less restrictive management would apply.

Future vegetation/fuel reduction treatments could cause a short-term reduction in fuel loading on an estimated 497,000-672,500 acres across the planning area (Table 3-25; BLM In prep. a). Many of these areas would undergo multiple treatments over several years (*e.g.* juniper thinning followed by prescribed burning or seeding), so these estimates may double-count the total treated acres on the ground. However, these effects would decrease as the treated areas recover to native or desired vegetation communities over the long-term and would occur on fewer acres than the No Action Alternative. Though fuel loads would increase over time following treatments as vegetation communities recover, native communities would improve in ecological condition and resiliency to fire over the long-term.

Since fuel breaks would be precluded in all new Section 202 WSAs and Category C units, and there would be no management setbacks where fuel breaks could be implemented under this alternative, the potential negative effects to vegetation communities from creating new fuel breaks would occur on fewer (up to 52,500) acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25; BLM In prep. a) over the long-term compared to all other alternatives (see *Soil* and *Vegetation - Cumulative Effects* section).

Fewer fuel breaks, coupled with fewer, less-effective fuel reduction treatments, and a warmer climate would likely result in greater fuel loading, greater wildfire risk, higher intensity wildfires, and more total acres burned within untreated areas (*e.g.* Category C units and new Section 202 WSAs) over the long-term of all the alternatives analyzed. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that the average annual acres burned would increase (an additional 380,400-500,000 acres total on top of the estimated 400,758 acres that have burned since 1980) within the planning area over the long-term. This would result in a cumulative loss of vegetation communities and larger areas of bare ground subject to increased soil erosion potential compared to the No Action Alternative and Alternative A. However, these negative effects would decline over the long-term due to natural revegetation and emergency rehabilitation (estimated 100,000-180,000 acres of seeding/planting) actions (Table 3-25) (see *Soil* and *Vegetation - Cumulative Effects* sections).

An additional 444 to 868 acres of vegetation could be disturbed by livestock concentration or trailing use associated with new range improvements over the long-term (on top of an estimated 21,500-32,000 acres of concentrated use; Table 3-17) (see *Livestock Grazing – Cumulative Effects* section) resulting in slightly less potential cumulative impacts to vegetation communities compared to the No Action Alternative.

Cumulative Impacts of Alternative C

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 1,961-2,206 additional acres of vegetation over the long-term (on top of the existing 8,227 acres associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a) outside of Category C units.

Vegetation/habitat restoration treatments could cause short-term loss of vegetative cover on an estimated 935,600-1,202,100 acres throughout the planning area (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. However, these effects would decrease as the treated areas recover to native or desired vegetation communities over the long-term.

New fuel breaks could be created on up to an estimated 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25; BLM 2020e, In prep. a) over the long-term, including within Category C unit setbacks. While this action would reduce total vegetative cover, particularly woody vegetation, and temporarily increase soil erosion potential, it would not completely remove all vegetation within the fuel break. Though climate change could contribute to a higher probability of wildland fire in the future, the creation and maintenance of a comprehensive fuel break system would result in fewer fire starts along roads, direct modification of fire behavior within the fuel breaks themselves and would increase the likelihood for future wildfires to burn fewer acres (BLM 2020e, p. 58).

Since vegetation/fuel reduction treatments can also reduce the intensity and/or size of future wildfires in the treated area (due to lower fuel loads), the short-term, collective negative effects of both fuel breaks and fuel reduction treatments on existing sagebrush steppe, forest, and riparian/wetland vegetation communities would be offset by keeping the total acres burned by future wildland fires from growing larger over the long-term. Though the specific location, timing, and severity of future wildland fires are not reasonably predictable, the BLM estimates that an additional 300,000-389,000 acres of sagebrush steppe, forest, and riparian/wetland vegetation communities within the planning area (on top of the estimated 400,758 acres that have burned since 1980) could burn over the long-term. While this would

result in short-term, cumulative loss of vegetation communities and areas of bare ground subject to increased soil erosion potential, these negative effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Soil* and *Vegetation - Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of vegetation could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17) resulting in the same potential cumulative impacts to vegetation communities as described for the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative D

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 2,065-2,310 additional acres over the long-term (on top of the existing 8,227 acres associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a) outside of Category C units.

Vegetation/habitat restoration treatments could cause a similar level of short-term loss of vegetative cover as the No Action Alternative (907,600-1,371,100 acres; Table 3-25; BLM In prep. a). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. However, these negative effects would decrease as the areas recover to native or desired vegetation communities over the long term.

New fuel breaks could be created on up to an estimated 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25; BLM 2020e, In prep. a) over the long-term, including within Category C unit setbacks. While this action would reduce total vegetative cover, particularly woody vegetation, and temporarily increase soil erosion potential, it would not completely remove all vegetation within the fuel break. Though climate change could contribute to a higher probability of wildland fire in the future, the creation and maintenance of a comprehensive fuel break system would result in fewer fire starts along roads, direct modification of fire behavior within the fuel breaks themselves and would increase the likelihood for future wildfires to burn fewer acres (BLM 2020e, p. 58).

Since vegetation/fuel reduction treatments can also reduce the intensity and/or size of future wildfires in the treated area (due to lower fuel loads), the short-term, collective negative effects of both fuel breaks and fuel reduction treatments on existing sagebrush steppe, forest, and riparian/wetland vegetation communities would be offset by keeping the total acres burned by future wildland fires from growing larger over the long-term. Though the specific location, timing, and severity of future wildland fires are not reasonably predictable, the BLM estimates that an additional 300,000-389,000 acres of sagebrush steppe, forest, and riparian/wetland vegetation communities within the planning area (on top of the estimated 400,758 acres that have burned since 1980) could burn over the long-term. While this would result in short-term, cumulative loss of vegetation communities and areas of bare ground subject to increased soil erosion potential, these negative effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Soil* and *Vegetation - Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of vegetation could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17) resulting in the same potential cumulative impacts to vegetation communities as described for the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative E

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 1,965-2,210 additional acres of vegetation over the long-term (on top of the existing 8,227 acres associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a) outside of Category C units.

Vegetation/habitat restoration treatments could cause short-term loss of vegetative cover on approximately 935,600-1,202,100 acres throughout the planning area (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. However, these negative effects would decrease as the treated areas recover to native or desired vegetation communities over the long term.

The potential negative effects to vegetative cover from creating new fuel breaks could occur on up to 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25; BLM 2020e, In prep. a) over the long-term, including within Category C unit setbacks. While this action would reduce total vegetative cover, particularly woody vegetation, it would not completely remove all vegetation within the fuel break. Though climate change could contribute to a higher probability of wildland fire in the future, the creation and maintenance of a comprehensive fuel break system would result in fewer fire starts along roads, direct modification of fire behavior within the fuel breaks themselves and would increase the likelihood for future wildfires to burn fewer acres (BLM 2020e, page 58).

Since vegetation/fuel reduction treatments can also reduce the intensity and/or size of future wildfires in the treated area (due to lower fuel loads), the short-term, collective negative effects of both fuel breaks and fuel reduction treatments on existing sagebrush steppe, forest, and riparian/wetland vegetation communities would be offset by keeping the total acres burned by future wildland fires from growing larger over the long-term. Though the specific location, timing, and severity of future wildland fires are not reasonably predictable, the BLM estimates that an additional 300,000-389,000 acres of sagebrush steppe, forest, and riparian/wetland vegetation communities within the planning area (on top of the estimated 400,758 acres that have burned since 1980) could burn over the long-term. While this would result in a short-term, cumulative loss of vegetation communities and areas of bare ground subject to increased soil erosion potential, these negative effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Soil* and *Vegetation - Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of vegetation could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (Table 3-17) resulting in the same potential cumulative impacts to vegetation communities as described for the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Facilities

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect BLM's ability to manage needed administrative facilities in the planning area?*

Affected Environment

The Lakeview District BLM office is located in Lakeview, Oregon. The inter-agency office building is leased from the Government Services Administration and houses staff of the Lakeview District and Lakeview Field Office of the BLM, and the Fremont-Winema National Forests Supervisor's Office. Other non-recreation facilities include an inter-agency maintenance shop/fire center, an inter-agency communication/repeater site, a fire lookout, and a fireguard station (Table 3-31) covering an estimated 25 acres.

Table 3-31. Existing BLM Administrative Facilities

Name	Location	Description
Fort Rock Guard Station	Northwest of Christmas Valley	Fire station with seasonal quarters
Green Mountain Lookout	North of Christmas Valley	Fire lookout tower, communication site, and seasonal
Hart Mountain Repeater	Hart Mountain National Antelope Refuge	Communication site
Lakeview Interagency Maintenance Facility	Lakeview	Interagency Fire Center, telecommunication site and shop, equipment maintenance shop, and seasonal quarters

Source: BLM records.

The existing road and trail network is addressed in the *Off-Highway Vehicle Use and Travel Management* section and Appendix 9. Numerous structures (ditches, culverts, and signs) are associated with this route network. Existing utilities, associated access roads, and other facilities authorized under rights-of-way (ROWs) are addressed in the *Lands, realty, and cadastral survey* section. Developed or designated recreation sites/facilities are addressed in the *Recreation* section.

There are several thousand existing range improvement structures/facilities scattered across the planning area that support livestock, wild horse, and wildlife management activities. These include, but are not limited to water control structures, check dams, reservoirs, waterholes, wells, pipelines, water troughs, fences, corrals, cattle guards, wildlife guzzlers, and other similar facilities. These are addressed in the *Livestock Grazing* section.

Environmental Effects

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Conducting periodic or routine facility maintenance activities, including those facilities within wilderness characteristics units, represent management actions that typically have such minor impacts that they are excluded from the requirements of NEPA under 43 CFR § 46.210(f). The BLM determined that all wilderness characteristics units were in a substantially natural condition despite the presence of numerous, substantially unnoticeable, existing facilities (range improvements, signs, recreation sites, and other facilities scattered across these units). Therefore, continuing to maintain these existing facilities would not

impact wilderness characteristics within any units or cause an entire inventory unit to no longer meet the criteria for wilderness characteristics.

New facilities or major renovations of existing facilities have the potential to negatively affect the existing natural character of a wilderness characteristics unit but would only be precluded if the BLM deemed it would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics.

Impacts of Alternative A

Wilderness Characteristics Management Impacts

Under this alternative, the maintenance of existing administrative facilities could continue to occur throughout all wilderness characteristics units similar to the No Action Alternative because maintenance actions would not cause additional impacts to the existing natural character of these units. In addition, proposed new facilities and major renovations of existing facilities could also occur within wilderness characteristics units. Overall, this alternative would provide the most flexibility to develop and maintain needed facilities of all the alternatives over the long-term.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Under Alternative B, existing administrative facilities within all Category C units and new Section 202 WSAs could be maintained similar to the No Action Alternative because maintenance actions would not cause additional impacts to the existing natural character of these areas. However, the BLM could only construct or authorize new, permanent facilities within the Category C units if such facilities would meet VRM Class II objectives and would not be substantially noticeable. Existing facilities within new Section 202 WSAs could be maintained or replaced if such actions meet the non-impairment standard or one of its exceptions. New facilities within new Section 202 new Section WSAs would only be allowed where they meet the non-impairment standard or one of its exceptions (BLM 2012h). The application of BMPs (see Appendix 7) could further limit the types of facilities subsequently approved in Category C units and new Section 202 WSAs. For this reason, new facilities would be the most severely restricted when compared to all of the other alternatives.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Under this alternative, existing administrative facilities within all categories of wilderness characteristics units (A, B, C, and C setbacks) could be maintained because maintenance actions would not cause additional impacts to the existing natural character of any of these units. However, new facilities could only be approved by the BLM within Category C units if such facilities meet VRM Class II objectives and would not be substantially noticeable. The application of BMPs (see Appendix 7) could further limit the types of facilities subsequently approved by the BLM in these units.

While the BLM could approve new administrative facilities in Category B units, the decision-maker could also apply BMPs (see Appendix 7) to minimize potential impacts to wilderness characteristics. This

could limit the types of facilities that would be approved in the future or could add additional costs to the project design. In Category B units, the BLM could also decide to approve facilities without such BMPs. Impacts associated with new facilities in Category A units would be the same as those described for Alternative A.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Under Alternative D, existing administrative facilities within all categories of wilderness characteristics units (A, B, C, and C setbacks) could be maintained because maintenance actions would not cause additional impacts to the existing natural character of any of these units. The constraints on constructing new facilities within Category C units would be limited to about 4,671 additional acres under this alternative. The effects on constructing new facilities within Category B units would be the same as those described for Category B units in Alternative C. Impacts associated with new facilities in Category A units would be the same as those described for Alternative A.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Under Alternative E, existing administrative facilities within all categories of wilderness characteristics units (A, B, C, and C setbacks) could be maintained because maintenance actions would not cause additional impacts to the existing natural character of any of these units. However, new facilities could only be approved by the BLM within Category C units if such facilities meet VRM Class II objectives and would not be substantially noticeable. The application of BMPs (see Appendix 7) could further limit the types of facilities subsequently approved by the BLM in these units. The effects on constructing new facilities within Category B units would be similar to those described for Category B units in Alternative C. Impacts associated with new facilities in Category A units would be the same as those described for Alternative A.

Cumulative Impacts Common to All Alternatives

None of the RFAs listed in Table 3-1 would have any additive, incremental cumulative effects on facilities management within the planning area beyond those direct effects described in the preceding *Environmental Effects* section. The potential incremental additive cumulative effects associated with additional fencing and water developments associated with livestock grazing management are discussed in the *Livestock Grazing – Cumulative Impacts* section.

Off-Highway Vehicle Use and Travel Management

Issue: *How would alternative strategies for wilderness characteristics management, OHV and travel management, and livestock grazing management affect public and administrative access in the planning area?*

Affected Environment

Motorized vehicle access is necessary for BLM staff to administer resource management programs on the public lands. Vehicle access is also an important need for wildfire suppression and other emergency actions. Commercial and permitted users such as miners, livestock operators, commercial outfitters, and private landholders also need access. Access to BLM-administered lands provides opportunities for a variety of recreation activities (hunting, fishing, camping, and driving for pleasure). Access is provided by a combination of off-highway vehicle (OHV) area designations, the existing route network (federal and state highways, county roads, and BLM roads and trails), and legal easements across non-federal ownerships.

For purposes of this analysis, OHVs include such things as all-terrain vehicles (ATVs), utility task vehicles (UTVs), recreation off highway vehicles (ROV)4 by 4s, sand rails, three-wheelers, quads, and motorcycles[7]. Local legislation (Lake County, OR: Ordinance NO. 104, 10/2014) has enabled ATV/UTV/ROV use on many county roads and much of the recreational OHV travel depends on access to open public BLM-administered primitive roads to connect between many dispersed recreation opportunities available in the planning area (see *Recreation* section).

OHV use in the planning area is rising. The Oregon Parks and Recreation Department (OPRD) estimates there were 150,000 ATV operating permits issued in Oregon in 2011 and over 20.4 million OHV activity days in Oregon in 2017 (ORPR 2011, Rosenberger 2018). Sales of quads and off-road motorcycles have increased 400% since 1990 (OPRD 2018). Based on these trends, the demand for OHV use/motorized recreation opportunities within the planning area is expected to increase over the long-term.

Existing Off-Highway Vehicle Area Designations

Most motorized vehicle use on BLM-administered lands in the planning area occurs on existing roads, primitive roads, and trails. However, approximately 467,174 acres of the planning area are currently designated as Open to (cross-country) OHV use (Table 3-32). There are currently several Open OHV areas (totaling an estimated 30,000 acres) within the planning area where cross-country motorized vehicle use is relatively concentrated or intensive. The largest and most notable Open area is the Christmas Valley Sand Dunes. In addition, the Sunstone mining area is subject to a substantial amount of cross-country vehicle use associated with locatable mining and public recreational rock-hounding activities.

As a result of the *Oregon Sage-Grouse ARMPA* (BLM 2015b), many former OHV Open area designations within Greater Sage-Grouse habitat were changed to Limited to Existing Routes, while areas that were already designated as Limited to Designated Routes (384,930 acres) were retained. Currently there are approximately 2,339,555 acres that are designated as Limited to Existing Routes in the planning

[7] While OHVs also include motorboats, jet skis, and snowmobiles (see definitions in Chapter 2), there is very little of these types of motorized uses on BLM-administered lands/water bodies in the planning area, and therefore, they will not be addressed further in this analysis.

Table 3-32. OHV Area Designations by Alternative

OHV Area Designation	No Action/Alternative A				Alternative B			
	WC Units	**Existing WSAs**	**Rest of Planning Area**	**Total**	**WC Units/ New Section 202 WSAs**	**Existing WSAs**	**Rest of Planning Area**	**Total**
Open	205,535	9,069	261,570	476,174	0	0	252,569	252,569
Limited - Designated Routes	113,502	145,725	125,703	384,930	0	0	125,764	125,764
- Existing Routes	1,335,933	324,265	679,337	2,339,555	0	0	681,928	681,928
Closed	1,225	5,740	3,844	10,809	1,655,290	484,789	3,844	2,143,923
	Alternative C				**Alternative D**			
	WC Units	**Existing WSAs**	**Rest of Planning Area**	**Total**	**WC Units**	**Existing WSAs**	**Rest of Planning Area**	**Total**
Open	0	0	0	0	5,950	9,069	55,554	70,573
Limited - Designated Routes	113,502	145,715	124,976	384,193	113,502	145,725	124,966	384,193
- Existing Routes	1,541,468	333,334	933,102	2,807,904	1,535,518	324,265	877,523	2,737,306
Closed	1,225	5,740	4,320	11,285	1,225	5,740	4,320	11,285
	Alternative E							
	WC Units	**Existing WSAs**	**Rest of Planning Area**	**Total**				
Open	205,044	9,069	252,685	466,798				
Limited - Designated Routes	113,502	145,725	124,966	384,193				
- Existing Routes	1,336,424	324,265	680,416	2,341,105				
Closed	1,225	5,740	4,320	11,285				

area. Approximately 10,809 acres are currently designated as Closed to motorized vehicle use (Table 3-32; Map OHV-1, Appendix 1).

Existing Route Network

Federal Highways, State Highways, and County Roads

BLM-administered lands in the planning area are accessible from one federal highway (395), two state highways (31 and 140), and numerous county roads. Where these roads cross BLM-administered lands, the road managing agency typically has a right-of-way from the BLM for the road and associated maintenance (see *Lands, Realty, and Cadastral Survey* section). However, BLM-administered lands within the Highway 395 ROW (between Valley Falls and Wagontire) were recently transferred to the Federal Highway Administration and are no longer under BLM administration (Letter of Consent, dated July 15, 2019). There are approximately 296 miles of federal and state highways and 247 miles of county roads in the planning area that have a double-lane, paved surface. There are another 300 miles of double-lane, gravel surface and 37 miles of natural graded surface county roads. About 64 miles of state

highways and 226 miles of county roads cross BLM-administered lands in the planning area under right-of-way.

A wide variety of public, commercial, and government interests utilize these main roads, and they are generally open year-round, depending on road maintenance and snow conditions. This network of main roads connects a number of small communities in the planning area, including New Pine Creek, Lakeview, Westside, Valley Falls, Paisley, Alkali Lake, Wagontire, Christmas Valley, Fort Rock, Silver Lake, and Summer Lake with each other and the surrounding region (Maps TM-1 to TM-4, Appendix 1).

Existing BLM Routes

All BLM routes in the planning area are classified as either roads, primitive roads, or trails (see *Glossary* in Appendix 8 for definitions). The BLM has an existing *Transportation Plan* for the planning area (BLM 1981e) that includes about 43% of all existing BLM roads and primitive roads in the planning area. Route-specific information and management objectives from this plan are stored in the Facilities Asset Management System (FAMS) database. Since 2003, the BLM has been actively updating its route inventory datasets at multiple levels (see Appendices 2 and 9). As a result of route inventory updates, there are currently about 5,466 miles of open, BLM-administered roads or primitive roads in the planning area. (Maps TM-1 to TM-4, Appendix 1; Table 3-33). The routes that are summarized in this table and shown on the TM series maps represent open routes that existed at the time of WSA designation (1991) or completion of BLM's recent wilderness characteristics inventory update. User-created routes located within WSAs after 1991 have been closed (see Maps SMA-9, SMA-9A, SMA-13, SMA-15, SMA-16, SMA-26 through SMA-31, of BLM 2003b, as maintained) and are not included in this summary.

Table 3-33. Summary of Existing BLM Roads and Associated Disturbance

Route Type	Planning Area (miles)	Total Ground Disturbance (acres)[1]	WSA (miles)	106 WC Units (miles)[3]	Ground Disturbance in WSAs and WC Units (acres)
BLM Roads in Transportation Plan	1,232.0	1,792	0	89.4	130
BLM Primitive Roads in Transportation Plan	1,110.3	1,615	0	303.4	441
Unclassified/Unnumbered BLM Roads	3132.2	4,556	213.4	1,061.6	1,544
TOTAL	**5,466**[2]	**7,963**	**213.4**	**1,454.4**	**2,115**

Source: BLM's Ground Transportation (GTRN) and FAMS databases.
[1]Based on an average 12-foot wide disturbance for single lane road/primitive road.
[2] Total does not include approximately 247 miles of routes closed in *Lakeview RMP/ROD* (see Table 10 of BLM 2003b).
[3] These routes do not meet BLM's wilderness inventory boundary road definition (BLM 2012e and 2021f).

Existing BLM Trails

Currently, there are approximately 63.2 miles of user-created primitive, undesignated motorized trails that are scattered across the planning area that receive no maintenance. Most of these are located in the Sand Dunes WSA (15.7 miles), Sunstone mining area (8.8 miles), and Warner Wetlands ACEC (Table 3-34; Maps TM-1 to TM-4, Appendix 1).

Approximately 6.5 miles of open, designated foot trails also exist at Abert Rim (Juniper Creek), Warner Wetlands ACEC, Crack-in-the-Ground (Four Craters WSA), Buck Creek, and Derrick Cave (Devils Garden WSA). A designated canoe trail, totaling about 12.5 miles, also exists in the Warner Wetlands ACEC.

Table 3-34. Summary of Existing BLM Trails and Associated Disturbance

Trail Type	Planning Area (miles)	Total Ground Disturbance (acres)[1]	WSA (miles)	WC Units (miles)[2]	Ground Disturbance in WSAs and WC Units (acres)
Motorized trails	63.2	61.3	15.7	14.0	28.8
Non-motorized trails	10.6	6.4	2.2	3.2	3.3
Canoe trails (water)	12.5	0	0	12.5	0
TOTAL	**137**	**67.7**	**17.9**	**29.7**	**32.1**

Source: BLM's Ground Transportation (GTRN) and Canoe Trails databases.
[1] Based on an average 8-foot wide disturbance for motorized trails and 5-foot wide disturbance for non-motorized trails.
[2] These routes do not meet BLM's wilderness inventory boundary road definition (BLM 2012e and 2021f).

New Routes

In the past 20 years, the construction of one new permanent road segment resulted in relocating about a mile of BLM Road 7134-00 around a fenced private parcel. Other projects have resulted in the construction of approximately 10 miles of new routes under ROW grants to other parties. All of these have occurred outside of wilderness characteristics units. New, unimproved routes have also been created in connection with the construction of range improvements, sunstone mining, and high OHV use in the vicinity of the Christmas Valley Sand Dunes. Generally, such new route development has occurred by the repeated passage of vehicles rather than the use of heavy construction equipment. Some of these new user-created routes are located within wilderness characteristics units.

Road Maintenance and Upgrade

The amount of annual road maintenance that has been accomplished in the planning area has depended on the purpose of the route, assigned maintenance level, and annual funding. The BLM has maintained approximately 100 miles of roads each year for various classes of motorized use. Maintenance priorities are described further in Table A9-1 of Appendix 9.

Existing routes have also been upgraded, widened, resurfaced, or realigned where needed to address increased use or promote public safety. Two such projects have been completed since 2009 (BLM 2009d and 2010d), covering approximately 10 miles of existing BLM roads (6151-00 and 6115-00) into high-use areas near the Christmas Valley Sand Dunes and the Sunstone Mining Area.

Existing Route Density

Route densities were calculated for all watersheds in the planning area following a classification utilized in the Interior Columbia Basin Ecosystem Management Project (ICBEMP; FS and BLM 1996c):

- Very low: 0.02 to 0.1 miles of routes per square mile
- Low: 0.11 to 0.7 miles of routes per square mile
- Medium: 0.71 to 1.7 miles of routes per square mile
- High density: 1.7 to 4.7 miles of routes per square mile

Based on this classification, almost all of the planning area, including all wilderness characteristics units, falls in the very low to medium route density classes. In the very northwest corner of the planning area there are approximately 2,000 acres in the high route density category. Based on this analysis, there

currently are no known landscape health issues specifically related to high route density anywhere in the planning area. However, there still could be localized areas where a specific route(s) may be contributing to resource damage that would require identification and analysis during a future Comprehensive Travel Management Planning process.

Environmental Effects

Analysis Assumptions

- For analysis purposes, the potential impacts to public motorized vehicle users, public access, and user safety on BLM-administered lands within the planning area would be characterized by comparing acres of OHV area designations and miles of open routes as impact indicators.
- Based on statewide trends the demand for motorized vehicle/OHV access to BLM-administered lands in the planning area would increase over the long-term.
- Based on professional experience and trends in OHV use observed within the planning area, the BLM assumes for analytical purposes that up to 20% of any open OHV area designations would result in high, concentrated motorized vehicle use resulting in bare ground over the long-term, including the development of new user-created routes (see Appendix 2).
- Adequate recreation and law enforcement funding/staffing would be available to sign and enforce OHV/motorized vehicle area designation decisions, regardless of the alternative.
- Individual route designations for existing routes within OHV Limited areas will be evaluated during a future Comprehensive Travel Management Planning process and will not be addressed further in this plan amendment.
- Based on past road maintenance budgets, staffing levels, and annual accomplishments, up to 100 miles of roads could be maintained each year (BLM 2003b) under each alternative though the specific routes could differ by alternative. Not all BLM-administered roads in the planning area would be maintained.
- Based on past access needs by the BLM, other Federal, State, and County agencies, and public, an estimated 15-20 miles total of new roads (BLM 2003b) could be identified over the long-term.

OHV Area Designation Criteria

OHV area designations must address the designation (minimization) criteria identified in 43 CFR § 8342.1. Area designations shall:

- Be located to minimize damage to soil, watershed, vegetation, air, or other resources of the public lands, and to prevent impairment of wilderness suitability.
- Be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention should be given to protect endangered or threatened species and their habitats.
- Be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.

- Not be located in officially designated wilderness areas or primitive areas[8]. Areas shall be located in natural areas only if the authorized officer determines that off-road vehicle use in such locations will not adversely affect their natural, esthetic, scenic, or other values for which such areas are established.

The following impact analysis section includes a discussion of which minimization criteria are met by each alternative. Some alternatives minimize more potential impacts than others. Generally speaking, the Closed and Limited OHV area designations are employed in places intended to minimize potential OHV effects to one or more resource/use, whereas Open OHV area designations are placed in areas with few resource concerns or conflicts. More specific details of how each alternative minimizes potential impacts to soils, watershed, vegetation, air, wildlife, threatened and endangered species, recreation, wilderness suitability (WSAs), primitive areas (wilderness characteristics units), natural areas (RNAs), and other resources and uses are addressed in those respective sections of this chapter.

Impacts of No Action Alternative

OHV, Travel, and Wilderness Characteristics Management Impacts

The existing OHV area designations would be retained under this alternative. Motorized vehicle use on approximately 85.1% of the planning area would continue to be Limited to Existing (2,341,072 acres; 73.1%) or Designated Routes (384,193 acres; 12%). Approximately 14.6% of the planning area would continue to be open to cross-country motorized vehicle use. Approximately 0.3% of the planning area would remain closed to motorized vehicle use (Map OHV-1, Appendix 1; Table 3-32). Concentrated cross-country motorized vehicle (OHV) use would continue on about 30,000 acres initially (primarily in the Sand Dunes and Sunstone areas) but could potentially expand on up to an estimated 93,320 acres within other OHV Open area designations in the planning area due to increased demand for motorized recreation opportunities over the long-term. User-created routes could also increase within OHV Open areas over the long-term.

The existing OHV area designations were evaluated under the designation (minimization) criteria from 43 CFR § 8342.1 during previous land use planning efforts (BLM 2003a, 2015b). The results of those evaluations are hereby incorporated by reference in accordance with 40 CFR § 1500.4(j) and § 1502.21 (in effect prior to September 14, 2020). The reasons for designating specific areas as Closed to OHV use under these existing decisions included protecting or minimizing potential impacts to special status plant and animal habitats, important paleontological resources, and a designated educational use area.

Areas were assigned to the OHV Limited area designation specifically to reduce or minimize potential impacts of OHV use on wilderness study areas (WSAs), areas of critical environmental concern/research

[8] There are no designated wilderness areas in the Lakeview Field Office. Neither Executive Order 11644 or BLM's OHV regulations (43 CFR § 8340) define the term "primitive area" or "natural area". The BLM assumes that WSAs and lands with wilderness characteristics represent "primitive areas" and RNAs represent "natural areas" for purposes of addressing this criterion.

natural areas (ACEC/RNAs), a large special recreation management area (SRMA), a suitable wild and scenic river (WSR) corridor, important cultural/paleontological resources, crucial mule deer winter habitat, and large blocks of Greater Sage-grouse habitat (PHMA/GHMA). Under this alternative, most of the designated critical habitat and occupied habitat for Warner suckers on public lands within the planning area fall within the OHV Limited area designation. While a few small areas of critical/occupied habitat fall within OHV Open areas, very few roads or other motorized access occurs in these areas. There is currently no designated critical habitat for the listed Grey Wolf, but the ODFW's Area of Known Wolf Activity (AKWA) falls primarily within the OHV Limited area designation. A small portion is also closed to OHV use. Collectively, these OHV Limited area designations would minimize the potential for OHV impacts to important wildlife and their habitat, including threatened and endangered species, across the majority of the planning area.

Within Closed and Limited OHV area designations, the potential impacts of OHV use on soils, watershed, vegetation, and air quality would also be substantially reduced or minimized (when compared to the Open OHV area designation) on approximately 85.4% of the planning area.

Areas were designated as OHV Open areas because they provided a quality OHV opportunity, were not located near populated areas, and had no known resource or user conflicts at that time (BLM 2003a, 2015b).

All existing open BLM-administered routes (roads, primitive roads, and trails) in the planning area, including those within wilderness characteristics units and WSAs, would remain open (or seasonally open) and available for motorized vehicle use (Maps TM-1 to TM-4, Appendix 1; Tables 3-33 and 3-34) under this alternative. The amount of road maintenance that could occur under this alternative (up to 100 miles per year) would maintain or slightly improve motorized access in areas where maintenance occurs. However, existing primitive routes within the interior of wilderness characteristics units could not be maintained by mechanical means as this could result in changes to the unit boundary and/or a reduction in unit size. Continued motorized vehicle use would be the only method available to users to keep interior motorized routes passable under this alternative.

Over time, many interior routes that are not maintained could deteriorate due to weather events, damage from vehicle use during wet conditions, roadbed erosion, and revegetation to the point of becoming impassable. In addition, approximately 1,410,233 acres (43.1%) of the planning area would continue to be closed to salable mineral development which would negatively impact the availability of salable minerals for BLM road maintenance or construction needs in portions of the planning area. These factors would collectively impact road/route conditions in some portions of the planning area. Non-maintained routes would also be used less since they would be more difficult or less safe to drive which would also promote revegetation and contribute to impassable conditions. Collectively, these factors could result in less public and administrative access (BLM 2003a, p. 4-144 to 4-145) to some portions of the planning area over the long-term.

The existing OHV area designations and open route network would continue to provide public and administrative motorized access to most public lands in the planning area for a variety of uses including, but not limited to recreation, fish and wildlife management, mining, utility development and maintenance, livestock grazing administration, wildfire suppression, fuels management, and resource monitoring. While an estimated 15-20 miles of new roads could be constructed in the planning area over the long-term this could only occur outside of wilderness characteristics units. Since roads form inventory unit boundaries, the construction of new roads would change existing unit boundaries resulting in a reduction

in unit size. For this reason, the BLM could not construct or authorizing others to construct new roads within wilderness characteristics units under this alternative.

Livestock Grazing Management Impacts

Continuing existing livestock grazing management would have no impacts on OHV area designations or public/administrative motorized access or safety within the planning area.

Summary

Most management activities under this alternative would continue to provide for motorized vehicle use, public access, and user safety, as well as provide opportunities to meet existing motorized vehicle use demand while minimizing conflicts among various public land users. This management would maintain or protect the BLM's investment in road/access development on some of the public lands in the planning area but would not be able to accommodate any increased OHV demand within wilderness characteristics units.

Impacts of Alternative A

OHV, Travel, and Wilderness Characteristics Management Impacts

The effects of the existing OHV area designations and open route network management would be the same as the No Action Alternative except the BLM's road maintenance and construction activities would not be constrained by the Settlement Agreement. This alternative would promote motorized vehicle use, public access, and user safety, as well as provide more opportunities to meet increased motorized vehicle use demand to a higher degree than the No Action Alternative or any of the other action alternatives. This alternative could result in increased conflicts with other public land users, but would maintain or protect the BLM's investment in road development/access on the public lands to a higher degree than the No Action Alternative or any of the other action alternatives.

Livestock Grazing Management Impacts

Continuing existing livestock grazing management would have no impacts on OHV area designations or public/administrative motorized access or safety within the planning area, similar to the No Action Alternative.

Impacts of Alternative B

OHV, Travel, and Wilderness Characteristics Management Impacts

Under this alternative, existing OHV Closed areas would remain closed to public motorized vehicle use. In addition, all Category C units, new Section 202 WSAs, and existing WSAs would be closed to public motorized vehicle use (Table 3-3 and Map OHV-2, Appendix 10. Compared to the No Action Alternative and Alternative A, OHV closed area designations would increase to approximately 2,142,970 acres (66.9%) of the planning area (Table 3-32).

The Limited to Existing Routes OHV area allocations would decrease to about 681,928 acres (21.3%) and Limited to Designated Routes area allocations would decrease to about 125,764 acres (3.9%) within the planning area (Map OHV-2, Appendix 1; Table 3-32). The remaining Limited OHV area designations

would reduce or minimize potential impacts to a suitable WSR corridor, a portion of a large SRMA, some Sage-grouse habitats (GHMA/PHMA), and all crucial mule deer winter range. Under this alternative, most of the critical/occupied habitat for Warner suckers on public lands in the planning area would fall within the OHV Limited or Closed area designations. While a few small areas of critical/occupied habitat would fall within OHV Open areas, very few roads or other motorized access occurs in these areas. Compared to the No Action Alternative/Alternative A, more of the Grey Wolf AKWA would fall within the OHV Closed area designation. Collectively, these OHV area designations would minimize the potential for OHV impacts to important wildlife and their habitats, including threatened and endangered species, across the planning area.

Within Closed and Limited OHV area designations, the potential impacts of OHV use on soils, watershed, vegetation, and air quality would also be substantially reduced or minimized (when compared to the Open OHV area designation) on approximately 92.1% of the planning area.

Open OHV area allocations would decrease to about 252,569 acres (7.9%) of the planning area. Areas were assigned to the OHV Open area designation because they provided a quality OHV opportunity, were not near populated areas, had no known resource or user conflicts, and could meet future motorized recreational demand. Concentrated cross-country motorized vehicle (OHV) use would be reduced in some portions of the planning area initially. In particular, the Sand Dunes WSA and portions of the Sunstone mining area would be closed to OHV use. However, concentrated vehicle use could shift to other remaining Open OHV area designations and could expand up to an estimated 50,460 acres of the planning area (20,460-acre increase) due to increased demand for motorized recreation opportunities over the long-term. User-created routes could also increase within OHV Open areas over the long-term.

All Category C unit, new Section 202 WSA, and existing WSA boundary roads (including cherry-stem boundary roads) would remain open to motorized vehicle use and could periodically be maintained under this alternative. However, approximately 1,697 miles of interior primitive routes in Category C units, new Section 202 WSAs, and existing WSAs would be closed to motorized vehicle use (Tables 3-33 and 3-34). This represents about 30% of all BLM-administered routes in the planning area. In addition, no public cross-country motorized or non-motorized mechanical travel (*e.g.* mountain bikes) would be allowed in these areas (Maps W-3 and OHV-2, Appendix 1). As a result, public motorized access to approximately 2.1 million acres of public lands in the planning area would be substantially reduced compared to the No Action and Alternative A. Over the long-term, interior closed routes could become impassable due to lack of maintenance or use, weather events, erosion, and natural revegetation. As this happens, the interior of units (potentially up to 2.1 million acres) would become inaccessible to the BLM for administrative management purposes over the long-term compared to the No Action and Alternative A.

While the BLM would still maintain up to an estimated 100 miles of roads in the planning area each year, this would occur only on Category C unit, new Section 202 WSA, and existing WSA boundary roads or other portions of the planning area located outside of these areas. An estimated 15-20 miles of new roads could be constructed in the planning area over the long-term, but this could only occur outside of Category C units and all WSAs. In addition, approximately 2,393,134 acres (73.2%) of the planning area would be closed to salable mineral development which would negatively impact the availability of salable minerals for BLM road maintenance and construction activities to a higher degree compared to either the No Action Alternative or Alternative A. Road maintenance, coupled with the minor amount of new road

development expected under this alternative, would maintain motorized access and safety on the smallest portion of the planning area over the long-term compared to all of the other alternatives.

Livestock Grazing Management Impacts

The elimination or reduction of grazing activities that could occur in portions of the planning under this alternative would likely result in reduced use of some of the remaining open roads, primitive routes, and trails currently used primarily livestock permittees. Some of these routes could begin to revegetate and reclaim naturally due to less use which could further diminish motorized access for other users (recreationists, miners, etc.) in those portions of the planning area (see *Vegetation* and *OHV and Travel Management* sections) where grazing use has been eliminated or reduced.

Summary

Collectively, these management actions would result in the most substantial reduction or loss of motorized vehicle use and public access (about two-thirds of the planning area) of all the alternatives over the long-term. This alternative would promote user safety on the remaining open routes and would likely reduce some conflicts between those seeking motorized access to the public lands and those seeking non-motorized experiences. However, those desiring to participate in off-road motorized vehicle activities would experience a substantial reduction in these opportunities compared to the No Action Alternative and Alternative A (see *Recreation* section). In addition, this alternative would not maintain or protect the BLM's investment in road development/access on about 1.65 million acres of the public lands in the planning area.

Impacts of Alternative C

OHV, Travel, and Wilderness Characteristics Management Impacts

Under this alternative, existing OHV Closed areas would remain closed, and the Alkali Lake chemical waste site would also be closed. As a result, approximately 11,285 acres (0.4%) of the planning area would be closed to motorized vehicle use under this alternative. The rationale for proposing designation of specific areas as Closed to OHV use under this alternative included protecting by minimizing potential impacts of OHV use on special status plant or animal habitats, important paleontological resources, and an educational use area, as well as improving public health and safety.

Areas that are currently Limited to Designated Routes would be retained (approximately 384,193 acres; 12.0%). However, all BLM-identified wilderness characteristics units, WSAs, and any remaining Open OHV area designations in the planning area would change to Limited to Existing Routes. As a result, the amount of area Limited to Existing Routes would increase to about 2,807,904 acres (87.6%) (Map OHV-3, Appendix 1; Table 3-32). Collectively, motorized vehicle use across most of the planning area (99.7%) would be Limited to Existing or Designated Routes. Areas were assigned to the OHV Limited area designation to reduce or minimize potential impacts of OHV use on all wilderness characteristics units, WSAs, ACEC/RNAs, a SRMA, a suitable WSR corridor, cultural/paleontological resources, Sage-grouse habitat (PHMA/GHMA), and crucial mule deer winter range. Under this alternative, all critical/occupied habitat for Warner suckers on public lands in the planning area would also fall within the OHV Limited area designation. The Grey Wolf AKWA would fall primarily within the OHV Limited area designation with a small portion closed to OHV use. Collectively, these OHV area designations would minimize the

potential for OHV impacts to important wildlife and their habitats, including threatened and endangered species, throughout the planning area.

The potential impacts of OHV use on soils, watershed, vegetation, and air quality would be limited primarily to the existing route network and would be substantially reduced on most of the planning area when compared to the No Action Alternative. The existing route network would remain open and continue to provide public and administrative motorized access to public lands in the planning area. In addition, an estimated 6.5 miles of routes that existed within 6 WSAs in 1991 and were previously closed in 2003 by decisions made in the *Lakeview RMP/ROD* (see Table 10, and Maps SMA-5, SMA-7, SMA-9, SMA-13, SMA-15, and SMA-16 of BLM 2003b, as maintained) would be re-opened and available for public use. However, no areas/acres would be designated as Open or available for cross-country motorized vehicle use by the general public. As a result, concentrated cross-country motorized vehicle (OHV) use within the planning area would be reduced to zero authorized acres over the long-term. In addition, this alternative would reduce the proliferation of new user-created routes throughout the planning area.

An estimated 15-20 miles of new roads could be constructed in the planning area over the long-term outside of Category C units (or WSAs). While the BLM would still maintain an estimated 100 miles of roads in the planning area each year, this would occur only on Category C unit boundary roads or other portions of the planning area (including Category A and B units) outside of Category C units. Even though primitive routes within the interior of Category C units would remain open, none of these routes would be maintained under this alternative. In addition, approximately 1,667,372 acres (51%) of the planning area would be closed to salable mineral development which would negatively impact the availability of salable minerals for BLM road maintenance and construction activities more than either the No Action Alternative or Alternative A, but less than Alternative B. These factors would collectively impact road/route conditions in portions of the planning area. In the short-term, the public and BLM would still be able to access most of the planning area. However, over time, some interior routes within Category C units that are not maintained could deteriorate due to weather events, damage from vehicle use during wet conditions, roadbed erosion, and revegetation to the point of becoming impassable. Non-maintained routes would also be used less since they would be more difficult or less safe to drive which would also promote revegetation and contribute to impassable conditions. Collectively, these factors would result in less public and administrative access (BLM 2003a, p. 4-144 to 4-145) to some portions of the planning area over the long-term. Road maintenance, coupled with the minor amount of new road development expected under this alternative, would maintain motorized access and safety to most of the planning area over the long-term similar Alternative E.

Livestock Grazing Management Impacts

The elimination or reduction of grazing activities that could occur under this alternative would likely result in the reduced overall use of a few of the open roads, primitive routes, and trails currently used primarily to manage livestock in portions of the planning area. These routes would begin to revegetate and reclaim naturally due to lack of use. Compared to the No Action Alternative and Alternative A, this could result in diminished motorized access for all users in those portions of the planning area. This reduction in public and administrative motorized access would be substantially less than Alternative B, but more than Alternatives D and E.

Summary

Collectively, these management activities would promote motorized vehicle use, public access, and user safety on the existing route network while minimizing conflicts among most public land users. These management activities would also maintain or protect the BLM's investment in road development/access on the public lands. However, this alternative would not provide any areas for off-road or cross-country motorized vehicle activities. Those desiring to participate in these types of activities would be precluded from doing so (see *Recreation* section).

Impacts of Alternative D

OHV, Travel, and Wilderness Characteristics Management Impacts

Existing OHV Closed area designations would remain closed, and the Alkali Lake chemical waste site and Foskett Speckled Dace habitat area would also be closed to motorized access (approximately 11,285 acres total; 0.4% of the planning area). The rationale for proposing designation of specific areas as Closed to OHV use under this alternative included protecting by minimizing potential impacts to special status plant or animal habitats, important paleontological resources, and an educational use area, as well as improving public health and safety.

Areas that are currently Limited to Designated Routes would be retained (approximately 384,193 acres; 12.0% of the planning area). Vehicle use in the 2 Category C units are currently Limited to Existing Routes. Under this alternative, there would be no change in existing OHV area designations within these 2 Category C units. As a result, about 2,737,306 acres would be Limited to Existing Routes (85.4% of the planning area). Collectively motorized vehicle use across 97.4% of the planning area would be Limited to Existing or Designated Routes (Table 3-32; Map OHV-4, Appendix 1). Areas were assigned to the OHV Limited area designation to reduce or minimize the potential impacts of OHV use on Category C wilderness characteristics units, WSAs, ACEC/RNAs, a suitable WSR corridor, a SRMA, special status plant habitats, cultural/paleontological resources, Sage-grouse habitats (PHMA/GHMA), and crucial mule deer winter habitat. Under this alternative, all critical/occupied habitat for Warner suckers on public lands in the planning area would also fall within the OHV Limited area designation. The Grey Wolf AKWA would fall primarily within the OHV Limited area designation with a small portion closed to OHV use. Collectively, these OHV area designations would minimize the potential for OHV impacts to important wildlife and their habitats, including threatened and endangered species, across the planning area.

Within Limited and Closed OHV area designations, the potential impacts of OHV use on soils, watershed, vegetation, and air quality would also be substantially reduced or minimized (when compared to the Open area designation) on about 97.8% of the planning area.

Cross-country travel would be allowed in 44 discreet Open OHV area designations (approximately 70,500 acres; 2.2% of the planning area) (Table 3-32; Map OHV-4, Appendix 1). Areas were assigned to the OHV Open area designation because they had documented OHV use, provided a quality OHV opportunity, were not near populated areas, had no known resource or user conflicts, and could meet future motorized recreational demand. In addition, several disturbed areas were designated as open to OHV use that included small existing administrative sites (fire facilities, airstrips, helipads, parking areas, etc.), old mine sites, and an existing Sunstone mining and recreational rock hounding area. The OHV Open area boundaries were based on the need to avoid important resources along with minor adjustments

to identify feasible and enforceable boundaries on the ground (Map OHV-4, Appendix 1). The manner in which each individual OHV area designation met the designation (minimization) criteria and national policy (BLM 2016b) is documented further in Table A9-2 of Appendix 9. Implementation and enforcement of the OHV area designations under this alternative would be more feasible than all other alternatives.

Fewer areas/acres would be available for cross-country motorized use by the general public compared to the No Action Alternative and Alternative A. Concentrated cross-country motorized vehicle use would continue on about 30,000 acres of the planning area, including the Sand Dunes and Sunstone areas, but could expand by an additional estimated 40,500 acres (70,500 acres total) within the Open area designations due to the increased demand for motorized recreation opportunities expected over the long-term. User-created routes could also increase within these OHV Open areas over the long-term.

The existing route network would remain open and would continue to provide public and administrative motorized access to public lands in the planning area. An estimated 15-20 miles of new roads could also be constructed in the planning area over the long-term outside of the 2 Category C units. While the BLM would maintain an estimated 100 miles of roads in the planning area each year, this would occur only on Category C unit boundary roads or areas located outside of Category C units in other portions of the planning area (including Category A and B units). Even though primitive routes within the interior of Category C units would remain open, these routes would be maintained under this alternative.

Approximately 1,410,347 acres (43.2%) of the planning area would be closed to salable mineral development which would negatively impact the availability of salable minerals for BLM road maintenance and construction activities slightly more than either the No Action Alternative and Alternative A, but less than Alternatives B or C. These factors would collectively impact road/route conditions in a small portion (2 Category C units) of the planning area. In the short-term, the public and BLM would still be able to access most of the planning area. However, over time, the few routes within the interior of the 2 Category C units that are not maintained could deteriorate due to weather events, damage from vehicle use during wet conditions, roadbed erosion, and revegetation to the point of becoming impassable. Over time, non-maintained routes would be used less since they would be more difficult or less safe to drive which would also promote revegetation and contribute to impassable conditions. Collectively, these factors would result in less public and administrative access (BLM 2003a, p. 4-144 to 4-145) to a small portion of the planning area over the long-term. Road maintenance, coupled with the minor amount of new road development expected under this alternative, would maintain or slightly improve motorized access and safety to most of the planning area over the long-term similar Alternative A.

Livestock Grazing Management Impacts

Livestock grazing management would have no impacts on OHV area designations or public/administrative access within the planning area, similar to the No Action Alternative.

Summary

Collectively, these management activities would promote motorized vehicle use, public access, and user safety while minimizing conflicts among most public land users. This alternative would also maintain or protect the BLM's investment in road development/access on the public lands. However, those desiring

to participate in off-road motorized vehicle activities would experience a reduction in these opportunities compared to the No Action Alternative and Alternative A (see *Recreation* section).

Impacts of Alternative E

OHV, Travel, and Wilderness Characteristics Management Impacts

Under this alternative, existing OHV Closed area designations would remain closed, and the Alkali Lake chemical waste site would also be closed to motorized access (approximately 11,285 acres; 0.4% of the planning area). The reasons for proposing designation of specific areas as Closed to OHV use under this alternative included protecting by minimizing potential impacts of OHV use on special status plant or animal habitats, important paleontological resources, an educational use area, as well as improving public health and safety.

Areas that are currently Limited to Designated Routes would be retained (approximately 384,193 acres; 12.0% of the planning area). Though Category C units would be Limited to Existing Routes, this would not represent much change from either the No Action Alternative or Alternative A. As a result, approximately 2,341,105 acres (73.1% of the planning area) would be Limited to Existing Routes. Collectively, motorized vehicle use on about 85.1% of the planning area would be Limited to Existing or Designated Routes (Table 3-32; Map OHV-5, Appendix 1).

Areas were assigned to the OHV Limited area designation to reduce or minimize potential impacts of OHVs on Category C units, WSAs, ACEC/RNAs, a suitable WSR corridor, a SRMA, cultural/paleontological resources, special status plant habitats, Greater Sage-grouse habitats (PHMA/GHMA), and crucial mule deer winter habitat. Under this alternative, most of the critical/occupied habitat for Warner suckers on public lands falls within the OHV Limited area designation. While a few small areas of critical/occupied habitat fall within OHV Open areas, very few roads or other motorized access occurs in these areas. The listed Grey Wolf AKWA falls primarily within the OHV Limited area designation. A small portion is also closed to OHV use. Collectively, these OHV area designations would minimize the potential for OHV impacts to important wildlife and their habitat, including threatened and endangered species, across the majority of the planning area, in the same manner as the No Action Alternative and Alternative A.

Within Limited and Closed OHV area designations, the potential impacts of OHV use on soils, watershed, vegetation, and air quality would also be substantially reduced or minimized (when compared to the Open area designation) on about 85.5% of the planning area.

About 466,798 acres would remain Open to cross-country motorized vehicle use (14.6% of the planning area). Areas were assigned to the OHV Open area designation because they provided a quality OHV opportunity, were not near populated areas, had no known resource or user conflicts, and could meet future motorized recreational demand. In addition, the disturbed Sunstone mining and recreational rock hounding area was designated as open to OHV use. As a result, slightly fewer areas/acres would be available for cross-country motorized use by the general public, but those desiring to participate in off-road motorized vehicle activities would experience largely similar opportunities as the No Action Alternative and Alternative A. Concentrated cross-country motorized vehicle use would be continue on about 30,000 acres of the planning area, including the Sand Dunes WSA and Sunstone areas, but could expand up to an estimated 93,320 acres within the OHV Open areas due to increased demand for

motorized recreation opportunities over the long-term. User-created routes could also increase within these OHV Open areas over the long-term.

The existing route network would remain open and would continue to provide public and administrative motorized access to most public lands in the planning area. An estimated 15-20 miles of new roads could also be constructed in the planning area over the long-term outside of Category C units. While the BLM would maintain an estimated 100 miles of roads in the planning area each year, this would occur only on Category C unit boundary roads or in other portions of the planning area (including Category A and B units) outside of Category C units. Even though primitive routes within the interior of Category C units would remain open, none of these routes would be mechanically maintained under this alternative.

Approximately 1,540,684 acres (47.1%) of the planning area would be closed to salable mineral development. These additional constraints would negatively affect the availability of salable minerals for BLM road maintenance and construction activities compared to the No Action Alternative and Alternative A. These factors would collectively impact road/route conditions in portions of the planning area. In the short-term, the public and BLM would still be able to access most of the planning area. However, over time, some of the routes within the interior of Category C units that are not maintained could deteriorate due to weather events, damage from vehicle use during wet conditions, roadbed erosion, and revegetation to the point of becoming impassable. Non-maintained routes would also be used less since they would be more difficult or less safe to drive which would also promote revegetation and contribute to impassable conditions. Collectively, these factors would result in less public and administrative access to some portions of the planning area (BLM 2003a, p. 4-144 to 4-145) over the long-term. Road maintenance, coupled with the minor amount of new road development expected under this alternative, would maintain motorized access and safety to most of the planning area over the long-term similar Alternative C.

Livestock Grazing Management Impacts

Livestock grazing management would have no impacts on OHV area designations or public/administrative access within the planning area, similar to the No Action Alternative.

Summary

Collectively, these management activities would promote motorized vehicle use, public access, and user safety while minimizing conflicts among most public land users similar to Alternative A. Those desiring to participate in off-road motorized vehicle activities would experience similar opportunities as the No Action Alternative and Alternative A (see *Recreation* section). These management activities would also maintain or protect the BLM's investment in road development/access on the public lands.

Cumulative Impacts of No Action Alternative

Areas closed to salable mineral development would negatively impact the availability of salable minerals for BLM, other Federal, State, and County road construction and maintenance programs in or near closed portions of the planning area. While the BLM could develop up to 5 new salable pits to support some of these future road maintenance needs this could occur only outside of wilderness characteristics units. More specifically, the constraints on salable mineral development under this alternative would preclude the use of 2 reasonably foreseeable future material sites (Table 3-9; BLM 2023a) located within 2 wilderness characteristics units (see *Energy and Minerals* section). As a result, this alternative would

have a cumulative negative effect on BLM and others' ability to maintain existing routes within the regions surrounding the two precluded mineral material sites, which would negatively affect motorized access and public safety in and around these sites.

Cumulative Impacts Common to Alternatives A, D, and E

Though the amount of total area closed to salable mineral development would vary somewhat under these alternatives, they would impact the availability of salable minerals for BLM, other Federal, State, and County road construction and maintenance programs from reasonably foreseeable mineral pits in a similar fashion (Table 3-1). Under these alternatives, salable mineral materials would be available from all 7 reasonably foreseeable mineral material sites (Table 3-9; BLM 2023a) (see *Energy and Minerals* section). As a result, adequate mineral materials would be available for BLM and others to maintain their existing route network across the planning area over the long-term. Compared to the No Action Alternative, these alternatives would have higher positive cumulative benefits for motorized access and public safety in the areas surrounding these 7 material sites.

Cumulative Impacts of Alternative B

Areas closed to salable mineral development would negatively impact the availability of salable minerals for BLM, other Federal, State, and County road construction and maintenance programs to a slightly higher degree than the No Action Alternative. While the BLM could still develop up to 5 new salable pits to support some of these other road maintenance needs this could occur only outside of Category C units, new Section 202 WSAs, or existing WSAs. More specifically, the constraints on salable mineral development under this alternative would preclude the use of 2 reasonably foreseeable future material sites (Table 3-9; BLM 2023a) within 2 Category C units (see *Energy and Minerals* section). As a result, this alternative would have a cumulative negative effect on BLM and others' ability to maintain existing routes within the regions surrounding the two precluded mineral material sites which would have cumulative negative effect on motorized access and public safety in these areas.

Cumulative Impacts of Alternative C

Areas closed to salable mineral development would negatively impact the availability of salable minerals for BLM, other Federal, State, and County road construction and maintenance programs more than either the No Action Alternative or Alternative A, but less than Alternative B. More specifically, the constraints on salable mineral development under this alternative would preclude the use of one reasonably foreseeable mineral material site (Table 3-9; BLM 2023a) that is located within a Category C unit (see *Energy and Minerals* section). While this alternative would meet most agency and public needs for salable mineral materials for road maintenance needs across the planning area over the long-term, it would have a negative cumulative effect on BLM and others' ability to maintain their existing routes and motorized access and public safety within the region surrounding this one mineral material site.

Livestock Grazing

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect livestock grazing use and administration in the planning area?*

Affected Environment

Grazing Allotments and Livestock Forage

After passage of the Taylor Grazing Act in 1935, grazing allotments were established and tied to private base property owned by a permittee. The BLM currently administers livestock grazing on 127 allotments in the planning area (Table A5-1, Appendix 5). Grazing is authorized via permits issued under Section 3 of the Taylor Grazing Act on 119 allotments and through leases issued under Section 15 of the Taylor Grazing Act on 8 allotments. Currently, 54 permittees graze 117 allotments under permit or lease. Eight entire allotments and a portion of a ninth are currently vacant for various reasons but are available for livestock grazing use (Tables 3-35 and A5-3, Appendix 5; Map G-1, Appendix 1).

These 127 allotments provide 164,495 Animal Unit Months (AUMs) of available forage (active use) along with 25,576 AUMs of suspended nonuse forage (190,071 AUMs total) on about 2,960,285 acres of public land that is open or available for livestock grazing within the planning area. This includes portions or most of Sand Dunes, Diablo Mountain, Orejana Canyon, Abert Rim (eastern half), Fish Creek Rim, Spaulding, Hawk Mountain, Sagehen Hills, Rincon, and Basque Hills WSAs, as well as all or portions of Lost Forest, Lake Abert (northern quarter), Warner Wetlands (western third), Abert Rim (eastern half), Black Hills, Connley Hills, Fish Creek Rim, Foley Lake, Hawskie-Walksie, High Lakes, Juniper Mountain, Rahilly-Gravelly, Red Knoll, and Spanish Lake ACECs.

Approximately 56,809 acres are currently not available for livestock grazing due to past land use plan decisions or legislation including Guano Creek WSA (Guano Creek-Sink Lakes ACEC/RNA), the central portion of the Warner Wetlands ACEC, the western portion of Abert Rim WSA/ACEC and portions of three key RNAs (approximately 12,052 acres in Fish Creek Rim, Foley Lake, and Rahilly-Gravelly RNA\ACECs) were also made unavailable to livestock grazing use by decisions contained in the *Oregon Greater Sage-Grouse ARMPA* (Objective LG-2, MD LG-1, BLM 2015b)[9] (Table 3-35; Map G-1, Appendix 1).

No grazing use is generally permitted (via previous grazing or project level closure/exclosure decisions or agreements) within about 25,097 acres of the planning area to protect other resources. More specifically, Fossil Lake ACEC, Table Rock ACEC, west side of Lake Abert ACEC, Warner Sucker designated

[9] In March 2019, the BLM issued a Record of Decision (ROD; BLM 2019f) amending its *Oregon Greater Sage-Grouse ARMPA* (BLM (2015a). The ROD reversed BLM's 2015 decision to make all or part of 13 Key RNAs throughout Oregon unavailable for livestock grazing use. Three of these Key RNAs fall within the Lakeview planning area. (A 4th area, Guano Creek, which was made unavailable for livestock grazing use via legislation in 1998, would remain unavailable). In October 2019, the District Court of Idaho issued a preliminary injunction that prevents the BLM from implementing the 2019 ROD. *Western Watersheds Project v. Schneider*, Case No. 1:16-cv-00083-BLW (D. Id. Oct. 16, 2019). During this preliminary injunction, the 2015 ARMPA remains in effect. The BLM is in the process of implementing the necessary actions to close the Key RNAs to livestock grazing (see BLM In prep. b). Implementation may require the BLM to construct fencing and issue grazing decisions subject to protest/appeal (see 43 CFR 4110.4-2 and 4160)) and could result in an estimated reduction of up to 791 AUMs of available forage.

critical habitat, Twelvemile Creek wild and scenic river corridor, a hazmat site, numerous wildlife guzzlers, springs, and other areas are excluded from livestock grazing use (Table 3-35; Map G-1, Appendix 1).

Approximately 115,609 acres within the planning area are currently unallotted for livestock grazing use including 89,558 acres in portions of Diablo Mountain, Four Craters Lava Bed, Devils Garden Lava Bed and Sq__ Ridge Lava Bed WSAs, and Lake Abert ACEC (Table 3-35; Map G-1, Appendix 1). Authorized livestock grazing does not occur on the majority of these acres. However, the *Core Wetland – Acquired South* portion of the Warner Wetlands ACEC (approximately 3,015 acres; see Map SMA-10, BLM 2003b) is grazed occasionally through agreement to meet wildlife habitat management objectives (BLM 2003b, p. 63-64, as maintained).

In total, approximately 260,401 acres (8.1%) in the planning area is currently ungrazed for various reasons (Table 3-35). The current vegetation condition (see *Vegetation* section) and associated forage is capable of supporting the existing forage allocations (Table A5-2, Appendix 5) for livestock, wild horses, and wildlife across the planning area.

Standards for Rangeland Health

The rangeland reform process resulted in the development of *Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington* (BLM 1997a). The *Livestock Grazing* section (Chapter 2) and Appendix 5 describe these five standards (see also 43 CFR § 4180; 2005). The BLM began assessing rangeland health in 1998 within the planning area and continues to update these assessments during the grazing permit renewal process. Completion of rangeland health assessments (RHAs[10]) has occurred on 120 of the 127 allotments within the planning area (Table A5-4, Appendix 5). The Devil's Garden, Tucker Hill, Table Rock, Abert Rim, Bottomless Lake, Crane Mountain, and Diablo Allotments are not currently grazed; therefore, completing an RHA on these allotments has not been a priority and has not yet occurred.

Within the planning area, approximately 92% of the allotted acres are currently meeting rangeland health standards. Approximately 7% of the acres are not meeting standards and about 1% of the acres have not been assessed because they are not currently grazed. Of the acres not meeting standards, livestock grazing was determined to be a contributing factor on about 4% of those acres. However, problems pertaining to livestock grazing have typically been related to a need to make livestock management changes to season of use or livestock distribution rather than forage allocation (BLM 2003a). The other 3% of the acres failed to meet the standard due to other factors including, but not limited to: invasive weeds, stream temperature, poor riparian conditions due to roads, past cultivation, or juniper encroachment. In all acres and allotments where livestock grazing was determined to be a contributing factor in not meeting standards, BLM has made appropriate changes in grazing practices so that these areas are now making progress toward achieving rangeland health standards. As a result, all acres and

[10] Also referred to more recently as land health assessments.

1

Table 3-35. Areas Currently not Grazed by Livestock

Area	Location/Allotment	Acres
Areas Not Available to Livestock Grazing Use Due to Land Use Plan Decision, Legislation, or Litigation		
Warner Wetlands ACEC	Acquired North Area	3,965
Warner Wetlands ACEC	Potholes Area	19,620
Guano Creek WSA/Sink Lakes ACEC/RNA	Beaty Butte Allotment (00600)	11,809
Abert Rim WSA/ACEC	Abert Rim Allotment (00437)	9,352
Small Administrative Sites	LIFC/Hart Bar	11
Key RNAs (implementation in process)[1]		
- Fish Creek Rim ACEC/RNA	Lynch-Flynn Allotment (00520)	2,750
- Rahilly-Gravelly ACEC/RNA	Rahilly-Gravelly Allotment (00212)	8,284
- Foley Lake ACEC/RNA	Juniper Mountain and Coyote-Colvin Allotments (00515 and 00517)	1,018
Subtotal		**56,809**
Grazing Closures or Excluded Areas [2]		
Table Rock ACEC	Table Rock Allotment (00714)	3,755
Fossil Lake Exclosure (Sand Dunes WSA/ACEC)	ZX Allotment (10103)	5,100
Lake Abert ACEC Riparian Exclosure	West Lake and XL Allotments (00424 and 00427)	1,038
Highway 140 Exclosure	Beaty Butte Allotment (00600)	3,903
Crane Mountain	Crane Mountain Allotment (01307)	240
Warner Sucker Designated Critical Habitat:		
- Honey Creek Exclosures	Fitzgerald FFR, Taylor FFR, and Fish Creek Allotments (00502, 00503, and 00519)	876
- Twelvemile Creek Exclosure	Fish Creek Allotment (00519)	137
- Twentymile Creek Exclosures	O'Keeffe FFR, Lane Plan I, and Round Mountain Allotments (00203, 00207, and 00211)	362
Twelvemile Creek Suitable WSR	Round Mountain Allotment (00211)	1,600
Other riparian/stream, wetland, spring, experimental plot, guzzler, or facility exclosures	Various locations across planning area	8,086
Subtotal		**25,097**
Unallotted Areas [3]		
Lake Abert ACEC	Lake Abert	30,096
Diablo Mountain WSA	Summer Lake	18,721
Four Craters Lava Bed WSA	Four Craters Lava Bed	4,527
Devil's Garden Lava Bed WSA	Devil's Garden Lava Bed	19,894
Sq__ Ridge Lava Bed WSA	Sq__ Ridge Lava Bed	16,320
Miscellaneous Public Lands	Various locations across planning area	26,051
Subtotal		**115,609**
Vacant Allotments/Pastures in:		
Diablo Mountain WSA	Diablo Peak Allotment (00436)	53,594
Devil's Garden Lava Bed WSA/ACEC	Devil's Garden Allotment (00907)	4,515
Warner Wetlands ACEC	Swamp Lake South Pasture of Warner Lakes Allotment (00523)	572
Other Vacant Allotments [4]	Tucker Hill, Crooked Creek, Schultz, Barry, and Bottomless Lake Allotments (00409, 01301, 01305, 01308, and 10104)	4,205
Subtotal		**62,886**
Total		**260,401**

2
3 Source: BLM Grazing Allotments and Pasture GIS Database
4 [1] The *Oregon Greater Sage-Grouse ARMPA* designated 4 Key RNAs in the Lakeview planning area and made portions of 3 of them unavailable
5 for livestock grazing. The 4th area, Guano Creek WSA (which includes Sink Lakes ACEC/RNA), had already been made unavailable for
6 livestock grazing via legislation in 1998 (see BLM 2015a, p. 2-18; BLM In prep. b).

[2] Areas that have been closed to grazing use through grazing/project decision or agreement. Most livestock exclosures would not be subject to scheduled grazing during the long-term. However, grazing could be authorized on a limited, temporary basis within some exclosures as a management tool to maintain vegetation objectives such as wildlife nesting habitat or weed/invasive species control.
[3] Areas that are not part of a grazing allotment and are not subject to authorized grazing use.
[4] Allotments or pastures that are available for livestock grazing but are currently vacant or not grazed for various reasons (Table A5-3, Appendix 5).

allotments within the planning area are currently in conformance with the requirements of 43 CFR § 4180.

Range Improvement Projects

Range improvement projects or treatments have been authorized on BLM-administered lands to improve production of forage, change vegetation composition, control patterns of use, provide water, stabilize soil and water conditions, and restore, protect, or improve the condition of rangeland ecosystems to benefit livestock, wild horses, fish, and wildlife (43 CFR § 4100.0-5). A variety of projects have been constructed across the planning area over the years including allotment/pasture fences, exclosure fences, water developments (reservoirs, waterholes, spring developments, pipelines, water troughs, storage tanks), and non-native seedings (Table 3-17). The presence and visibility of these existing range improvements were considered during BLM's recent wilderness characteristics inventory update under the discussion of "apparent naturalness" for each inventory unit (see Appendix 2).

Environmental Effects

Analysis Assumptions

- Based on the results of past rangeland health assessments (RHAs) completed between 1998 and present day (which resulted in portions of 12 allotments totaling about 126,614 acres (4%) of BLM-administered lands in the planning area failing to meet standards due to livestock grazing), the BLM assumes that a similar number of additional pastures and/or acres could fail to meet one or more rangeland health standards due to livestock grazing following completion of rangeland health assessment updates over the long-term.
- Removal or reduction of livestock grazing use would likely result in the expedited attainment of rangeland health standards at the pasture or allotment scale compared to other livestock management options available under 43 CFR 4180. However, removing or reducing grazing would not address all potential impact-causing activities on public lands. For this reason, rangeland health standards may not be met in some areas due to the removal or reduction of grazing alone, regardless of the alternative. Some areas may need additional active restoration management (juniper removal, weed treatment, etc.) to make progress towards meeting standards or desired future conditions over the long-term.
- For analysis purposes, the BLM assumes that for Alternative B, up to 100% of the land use allocations listed in Table 2-2 (up to 2,455,325 acres) could have grazing permits voluntarily relinquished and those areas made unavailable for grazing use over the long-term.
- For analysis purposes, the BLM assumes that for Alternative C grazing permits could be voluntarily relinquished and those areas made unavailable for grazing use on up to 403,190 additional acres within WSAs over the long-term.

- Maintenance of most existing or future range improvements (fences, corrals, water developments, etc.) would be the responsibility of the permittee. However, BLM may be responsible for the maintenance of some improvements. These responsibilities would be identified in cooperative or rangeline agreements and would be conducted on an as-needed basis.

Impacts of No Action Alternative and Alternative A

Livestock Grazing Management Impacts

Under these two alternatives, all BLM-administered lands currently available for livestock grazing use (about 2,960,285 acres) would remain available for this use. Approximately 260,401 acres (8.1%) in the planning area would be ungrazed for various reasons under these two alternatives (Tables 3-39).

The average authorized forage use level (112,676 AUMs) would likely continue to be utilized annually; however, up to the full active preference (164,495 AUMs) could be authorized in any given year. The active preference use level for each allotment would continue to be assessed through rangeland health assessments, allotment evaluations, allotment management plans, watershed analyses, plan amendments, or biological opinions. Changes in active preference would continue to be made where needed, on an allotment-specific basis. Administrative solutions to meet resource management needs would not affect the quantity of forage available for livestock use.

Generally, livestock grazing within WSAs (approximately 15.2% of the planning area) is considered a legacied or pre-existing use that may continue in the same manner and degree as what was allowed on the date of approval of the FLPMA (October 21, 1976), even if this use impairs wilderness suitability. This type of use represents an exception to the non-impairment standard (BLM 2012h, p. 1-11 to 1-12). Changes in livestock grazing management would continue to be governed by the requirement to meet the WSA non-impairment standard or one of the exceptions to the non-impairment standard (BLM 2012h, p. 1-10 to 1-13, 1-16 to 1-19).

BLM would continue to take appropriate action(s) to adjust livestock grazing in areas where rangeland health assessments found livestock grazing to be a causal factor in a failure to meet a standard. Implementation of short-term or temporary reductions in AUMs would continue to be one of many potential appropriate actions that could be taken to improve rangeland health. Over the past 20 years, livestock grazing was found to be a significant factor in failing to achieve rangeland health standards in portions of 12 allotments (totaling about 126,614 acres). In the majority of these instances, changes in grazing management or small riparian exclosures (which removed livestock grazing on very small acreages within a pasture or allotment) remedied the issue. These changes in livestock grazing management have promoted progress toward meeting rangeland health standards in all areas, but none have resulted in a reduction in forage allocations. Based on this, it is not likely that any permanent reductions in AUMs would occur under these two alternatives over the long-term.

Over the past 20 years, only three permits have been relinquished due solely to a lack of interest in the permit areas (totaling about 550 acres and 43 AUMs of forage). Based on this trend for the planning area, the BLM assumes for analytical purposes that 1-3 additional permits could be voluntarily relinquished over the analysis timeframe under this alternative. While current policy does allow the BLM to consider other resource management objectives when deciding how to manage an area where a grazing permit has been relinquished, the permit is typically made available to another qualified applicant in accordance with

43 CFR § 4100 or remains vacant until such time as there is interest by another qualified applicant. While the BLM could also consider designating the allotment as a Reserve Common Allotment (see also MD LG-15, BLM 2015a) or allocating the forage for a different purpose or other resource uses, these actions would require the preparation of a separate RMP Amendment or revision to adopt.

The responsibility to maintain existing range improvements typically falls on the benefiting permittee(s). Being able to maintain existing range improvements throughout the planning area, including within wilderness characteristics units, would benefit livestock grazing management over the long-term by continuing to provide reliable livestock water, keep livestock in authorized areas, and provide scheduled rest.

Summary

Continuing the existing livestock grazing, vegetation, and OHV management under these two alternatives would likely maintain or increase the quality and/or quantity of available forage across the planning area, but livestock forage allocation increases would typically not occur as a result.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Vegetation management activities could continue to occur within wilderness characteristics units under this alternative provided the BLM deems the treatments/methods would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. Appropriate mixes of native and non-native perennial and annual plant species would be used for rehabilitation of areas in poor ecological condition (which may or may not be due to grazing). Continuing the current integrated noxious weed and invasive species management program would also benefit livestock management by decreasing the opportunity for undesirable species to displace higher quality forage species.

Rehabilitated areas would typically be excluded from grazing for a minimum of two growing seasons after rehabilitation activities. The short-term effect of many vegetation/habitat rehabilitation actions would be a temporary decrease in available livestock forage along with a short-term impact to a permittee's annual operations to accommodate rest. While vegetation management actions are not typically conducted for the purpose of increasing livestock forage (AUMs), these actions would improve plant community health and forage quality or quantity within treated areas over the long-term.

New range improvements could have the potential to negatively impact naturalness but would only be constructed within wilderness characteristics units if the BLM deemed it would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. While some project designs could be modified to reduce impacts to naturalness and prevent the loss of wilderness characteristics from a given unit, this could, based on past experience within the planning area, make a proposed range improvement project ineffective or too expensive and therefore, the improvement would not be implemented. This management constraint would continue to negatively impact livestock grazing administration, operations, and management within large portions (up to 52%) of the planning area over the long-term.

OHV and Travel Management Impacts

Retaining existing motorized vehicle/OHV use designations across the entire planning area under this alternative would result in the greatest number of acres left open to cross-country motorized vehicle use and the greatest number of open and maintainable access routes, which would continue to provide the highest benefit to livestock administration of all the alternatives. In addition, BLM could continue to authorize livestock permittees to travel off-road in limited use areas or travel on closed routes where needed to perform livestock management actions under OHV Exception #5 (see *Off-Highway Vehicle Use and Travel Management* section). For this reason, permittees would retain adequate authorized access to perform effective livestock administration, including range improvement construction and maintenance operations under these two alternatives.

However, the existing route network would continue to negatively impact an estimated 8,024 acres of soils and vegetation communities across the planning area. In addition, cross-country motorized vehicle use would negatively impact an estimated 30,000 to 93,420 acres of vegetation communities scattered across the planning area (see *Soils* and *Vegetation* sections). This would have a negative effect on livestock forage production and quality in these areas over the long-term.

Impacts of Alternative A

Wilderness Characteristics Management Impacts

Under this alternative, the BLM would have the most flexibility to manage livestock grazing use as wilderness characteristics management would not constrain livestock management options, particularly the construction of new range improvements or implementation of beneficial vegetation management actions. Drill seeding would continue to be used for restoration seedings and seeding maintenance. Appropriate mixes of native and non-native perennial and annual plant species would be used for rehabilitation of areas in poor ecological condition (which may or may not be due to grazing). Continuing the current integrated noxious weed and invasive species management program would also benefit livestock management by decreasing the opportunity for undesirable species to displace higher quality forage species similar to the No Action Alternative.

Rehabilitated areas would typically be excluded from grazing for a minimum of two growing seasons after rehabilitation activities. The short-term effects of many vegetation/habitat rehabilitation actions would be a temporary decrease in available livestock forage along with a short-term impact to a permittee's annual operations to accommodate rest. While vegetation management actions are not typically conducted for the purpose of increasing livestock forage (AUMs), these actions would improve plant community health and forage quality or quantity within treated areas over the long-term similar to the No Action Alternative.

OHV and Travel Management Impacts

The effects of OHV use and travel management under this alternative would be the same as those described for the No Action Alternative.

Summary

Compared to all of the other alternatives, Alternative A would provide the most benefits to the livestock grazing management program, as it would have the fewest management constraints. Permittees and BLM staff would have the greatest level of flexibility to authorize permitted grazing use, access allotments,

monitor livestock, construct new range improvements, conduct weed management, and maintain existing crested wheatgrass seedings and associated forage quality/quantity across the planning area.

Impacts of Alternative B

Livestock Grazing Management Impacts

Based on the potential changes in permitted livestock use, this alternative would have the greatest potential for reductions or elimination of grazing use on the largest number of acres compared to all other alternatives. Approximately 56,809 acres would continue to be unavailable for livestock grazing initially, including most of Guano Creek WSA (Guano Creek-Sink Lakes ACEC/RNA), the western portion of Abert Rim WSA/ACEC, and portions of Fish Creek Rim ACEC/RNA (WSA), Foley Lake ACEC/RNA, and Rahilly-Gravelly ACEC/RNA (Table 3-35). An additional 62,436 acres of vacant allotments or pastures (previously relinquished) within portions of Diablo Mountain WSA, Devil's Garden Lava Beds WSA, Table Rock ACEC, and Warner Wetlands ACEC would also be designated as unavailable for livestock grazing use immediately under this alternative (Table 3-36).

Table 3-36. Additional Areas not Available to Livestock Grazing Immediately under Alternative B

Area	Allotment/Pasture	Acres
Diablo Mountain WSA	Diablo Peak (00436)	53,594
Devil's Garden Lava Bed WSA/ACEC	Devil's Garden (00907)	4,515
Table Rock ACEC	Table Rock (00714)	3,755
Warner Wetlands ACEC	Swamp Lake South Pasture of Warner Lakes (00523)	572
TOTAL		**62,436**

Approximately 25,097 acres would continue to be excluded from, or closed to, livestock grazing use by grazing or project decision, including portions of Fossil Lake ACEC (Sand Dunes WSA), western portion of Lake Abert ACEC, designated critical habitat for Warner Sucker, and Twelvemile Creek suitable Wild and Scenic River corridor to protect other resource values. In addition, no authorized grazing would occur on approximately 115,609 unallotted acres, including 89,558 acres in portions of Diablo Mountain, Four Craters Lava Bed, Devils Garden Lava Bed and Sq__ Ridge Lava Bed WSAs, and Lake Abert ACEC (Table 3-35; Map G-2, Appendix 1).

In total, approximately 260,401 acres (8.1%) in the planning area would be ungrazed initially under this alternative including approximately 217,905 acres (9.3%) of the land use allocations listed in Table 2-2. Additional grazing permits could also be relinquished, and additional lands made unavailable for grazing use on anywhere from 0 to 1,968,500 acres of the land use allocations listed in Table 2-2 over the long-term. This could reduce total grazing use on BLM-administered lands in the planning area by an estimated 0 to 131,233 additional AUMs (assuming an average forage production of 15 acres/AUM) over the long-term. Making these areas unavailable for grazing use would not require a subsequent plan amendment or revision.

Based on the assumption that as many as 126,614 acres could fail to meet a rangeland health standard(s) due to livestock grazing over the long-term, up to an additional estimated 8,441 AUMs (126,614 acres at an average of 15 acres/AUM) of livestock forage could be suspended over the long-term under this alternative. Vegetation recovery and progress towards meeting rangeland health standards could occur more quickly in these areas compared to most other alternatives where other livestock grazing management changes would more typically be employed.

The suspension or relinquishment of grazing would result in a reduction in the collection of grazing fees which, in turn, would reduce the availability of future range improvement funds. This would result in less opportunity for maintenance of existing range improvement projects (water developments, fences, cattle guards, etc.) or construction of new range improvements throughout most of the planning area. However, this would be offset somewhat by less need to maintain range improvements within the interior of areas where grazing is removed. The responsibility for maintenance of range improvements within the interior of pastures or allotments where grazing is relinquished would revert back to the BLM and would typically not occur unless the improvement was needed for other resource management purposes (*e.g.* providing water for wild horses or wildlife).

Wilderness Characteristics Management Impacts

The types of allowable vegetation and fuels management and range improvement activities within Category C units and new Section 202 WSAs would be more limited on about 1,655,290 acres under this alternative compared to the No Action Alternative and Alternative A. These activities would be subject to meeting VRM class I (280,748 acres) or VRM class II (1,374,018 acres) management objectives and applying other appropriate mitigation measures (see Appendix 7). This alternative would reduce the availability of some effective vegetation and range management tools on up to 52% of the planning area (see *Vegetation* and *OHV and Travel Management* sections) and could result in either added management costs or not being able to approve some future management proposals. For example, in new Section 202 WSAs, the BLM would only use surface disturbing methods if the project meets an exception to the non-impairment standard and would only use the method determined to be the least disturbing to the site while still achieving the objective. The use of heavy equipment and drill seeding methods would be restricted in some Category C units which could reduce the effectiveness of some reclamation, rehabilitation, and restoration actions, as aerial or broadcast seeding methods are not as effective in establishing desirable vegetation as drill seeding (Nelson *et al.* 1970, Hull 1970, Hudson 2016).

While reductions or elimination of livestock grazing would reduce the risk of weed and invasive seed spread across portions of the planning area, it would not remove all vectors of seed transmission (*e.g.* wind, water, and wildlife). In addition, the amount and effectiveness of invasive species treatments would be reduced within some Category C units, new Section 202 WSAs, and existing WSAs (up to 2.1 million acres) (see *Non-Native Invasive Plant* section) due to the decrease in ground-based access to large areas over time. As a result, invasive species could increase 7-12% annually in untreated areas (BLM 2010a, p. 133 and 596; 2015e, p. 11, 72, and 82).

For these reasons, the number of acres in the planning area that would not meet rangeland health standards due to causal factors other than livestock grazing (noxious weed expansion, juniper encroachment or expansion, or large catastrophic wildfires) would likely increase (see *Vegetation* section) and forage availability and quality for livestock use would be reduced in these portions of the planning area over time when compared to all other alternatives.

OHV and Travel Management Impacts

The BLM could continue to authorize livestock permittees to travel off-road in OHV Limited or Closed areas, or travel on closed routes where needed to perform livestock management actions under OHV Exception #5. This would allow permittees to continue to perform necessary livestock management (maintain existing range improvements, place nutritional supplements, or check on water availability or livestock distribution) in the short-term. However, most routes within the interior of wilderness

characteristics units and WSAs would become impassable over time due to less public use and no road maintenance activities (see *Off-Highway Vehicle Use and Travel Management* section). This would cause livestock permittees increased difficulties in accessing and managing livestock on their allotments over the long-term. Many existing range improvements within wilderness characteristics units (and WSAs) would have to be maintained by horseback or by foot. This would be less efficient and more costly to the permittees.

Public cross-country OHV use would be prohibited within all Category C units, new Section 202 WSAs, and existing WSAs under this alternative. As a result, the negative effects of cross-country motorized vehicle use on soils and vegetation communities would be reduced to an estimated 20,460 to 50,460 acres within the remaining Open OHV area designations in the planning area compared to the No Action Alternative and Alternative A. In addition, vegetation communities could recover on up to an estimated 2,115 acres of closed interior routes within wilderness characteristics units and WSAs (see *Soils* and *Vegetation* sections). Vegetation recovery would result in an increase in forage quantity in these areas over the long-term.

Summary

This alternative would have the largest potential negative impact to livestock grazing management and associated permittee operations compared to all other alternatives. Overall, permittees would be more limited in their ability to manage livestock and range improvements in large portions of the planning area, potentially resulting in deteriorated range improvements, livestock distribution problems, and declining vegetation conditions. Collectively, the management direction under this alternative could result in up to 139,674 AUMs of forage loss and/or lower quality livestock forage in Category C units, new Section 202 WSAs, and existing WSAs over the long-term. However, due to the potential for reductions in total livestock use, there would also be less total demand for livestock forage under this alternative.

Impacts of Alternative C

Livestock Grazing Management Impacts

Under this alternative, the average authorized use level (112,676 AUMs) would continue initially; the current active preference use level of 164,128 AUMs could be authorized annually, unless rangeland health management changes or permit relinquishments reduce livestock grazing use as described in the following section. Approximately 56,809 acres, including 21,161 acres within Guano Creek and Abert Rim WSAs, would remain unavailable for grazing use. An additional 59,462 unallotted acres within Diablo Mountain, Devils Garden, Four Craters Lava Bed, and Sq__ Ridge Lava Bed WSAs (Table 3-35) would not be grazed.

Permits/leases that are voluntarily relinquished would terminate automatically, as described for the No Action Alternative. There would be the potential for future permit relinquishment within WSAs that could potentially make up to 406,250 additional acres unavailable for livestock grazing use on top of those acres identified in Table 3-35. This could result in the loss of an additional estimated 0-26,897 AUMs of forage (15 acres/AUM) over the long-term. Making these areas unavailable for grazing use would not require a subsequent plan amendment or plan revision decision. Compared to the No Action Alternative and Alternative A, permit relinquishments under this alternative would have a higher potential to negatively affect the livestock grazing program. Compared to Alternative B, this alternative would

have fewer acres where permit relinquishments could result in areas becoming unavailable for livestock grazing over the long-term.

Under this alternative, the BLM would temporarily remove grazing when an allotment or pasture fails to achieve a rangeland health standard due to livestock grazing. Based on the assumption that up to 126,614 acres could fail to meet a rangeland health standard due to grazing over the long-term, temporary livestock grazing closures/reductions could result in up to an estimated 8,441 AUMs (15 acres/AUM) of forage lost on a temporary basis. However, grazing would resume in these areas once standards have been met or livestock grazing is no longer a causal factor.

Keeping livestock out of WSAs following permit relinquishment could require an estimated 30-50 miles of new fencing over the long-term (with an estimated 18-30 acres of new ground disturbance associated with fence construction and livestock trailing) under this alternative. This fencing would likely be constructed just outside of WSA boundaries (to meet the non-impairment criteria). However, should a Category C unit lie contiguous or adjacent to such a WSA, the constraints on future range improvements within Category C units could make it difficult to find an appropriate location for such fencing. Other improvements, such as above-ground power lines to wells and large, above-ground storage tanks would likely not be able to meet these requirements or BMPs (see Appendix 7) and would therefore not be feasible. This would result in BLM ultimately not being able to approve some new facilities within Category C units.

Maintenance of existing range improvements would be allowable within all areas available to livestock grazing, including within Category C units. In areas where livestock grazing is temporarily removed due to a rangeland health issue, maintenance of existing range improvements would likely not occur until such time as livestock grazing resumes. However, neighboring pasture fences and common use range improvements could continue to be maintained by other permittees. The responsibility for maintenance of range improvements within the interior of pastures or allotments where grazing is relinquished (WSAs) would revert back to the BLM and would typically not occur unless the improvement was needed for other resource management purposes (*e.g.* providing water for wild horses or wildlife).

Wilderness Characteristics Management Impacts

Management methods for vegetation, including fuels and invasive species, and range improvements within Category C units would be more limited within approximately 13.1% of the planning area. While existing range improvements within Category C units could be maintained by horseback or by foot, these methods would be less efficient, more costly, and have not typically been used by permittees.

New vegetation management and range improvements in Category C units would be allowed but would be subject to meeting VRM class II objectives and applying appropriate BMPs (see Appendix 7). These measures would result in added costs for project implementation, and could result in less effective management actions or not being able to approve some future management proposals compared to the No Action Alternative or Alternative A.

For example, only aerial or broadcast seeding of native species would be allowed within the interior of Category C units for vegetation restoration or wildfire rehabilitation purposes. These methods would not be as effective in establishing vegetation as drill seeding (Nelson *et al.* 1970, Hull 1970, Hudson 2016). This could result in less effective establishment of desirable vegetation with more bare ground and weeds in some of these units. In addition, the effectiveness of seeding maintenance, fuels, and invasive species

management actions would be reduced within Category C units. Overall, the availability of effective vegetation and livestock management tools would be reduced within approximately 13.1% of the planning area.

Within Category B units the decision-maker could apply BMPs for wilderness characteristics (see Appendix 7) to proposed range improvement and vegetation management actions on a case-by-case basis. These measures could result in added range management costs but would not prevent implementation of future proposals on up to 36.3% of the planning area. There would be no need to apply BMPs for wilderness characteristics to proposed new range improvements or vegetation treatments within Category A units (about 2.6% of the planning area).

OHV and Travel Management Impacts

Under this alternative all existing open routes in the planning area would remain open and available for permittees to use to conduct range management activities, including range improvement maintenance. Though public OHV use across the entire planning area would be limited to existing routes, the BLM would continue to authorize livestock permittees to travel off-road in OHV Limited or Closed areas or travel on closed routes where needed to perform livestock management actions under OHV Exception #5 in the same manner as the No Action Alternative and Alternative A. As a result, this alternative would only slightly reduce access for range improvement maintenance and construction, and livestock administration compared to the No Action Alternative and Alternative A.

Compared to the No Action Alternative and Alternative A, the negative effects of cross-country motorized vehicle use on soils and vegetation communities would be substantially reduced or eliminated throughout the entire planning area under this alternative. In this respect, this alternative would provide the highest level of protection to soils and vegetation from cross-country motorized vehicle impacts of all the alternatives analyzed (see *Soils* and *Vegetation* sections). Vegetation recovery in previous OHV disturbed areas would result in an increase in forage quantity and quality in many locations within the planning area over the long-term. Impacts to vegetation communities and associated forage production from BLM's open road network would be similar to those described for the No Action Alternative and Alternative A.

Summary

Overall, the ability to manage livestock by treating vegetation and fuels, and implementing new range improvements across most of the planning area would be similar to Alternative E, less restrictive than the No Action Alternative or Alternative B, but more restrictive than Alternative A. Livestock forage of up to 41,000 AUMs could be temporarily unavailable under this alternative.

Impacts of Alternative D

Livestock Grazing Management Impacts

Under this alternative, livestock grazing would continue at existing authorized levels similar to the No Action Alternative and Alternative A. Maintenance of existing range improvements would be allowable within all areas available to livestock grazing in the planning area, including in Category C units.

Making a management change(s) that addresses the appropriate causal factor(s) for an area that is failing to meet rangeland health standards would likely allow the area to make progress towards meeting standards over both the short and long-term. However, only making changes to livestock grazing management when livestock grazing is not the causal factor, would not likely make progress towards meeting standards.

The effects of future permit relinquishments under this alternative would generally be similar to those described for the No Action Alternative and Alternative A, as the BLM would continue to follow the permit relinquishment policy in WO IM 2013-184 (or subsequent guidance). The BLM would continue to accept all voluntary relinquishments. The BLM would then review the compatibility of livestock grazing use with other existing resources and multiple uses in the former permit area through a site-specific NEPA compliance process and document its rationale in the resulting decision. If grazing is found to be compatible with the other resource considerations, the area would remain available to livestock grazing and could become a reserve common allotment or a new grazing permit could be issued to a qualified applicant in accordance with 43 CFR 4100. If grazing was found to be incompatible, the forage allocation would be made to another resource for the life of the plan, but additional land use planning level analysis would not be required. Based on past permit relinquishment trends for the planning area, an estimated 1-3 additional permits could be voluntarily relinquished over the analysis timeframe under this alternative, but it is unlikely that the compatibility review would determine that continued livestock grazing use would be incompatible with other uses.

Wilderness Characteristics Management Impacts

This alternative would have only 2 small units managed as Category C (0.15% of the planning area). The majority (approximately 4,620) of these acres are currently ungrazed and have few existing range improvements and very little potential need for new range improvements or vegetation treatments. For this reason, the management of these Category C units would have little direct impact on the livestock grazing program.

Within Category B units the decision-maker could apply BMPs for wilderness characteristics (see Appendix 7) to proposed range improvement and vegetation management actions on a case-by-case basis. These measures could result in added range management costs but would not prevent implementation of future proposals on up to 33.6% of the planning area. There would be no need to apply BMPs for wilderness characteristics for proposed new range improvements or vegetation treatments within Category A units (18.2% of the planning area).

OHV and Travel Management Impacts

This alternative would have about 70,500 acres remaining open and subject to concentrated public motorized off-road vehicle use (13% fewer acres compared to the No Action Alternative, Alternative A, or Alternative E). The amount of area where permittees would need to be expressly authorized by the BLM to drive off-road for livestock management purposes under OHV exception #5 would be more than the No Action Alternative and Alternative A, but substantially less than Alternatives B or C. This alternative would only slightly reduce access for range improvement maintenance and construction, and livestock administration compared to the No Action Alternative and Alternative A.

The potential negative effects of concentrated cross-country motorized vehicle use on soils and vegetation communities and resulting effects on forage production (quality and quantity) under this alternative would

fall within the range of those estimated for the No Action Alternative and Alternative A. Impacts to soils and vegetation communities and associated forage production from BLM's open road network would be the same as those described for the No Action Alternative and Alternative A (see *Soils* and *Vegetation* sections).

Summary

Overall, the ability to manage livestock by treating vegetation and fuels, and implementing new range improvements across most of the planning area would be similar to the No Action Alternative and slightly more restrictive than Alternative A, but less restrictive than Alternatives B, C, or E. After Alternative A, this alternative would provide the highest level of livestock management flexibility to the largest number of acres across the planning area. Livestock forage availability and quality would be maintained over the long-term, similar to the No Action Alternative and Alternative A.

Impacts of Alternative E

Livestock Grazing Management Impacts

Under this alternative, livestock grazing would continue at existing authorized levels. Maintenance of existing range improvements would be allowable within all areas available to livestock grazing in the planning area, including in Category C units. The effects of addressing grazing permit relinquishments and rangeland health issues would also be the same as those described for the No Action Alternative and Alternative A.

Wilderness Characteristics Management Impacts

Management methods for vegetation, including fuels and invasive species, and range improvements within Category C units would be more limited within approximately 11.7% of the planning area. New vegetation management and range improvements in Category C units would be allowed but would be subject to meeting VRM class II objectives and applying appropriate BMPs (see Appendix 7). These measures would result in added costs for project implementation, and could result in less effective management actions or not being able to approve some future management proposals compared to the No Action Alternative or Alternative A.

For example, only aerial or broadcast seeding of native species would be allowed within the interior of Category C units for vegetation restoration or wildfire rehabilitation purposes. These methods would not be as effective in establishing vegetation as drill seeding (Nelson *et al.* 1970, Hull 1970, Hudson 2016). This could result in less effective establishment of desirable vegetation with more bare ground and weeds in some of these units. In addition, the effectiveness of seeding maintenance, fuels, and invasive species management actions would be reduced within Category C units. Overall, the availability of effective livestock management tools would be reduced on up to 11.7% of the planning area.

Within Category B units the decision-maker could apply discretionary BMPs for wilderness characteristics (see Appendix 7) to proposed range improvement and vegetation management actions on a case-by-case basis. These measures could result in added management costs but would not prevent implementation of future proposals on up to 34.9% of the planning area. There would be no need to apply BMPs for wilderness characteristics for proposed new range improvements or vegetation treatments within the Category A units (5.4% of the planning area).

OHV and Travel Management Impacts

This alternative would have a similar number of OHV Open, Closed, or Limited acres for public motorized vehicle use as the No Action Alternative and Alternative A. The amount of area where permittees would potentially need to be authorized to drive off-road for livestock management purposes under OHV exception #5 would be similar to the No Action Alternative and Alternative A, but would be less than Alternatives B, C, or D.

While public cross-country motorized vehicle use would be prohibited within Category C units under this alternative, this does not represent a substantial change in open areas from current OHV management (Maps OHV-1 and OHV-5, Appendix 1) specifically within these units. Concentrated cross-country motorized vehicle use would negatively impact an estimated 30,000 to 93,420 acres of soils and vegetation communities scattered across the planning area. This would have a negative effect on livestock forage production and quality in these areas over the long-term, similar to those estimated for the No Action Alternative and Alternative A. Impacts to soils and vegetation communities and associated forage production from BLM's open road network would be the same as those described for the No Action Alternative and Alternative A (see *Soils* and *Vegetation* sections).

Summary

Overall, the ability to manage livestock by treating vegetation and fuels, and implementing new range improvements across most of the planning area would be similar to Alternative C, less restrictive than the No Action Alternative and Alternative B, and slightly more restrictive than Alternatives A and D. This alternative would only slightly reduce access for range improvement maintenance and construction, and livestock administration compared to the No Action Alternative and Alternative A. Livestock forage availability and quality would be maintained over most of the planning area over the long-term.

Cumulative Impacts Common to All Alternatives

Climate Change

The potential effects of climate change on livestock grazing management under all alternatives could be numerous, variable, and include changes to forage quantity and quality and the need to make modifications to livestock production systems over time (Polley *et al*. 2013). Changes in climate that could impact livestock grazing management include warmer temperatures, changes in precipitation, water availability for use by livestock, higher occurrence of wildland fire, shorter fire return interval, and changes in vegetation communities, including increased weed infestations. The stocking rate of livestock on BLM-administered lands is dependent upon forage production. Forage or vegetation production is directly affected by temperature, precipitation, and the timing of the two throughout the year.

Brice *et al*. (2020) synthesized recent studies that modeled potential vegetation changes in the Inter-Mountain West (which included the Northern Great Basin portion of the planning area) attributed to climate change. The models employed a range of methods and incorporated multiple future GHG emission scenarios. Overall, the model results showed a high degree of consistency in predicting increased forage production in the region, though the models did not address the potential magnitude of this change. In some portions of the region, productivity could increase primarily in the form of non-native annual grasses, such as cheatgrass. However, the authors also noted that most of the models did

not consider the potential effects of future changes in wildland fire regimes which could seriously limit their relevance in predicting impacts to forage availability.

Warmer temperatures and decreased yearly precipitation could decrease above-ground biomass of vegetation (see *Vegetation* section) and result in less forage available for livestock use. However, increased spring precipitation, coupled with warmer temperatures, could increase the forage available for livestock. Changes could result in shifting the plant growing season to earlier in the year, which could change the optimal period of use by livestock. This could result in the need to adjust the rotation of livestock grazing, season of use to earlier in the year, or stocking rates. Increased flexibility in grazing management would be needed to be able to adjust livestock grazing use based on changing conditions each year.

Wildland fire occurrence on the landscape would decrease forage availability in the short-term, as lands burned by wildland fire are typically rested from grazing use for a minimum of two growing seasons. Vegetation community changes due to wildland fire and increased potential for expansion of invasive annual grasses or weedy species unpalatable to livestock could reduce forage availability for livestock. However, if rehabilitation efforts following a wildland fire include treatments for invasive species and seeding with perennial grass species, forage availability for livestock could increase in the long-term in areas previously dominated by shrub or cheatgrass communities.

While cattle are the only type of livestock currently authorized for grazing on BLM-administered lands in the planning area, shifts in vegetation communities away from perennial grasses (the preferred forage for cattle) across the planning area, could necessitate a shift in the type of livestock (*e.g.* domestic sheep, goats) that could be authorized to graze over the long-term. The combination of warmer temperatures and potential for increased variability in forage production could also make grazing management more challenging in the future, even if total forage quantities increase (Reeves *et al*. 2017).

Livestock tend to require more water under warmer temperatures (Thorton *et al*. 2009). Heat stress could reduce reproduction (Neinaaber and Hahn 2007), compromise metabolic and digestive functions (Mader 2003, Bernabucci *et al.* 2006, King *et al*. 2006), reduce weight gain (Mitlohner *et al.* 2001), and increase mortality (Sirohi and Michaelowa 2007). In addition, changes in water availability for livestock consumption could change the distribution of livestock use and forage consumption patterns on the landscape. Decreased water availability would reduce the total area and total forage available for livestock use, as they would not graze in areas where no drinking water is available. This would lead to heavier concentration of livestock around remaining water sources with the potential for larger concentration impact zones around these water sources. Less water availability could also increase the number of range improvements needed on the landscape to manage livestock such as increased infrastructure for hauling water, wells, changes in fencing, or other improvements. All of these types of climate related changes would result in increased grazing administration costs.

Grazing on Other Land Ownerships

There are many private, state, or other federal land ownership parcels fenced in and managed as part of BLM-administered grazing allotments in the planning area (Map G-1, Appendix 1). Livestock grazing could legally occur in the future on these lands regardless of whether grazing continues on adjacent BLM-administered lands in the planning area. For this reason, some level of livestock grazing and associated range management activities would likely continue on private lands and other ownerships within the

planning area boundary under all alternatives. Under any alternative where grazing is removed from BLM-administered lands, other landowners would be required to fence their lands or employ other less-effective or more costly methods (*e.g.* herding) to keep livestock from trespassing onto BLM-administered lands in order to continue grazing on these other ownerships. This would increase livestock management costs and could substantially reduce management efficiencies for these other parties.

Key RNAs and Preliminary Injunction

If BLM continues to implement the Key RNA grazing management decisions in the 2015 *Oregon Greater Sage-grouse AMPA* (BLM 2015a), up to 12.5 miles of new fencing could be constructed to keep livestock out of portions of the Key RNAs. This amount of new fence would result in an estimated additional 7.6 acres of ground disturbance from future fence construction and livestock trailing. The potential effects of this fencing will require completion of additional NEPA analysis prior to implementation (see BLM In prep. b). If the injunction is lifted and the 2019 *Oregon Greater Sage-grouse AMPA* (BLM 2019f) is implemented, approximately 12,301 acres and an associated estimated 747 AUMs of forage would become available for livestock grazing once again (see Table 2-2 of BLM 2018d). However, under this scenario the fencing and associated ground disturbance described above would not occur.

There could be an additional estimated 12 acres impacted by construction of approximately 11 miles of new fencing and livestock trailing associated with reasonably foreseeable grazing management changes in the South Rabbit Hills and Coyote-Colvin Allotments (BLM 2019o) in the next couple of years. Depending upon the alternative, an additional estimated 1-5 miles of fence could be constructed annually in the years that follow for other range management purposes in other portions of the planning area. This would result in an additional 24-121 acres impacted by 20-100 miles of total fence construction and livestock trailing over the long-term (Table 3-17).

Range Improvement Maintenance in WSAs

Continuing to use and maintain range improvements (fences and water developments) within WSAs that existed prior to October 1976, could negatively impact naturalness within some WSAs over the long-term. However, these types of activities represent a legacied use that meets one of the exceptions to the non-impairment criteria and would be allowable even if they have negative impacts to wilderness values (BLM 2012h). For this reason, periodic maintenance of these improvements would continue to facilitate effective livestock grazing management within WSAs.

Cumulative Impacts Common to No Action Alternative and Alternative A

Under these alternatives, new land use authorizations, mining, facilities, and recreation sites could potentially disturb or remove an estimated 1,944-2,310 additional acres of vegetation/livestock forage (on top of the existing 8,227 acres associated with these activities) over the long-term (Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a).

Future vegetation/fuel reduction treatments could cause a short-term reduction of livestock forage on an estimated 907,600-1,371,100 acres throughout the planning area (Table 3-25; BLM 2007b, 2010a, 2015e, 2015f, 2015u, 2016a, 2017d, 2018h, 2019m, In prep.a). Since many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by prescribed burning or seeding), these estimates may double-count the total acres actually treated on the ground. Forage levels would recover over time as vegetation communities recover. New fuel breaks could be created on up to an

estimated 95,230 acres (on top of maintaining 5,350 acres of existing fuel breaks; Table 3-25; BLM 2020e, In prep. a) over the long-term. This action would substantially reduce woody shrub and tree species and could also increase forage availability from grass and forb species within the fuel break area. Wildland fires reduce livestock forage availability for several years following the fire while the vegetation in the burned area recovers. Vegetation/fuel treatments and fuel breaks would reduce the intensity and/or size of future wildland fires in the treated areas, which would reduce the potential for incremental, negative cumulative losses of livestock forage on treated portions of BLM-administered lands in the planning area (see *Fire and Fuels* and *Vegetation – Cumulative Effects* section).

While the additional fencing and water developments identified in Table 3-1 would improve livestock distribution and management flexibility in specific pastures/allotments, it could also cause additional, incremental estimated 1,244 to 2,141 acres of vegetation/forage loss due to livestock concentration or trailing over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17).

Cumulative Impacts of Alternative B

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb or remove an estimated 1,862-1,961 additional acres of vegetation/livestock forage (on top of the existing 8,227 acres associated with these activities) over the long-term (Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a).

Future vegetation/fuel reduction treatments could cause a short-term reduction in livestock forage on an estimated 497,000-672,500 acres across the planning area (Table 3-25; BLM In prep. a). Many of these areas would undergo multiple treatments over several years (*e.g.* juniper thinning followed by prescribed burning or seeding), so these estimates may double-count the total treated acres on the ground. Forage levels would recover over time as vegetation communities recover. Since fuel breaks would be precluded in all Category C units and there would be no management setbacks where fuel breaks could be implemented under this alternative, the potential effects to vegetation/livestock forage from creating new fuel breaks would occur on fewer (up to 52,500) acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25; BLM In prep. a) over the long-term compared to all other alternatives (see *Fire and Fuels* and *Vegetation - Cumulative Effects* section).

Though vegetation/fuel treatments and fuel breaks would reduce the intensity and/or size of future wildland fires in the treated areas, fewer fuel breaks, coupled with fewer, less-effective fuel reduction treatments, and a warmer climate would likely result in higher intensity wildfires and more total acres burned within untreated areas over the long-term under this alternative when compared to all of the alternatives analyzed (see *Fire and Fuels* and *Vegetation – Cumulative Effects* section). This could potentially result in higher incremental, negative cumulative losses of livestock forage on BLM-administered lands in the planning area (see *Fire and Fuels* and *Vegetation – Cumulative Effects* section).

While less additional fencing and water developments would likely occur under this alternative, an additional 444 to 868 acres of vegetation and associated livestock forage could be disturbed by livestock concentration or trailing use associated with new range improvements over the long-term (on top of an estimated 21,500-32,000 acres of concentrated use; Table 3-17) compared to the No Action Alternative.

Cumulative Impacts of Alternative C

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 1,961-2,206 additional acres of vegetation/livestock forage over the long-term (on top of the existing 8,227 acres associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a) outside of Category C units.

Future vegetation/fuel reduction treatments could cause short-term reduction of livestock forage on an estimated 935,600-1,202,100 acres throughout the planning area (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. Forage levels would recover over time as vegetation communities recover. New fuel breaks could be created on up to an estimated 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25; BLM 2020e, In prep. a) over the long-term, including within Category C unit setbacks, and both Category A and B units. Vegetation/fuel treatments and fuel breaks would collectively reduce the intensity and/or size of future wildland fires in the treated areas, which would reduce the potential for incremental, negative cumulative losses of livestock forage on treated portions of BLM-administered lands in the planning area (see *Fire and Fuels* and *Vegetation – Cumulative Effects* section).

The additional fencing and water developments identified in Table 3-1 would have similar potential cumulative impacts on livestock forage (1,244-2,141 acres on top of an estimated 37,000 acres of concentrated use; Table 3-17) as described for the No Action Alternative.

Cumulative Impacts of Alternative D

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 2,065-2,310 additional acres of vegetation and associated livestock forage over the long-term (on top of the existing 8,227 acres associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a) outside of Category C units.

Future vegetation/fuel reduction treatments could cause a similar level of short-term loss of vegetation/livestock forage as the No Action Alternative (907,600-1,371,100 acres; Table 3-25; BLM In prep. a). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. Forage levels would recover over time as vegetation communities recover. New fuel breaks could be created on up to an estimated 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25; BLM 2020e, In prep. a) over the long-term, including within Category C unit setbacks, and both Category A and B units. Vegetation/fuel treatments and fuel breaks would collectively reduce the intensity and/or size of future wildland fires in the treated areas, which would reduce the potential for incremental, negative cumulative losses of livestock forage on treated portions of BLM-administered lands in the planning area (see *Fire and Fuels* and *Vegetation – Cumulative Effects* section).

The additional fencing and water developments identified in Table 3-1 would have similar potential cumulative impacts on livestock forage as described for the No Action Alternative.

Cumulative Impacts of Alternative E

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 1,965-2,210 additional acres of vegetation and associated livestock forage over the long-term (on top of the existing 8,227 acres associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51; BLM 2018k, 2020a, 2023a) outside of Category C units.

Future vegetation/fuel reduction treatments could cause short-term loss of vegetation/livestock forage approximately 935,600-1,202,100 acres throughout the planning area (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g.* juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. Forage levels would recover over time as vegetation communities recover. New fuel breaks could occur on up to 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25; BLM 2020e, In prep. a) over the long-term, including within Category C unit setbacks, and both Category A and B units. Vegetation/fuel treatments and fuel breaks would collectively reduce the intensity and/or size of future wildland fires in the treated areas, which would reduce the potential for incremental, negative cumulative losses of livestock forage on treated portions of BLM-administered lands in the planning area (see *Fire and Fuels* and *Vegetation – Cumulative Effects* section).

The additional fencing and water developments identified in Table 3-1 would have similar potential cumulative impacts on livestock forage as described for the No Action Alternative.

Climate

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect greenhouse gas emissions (GHG) emissions and carbon storage processes in the planning area?*

Affected Environment

Recent Climatic Conditions

Climate is the composite of generally prevailing weather conditions (temperature, air pressure, humidity, precipitation, sunshine, cloudiness, and winds) of a region averaged over time. The planning area lies in the semi-arid and cool climate of the northwest portion of the Great Basin (Bailey 1995). The planning area experiences both maritime and continental climate patterns, with most of the weather patterns moving inland on cyclonic low-pressure fronts off the Pacific Coast.

The area is sunniest during July, August, and September and cloudiest from November through March. Annually, the area averages 120 clear days and 151 cloudy days. The prevailing wind direction is from the north, although from November through March the wind is more typically from the south (WRCC 2010c). The area is characterized by hot summers and moderately cold winters, average annual temperatures in the Great Basin typically range from 40°F to 55°F, depending upon location and elevation. In the planning area, temperatures can range from a low of 0°F in the winter to more than 90°F in the summer. The area experiences its highest humidity levels (up to 84%) on December mornings and lowest humidity levels (21%) on July afternoons (WRCC 2010a, 2010b). The average annual precipitation in the planning area varies between 8 and 18 inches and occurs primarily during the winter

between October and March, but early spring rains are common (PRISM Climate Group 2010). Since 2000, the longest duration of drought (D1-D4) in Oregon lasted 270 weeks beginning on December 27, 2011, and ending on February 21, 2017 (NIDIS 2019).

The soil temperature regime is frigid. The frost-free period ranges from 50 to 80 days annually but freezing temperatures can occur at any time of year, especially at higher elevations. Higher elevation areas have a progressively shorter growing season, especially above the 6,000-foot elevation. The period of optimum plant growth is from April through June.

Climate Change

Climate change is defined by the Intergovernmental Panel on Climate Change (IPCC 2007) as "a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and persist for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or resulting from human activity." Climate change is generally described on a global, national, or regional scale (state or multi-state). Geologic studies suggest that the climate within the planning area has been cyclical over the past 15,000 years (NRCS 1999a).

Temperature and the Greenhouse Effect

The temperature of the Earth is regulated by a balance of radiation received from the sun minus the amount of radiation either absorbed or reflected back into space. By volume, dry air in the atmosphere contains an estimated 78.09% nitrogen (N), 20.9% oxygen (O), 0.93% argon (Ar), and 0.039% carbon dioxide (CO_2) (NOAA 2016). The atmosphere traps heat and keeps the Earth's temperature warmer than it would if an atmosphere was lacking, allowing the planet to sustain life. This "greenhouse effect" is primarily a function of the concentration of the greenhouse gases (GHGs) in the atmosphere that absorb the radiation reflecting off of the surface of the Earth (listed in descending order): water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and other trace gases (IPCC 2013). Of the four, water vapor represents over 90% of all GHGs present in the atmosphere (Taylor 2009).

Many factors may affect global temperatures (GHGs, ozone, aerosols, aviation contrails, surface albedo, solar irradiance), but not all have been studied in the same level of detail (Forester *et al*. 2007, Taylor 2009). Most of the research in recent years has focused on GHGs. Although GHGs have varied for millennia, recent industrialization and burning of fossil carbon sources have caused carbon dioxide concentrations in the atmosphere to increase and are likely contributing to global climatic changes (Forester *et al*. 2007; EPA 2009). Though researchers note there are complex interactions of many factors affecting temperature on both a regional and global scale, many conclude that anthropogenic (man-made) GHG emissions and, to a lesser degree, losses of biological carbon sinks from land management activities, are contributing to a net warming effect of the atmosphere, primarily by decreasing the amount of heat radiated from the earth back into space (Forester *et al*. 2007; EPA 2009).

USGCRP (2017) reports that the Earth's average land and ocean surface temperature has increased by about 1.8°F from 1901 to 2016, but also found substantial regional variation. Northern latitudes (above 24° N) have exhibited temperature increases of nearly 2.1°F since 1900, with nearly a 1.8°F increase since 1970 alone (GISS 2009). Mote (2003) studied climate across the Pacific Northwest and found that though temperatures have increased over the last century, the rates differed by climatic zone. The central zone, which included eastern Oregon, experienced an average annual temperature increase of 1.5°F

during this timeframe. NCEI (2020) reports that Oregon's average temperature has increased at an estimated rate of 2.2°F per century from 1895-2019.

There is still on-going scientific uncertainty as to how much anthropogenic actions are contributing to recent temperature increases. The IPCC (1992) reported that average global temperatures have been much warmer in the past 1,000 years and this was due entirely to natural causes. The National Oceanic and Atmospheric Administration (NOAA 2010, 2021a) estimates that more than 50% of the current global warming is likely due to human GHG increases. This implies that up to 50% of this warming trend is due to other causes beyond man's control, including natural fluctuations.

Carbon and Nitrogen Cycling

The carbon cycle is the mechanism that controls carbon dioxide in the environment. Many factors influence this process, with soils playing a large role in the cycle. Carbon sequestration, or the capture and storage of carbon, occurs when plants take up carbon dioxide from the atmosphere during photosynthesis. Plants emit oxygen and some of the carbon dioxide, while using the remaining carbon to build biomass (stems, branches, roots, and leaves) during plant growth. Carbon is stored in above-ground biomass pools (vegetation and litter), some of which is consumed and stored by animals (another form of biomass).

Carbon is also stored in below-ground soil carbon pools (root systems, decomposing organic matter, and inorganic sources). Soil carbon levels vary by texture, climate, vegetation, drainage, and time. When individual plants and animals in a community die, they slowly release carbon back into the soil through decomposition. Soil carbon is the main energy source for soil microorganisms (Pidwirny 2006). Carbon dioxide and nitrous oxide may also be released into the atmosphere during soil microbial respiration (Laskowski *et al*. 2011). This natural process may occur over several years to several decades. Some of the carbon remains stored in soil organic matter and is available for future uptake by growing plants. In semi-arid environments soil nitrogen (N) is often the factor most limiting vegetation after water availability. Carbon and nitrogen cycling are closely linked (Johnson and Curtis 2001). Some plants (*e.g.* legumes) also take up nitrogen from the atmosphere and fix it in the soil. Rau *et al.* (2011) found below-ground nitrogen is the single most important factor associated with below-ground carbon retention in pinyon-juniper woodlands.

Lal (2004) estimates that about 57% of the total global carbon pool is stored in soils. Soil carbon levels tend to be lower on warmer, arid lands, typical of the planning area, than on lands with higher precipitation and cooler temperatures. Natural arid and semi-arid ecosystems, such as the grasslands and shrublands in the central and eastern parts of the planning area, do not have a high net primary productivity which limits the amount of carbon that they are capable of storing annually (Booker *et al*. 2013). In sagebrush rangelands, over 90% of carbon is stored in below-ground roots of perennial herbaceous plants (grasses and forbs) (Putz and Restaino 2021). Follet *et al*. (2001) estimates that grazed lands (both pasture and rangelands) in the U.S. have the potential to sequester 29.5 to 110 million metric tons of soil carbon per year. In one rangeland study, an estimated 90% of the total carbon was stored in rangeland soils compared to about 10% in above-ground biomass (Schuman *et al*. 2001). Another study in arid woodlands found that above-ground biomass pools accounted for about 25% of the total carbon storage, leaving the remaining 75% in below-ground soil pools (Rau *et. al*. 2010). If these estimates are representative of the soil carbon storage potential in the planning area, then a wide range of 2-191 metric tons of carbon per acre could potentially be stored in soils in the planning area based on the above-ground vegetation communities (Table 3-37). The aridisol soil order comprises over 82% of the planning area (Table 3-38). Aridisols have the lowest soil organic carbon content of any soil group. Guo *et al*. (2006)

Table 3-37. Biomass Estimates for Representative Vegetation Communities

Vegetation/Fuel Type	Biomass (metric tons/acre)
Sagebrush/Western Juniper	1.4-18.4
Sagebrush/Native Grass	1.1-3.3
Low Sagebrush/Native Grass	2.2
Bitterbrush/Native Grass	1.3-2.9
Sagebrush/Non-Native Grass	0.7
Medusahead/Cheatgrass	0.27
Crested Wheatgrass Seeding	0.54
Ponderosa Pine/Western Juniper	21.2

Table 3-38. Soil Order Summary

Soil Order	Acres	Percent Clay	Percent Sand	Percent of Planning Area
Andisols	14,844	16.9	78.3	0.5
Aridisols	2,650,007	18.2	46.4	82.5
Entisols	232,929	18.5	66.8	7.3
Inceptisols	14,645	21.7	23.8	0.5
Mollisols	143,052	21.0	44.2	4.5
Vertisols	52,411	34.1	18.6	1.6
Other Soils	48,207	-	-	1.5
Water	46,701	-	-	1.5
TOTAL	**3,202,918**			

Source: NRCS GIS Soil Data 1999a, 2006, 2008, 2010a, 2010b.

estimates the mid-range carbon content of aridisols average about 46.6 metric tons per acre.

Oregon's forests sequester an estimated 34 million metric tons of carbon dioxide equivalents annually (CEC 2007). One recent study estimated forests (primarily National Forest and private forest lands) on the west side of Lake County sequestered about 71,045 metric tons of carbon dioxide equivalents in 2019 (Pamperin 2019). Bradley *et al*. (2006) estimated above-ground carbon stocks in sagebrush in Idaho, Oregon, Utah, and Nevada at 1.5-2.6 metric tons per acre. Sinkkink *et al.* (2009) estimated that the above-ground biomass fuel loading in sagebrush/grassland communities in the west varied from 0.75 to 40.9 tons per acre. The *Digital Photo Series* (FS 2021) provides estimates of biomass/fuel loading for a number of vegetation communities in eastern Oregon that are representative of those found in the planning area. Biomass/fuel loading estimates vary substantially by community type (Table 3-37). About half of this biomass by weight is carbon; the other half is water.

Some researchers suggest that rangelands can serve as large carbon sinks that are capable of mitigating some of the effects of increasing GHG emissions (McDermot and Elavathi 2014). For example, woodland expansion into grasslands could increase carbon sequestration on a given landscape (Norris *et. al* 2001; Hibbard *et.al.* 2003, Rau *et al*. 2012). However, invading juniper can dramatically alter the carbon cycle in sagebrush ecosystems by increasing above-ground carbon stocks and reducing below-ground carbon pools (Putz and Restaino 2021). Rau *et al.* (2011) noted that though additional carbon accumulation would occur in above-ground biomass during the transition from a Phase II to Phase III juniper woodland, it would be temporary and would have limited potential to store additional below-ground carbon. Increased tree density could also result in lower soil nitrogen levels, probably due to incorporation into above and below-ground biomass. They further cautioned that the potential benefit should be weighed against the increased risk of wildland fire, drought-induced tree mortality, and weed invasion, which would all reduce above-ground carbon storage. In areas susceptible to wildfire and drought, above-ground carbon pools do not represent long-term carbon storage pools (Putz and Restaino 2021). Miller and Tausch (2001) found that once semi-arid woodland canopy cover reaches 50% the

area becomes more susceptible to high-intensity wildland fire and subsequent weed invasion. Other researchers have found that long-term carbon sequestration in above-ground vegetation is not possible in arid, fire-prone rangeland systems (Hurteau and North 2009; Rau *et. al*. 2010) such as those found in the planning area because the frequency of wildfires in these environments (Table 3-12) releases much of the stored carbon back into the atmosphere during fairly frequent burning cycles.

Greenhouse Gas Emission Trends

In the U.S., carbon dioxide emissions have increased an estimated 5.8% between 1990 and 2018. Methane and nitrous oxide emissions represent a very small percentage of all U.S. GHG emissions. Methane emissions have declined by an estimated 18.1% and nitrous oxide emissions have declined slightly (0.022%) during this same timeframe (EPA 2021).

At the national scale, total gross GHG emission estimates from all sectors have ranged from 6,449.4 to 7,431.9 million metric tons of carbon dioxide equivalent (see *Glossary* in Appendix 8) annually between 1990 and 2019 (EPA 2021, page 2-32). Oregon's total sector based anthropogenic GHG emission estimates have varied from 56-70 million metric tons of carbon dioxide equivalents between 1990 and 2015. Total GHG emissions in Oregon have generally declined since their peak in 1999 (ODEQ 2018b, page 2; Appendix A, pages 1 and 5). In 2015, estimated emissions were about 63 million metric tons of carbon dioxide equivalents. About 81.7% of those emissions came from carbon dioxide emissions directly. The remainder came from methane (10.2%), nitrous oxide (4.3%), and other pollutants (3.9%) (QDEQ 2018b, Appendix A, page 5). In Lake County, total GHG emissions from all sectors were estimated at 396,082 metric tons of carbon dioxide equivalents in 2019 (Pamperin 2019).

On the national scale, total GHG emission estimates from the transportation sector ranged from 1,527.1 to 1,986.1 million metric tons of carbon dioxide equivalent between 1990 and 2019 (EPA 2021, page 2-30). In Oregon, an estimated 21-24.7 million metric tons of carbon dioxide equivalent emissions occurred annually from the transportation sector between 1990 and 2016 (ODEQ 2018b, Appendix A, page 2). In 2016, the transportation sector accounted for about 38.7% of total estimated GHG emissions. Emissions in this sector have increased approximately 15% in Oregon since 1990 (ODEQ 2018b, page 14; Appendix A, page 1). In Lake County, an estimated 82,921 metric tons of carbon dioxide equivalent emissions occurred from the transportation sector in 2019. About 81.8% of these emissions were from on-road vehicles (passenger cars, trucks, buses, etc.). About 17.7% of these emissions were from off-road transportation and 73% of the off-road vehicle emissions were from the agriculture and mining sectors (tractors, heavy equipment, etc.) (Pamperin 2019).

On the national scale, total GHG emission estimates from the agriculture sector ranged from 600.2 to 669.1 million metric tons of carbon dioxide equivalent between 1990 and 2019 (EPA 2021, page 2-31). In Oregon, the agriculture sector has consistently contributed about 8-9% of total estimated GHG emissions between 1990 and 2015 from activities such as managing soils (application of fertilizer and soil amendments), livestock management, and burning residual agricultural waste. Methane and nitrous oxide are the primary GHGs produced by this sector. At the national scale, U.S. beef production has declined about 30% between 1975 and 2021 (USDA-NASS 2023). Presumably, methane emissions associated with cattle production have declined by a similar amount during this timeframe. In Oregon, an estimated 5 to 6 million metric tons of carbon dioxide equivalent GHG emissions occurred annually from the agriculture sector between 1990 and 2015. About half of all methane emissions and 75% of all nitrous oxide emissions in Oregon come from the agricultural sector (ODEQ 2018b, 19-20; Appendix A, pages 4-5). In Lake County, an estimated 190,340 metric tons of carbon dioxide equivalent emissions occurred

from the agriculture sector in 2019 (about 48% of the total county emissions). Most of these emissions (92.3%) were attributed to methane emissions from livestock production (Pamperin 2019).

Uncertainty in Future GHG Emissions and Climate Trends

How GHG emissions may change in the future is a source of uncertainty. The rate of increase could change based on unforeseen events which result in sudden increases or decreases in atmospheric GHG concentrations. As an example of this uncertainty, ODEQ (2010) forecasted that Oregon's GHG emissions would grow by 55% from 1990 to 2020, but the latest data for Oregon indicates only about a 10% increase actually occurred between 1990 and 2015 (ODEQ 2018b, page 4).

Future climate and the effects of future climate change are uncertain (Brown *et al*. 2012). There is still scientific debate and uncertainty as to how much temperature change may occur in the future and its potential effect on future regional and global precipitation and weather patterns. The predictions of future climate conditions are based entirely on outputs from broad-scale computer modeling studies and vary greatly depending upon the model used and the data and assumptions that are plugged into the model(s). While such modelling efforts may help predict future climatic trends, the results have been inconsistent, and the validity of the projections cannot be tested or verified in real time.

Brown *et al*. (2012) noted that most climate models for the Pacific Northwest Region predict a future warming trend with average annual mean temperature increases varying from 4.5 to 6.1 degrees F by year 2100, but the predictions of future precipitation changes in the region vary considerably during this same timeframe. Polley *et al*. (2013) projected that the Northwest would warm considerably, but annual precipitation would change little despite a large decrease in summer precipitation. The BLM completed two regional environmental impact statements (EISs) which summarized the science regarding climate trends, predictive modelling study results, and sources of uncertainty in the Pacific Northwest Region (BLM 2010a, 2015b). These analyses are hereby incorporated by reference in their entirety in accordance with 40 CFR § 1501.11. One analysis predicted that the climate throughout Oregon in future decades would generally be warmer, but not significantly wetter (BLM 2010a, page 169). The other analysis predicted that eastern Oregon would become warmer and effectively drier over time (BLM 2015b, page 3-162).

Another source of uncertainty is the inability to down-scale broad-scale climate projections to be relevant for land management decisions at a planning area or project scale. This requires land managers to make assumptions about what the projections could mean at these smaller scales (Daniels *et al*. 2012). Newer methods of down-scaling climate modelling projections are starting to approach the level of resolution that land managers could find useful. The U.S. Geological Survey (USGS) has developed a National Climate Change Viewer (NCCV) web-based application which displays the averaged results of over 30 different climate models and projects future temperature and precipitation changes on a county level. Based on these model results, the annual mean maximum temperature in Lake County, Oregon, could increase by as much as 3.2 degrees F between 2025 and 2049. However, mean annual precipitation is not projected to change during this same timeframe (USGS 2016).

Another source of uncertainty arises from inter-annual and inter-decadal climate variability, which means climate change is not constant or linear, but may occur in fits and starts. As an example, average global temperature anomalies leveled off between 1998 and 2013 before rising further through 2020 (NOAA 2021b).

In general, modelling predicts that the regional, national, and global frequency of extreme precipitation events, heat waves, and droughts could increase, while snowpack could decrease (Christensen *et al*. 2007, Polley *et al*. 2013, Dalton and Fleishman 2021). The effects of these potential changes on other resources and multiple uses in the planning area are discussed in other appropriate portions of this analysis, and would largely depend on which predictions, if any, prove accurate over the long-term.

Analysis Assumptions

The *BLM NEPA Handbook* states that an issue must have a cause-and-effect relationship with the proposed action or alternatives in order to require analysis (BLM 2008g, page 40). The U.S. Geological Survey (USGS 2008) reviewed the science on greenhouse gas (GHG) emissions and concluded that it is "beyond the scope of existing science to identify any specific source of GHG emissions and designate it as the cause of specific climate impacts at an exact location". In addition, the Council on Environmental Quality (CEQ 2016) acknowledged that "the totality of climate change impacts is not attributable to any single action" (page 11), as well as provided final guidance to federal agencies on how to consider GHG emissions and the effects of climate change in NEPA reviews. This guidance calls for using GHG emissions (and to a lesser degree) carbon sequestration as proxies for assessing potential impacts to climate (CEQ 2016, page 4, 10). More recently, Secretarial Order 3399 has directed Department of Interior (DOI) agencies to consider GHG emissions in its NEPA analyses. For these reasons, this analysis focuses primarily on estimating potential differences in GHG emissions across the range of alternatives.

The primary resource management actions or uses addressed in this plan amendment that could affect GHG emissions and sequestration processes are wilderness characteristics management (including wildfire and vegetation management), OHV/motorized vehicle use, and livestock grazing. Though other BLM resource management actions (*e.g.* wild horses) could potentially contribute to total GHG emissions in the planning area, these other management actions are outside the scope of the analysis and therefore, are not included in this analysis.

Consistent with CEQ (2016) guidance, projections of GHG emissions will serve as the primary proxy or indicator for assessing the potential impacts of the alternatives on climate. The estimates of GHG emissions are expressed as carbon dioxide equivalents which attempt to equalize the global warming potential (GWP) of the various GHGs with that of carbon dioxide. The GWP of carbon dioxide is, by definition, equal to 1. Methane has a GWP 25 times that of carbon dioxide. The GWP for nitrous oxide is 298 times that of carbon dioxide. These values are used to calculate the carbon dioxide equivalent of the various GHGs (IPCC 2001, 2007; EPA 2021).

The estimates of metric tons of carbon dioxide equivalents across the range of alternatives in this analysis were calculated based on the following assumptions:

- Biomass and fuel load estimates associated with existing vegetation communities, treatment methods, and wood product harvest are based on local BLM data.
- About 0.5 metric tons of carbon are stored per metric ton of vegetation biomass.
- Carbon dioxide emission estimates from burning fossil fuels associated with management activities or uses involving OHVs, motorized vehicles, and heavy equipment are based on EPA (2010) emission estimates:

  2.421 kilograms per gallon of gasoline

2.778 kilograms per gallon of diesel

Environmental Effects

Impacts Common to All Alternatives

The BLM reviewed the science related to GHG emissions and carbon sequestration, the potential effects of climate change, future management implications for BLM-administered lands in eastern Oregon and Washington, and synthesized into three separate reports (Laskowski *et al.* 2011, Brown *et al.* 2011a, 2011b). These documents summarized the science on both GHG emissions and carbon sequestration from soils and vegetation communities (Dry Ponderosa Pine Forest, Sagebrush Steppe, Western Juniper, Invasive Annual Grasslands, Salt Desert Shrub, and Aspen) representative of eastern Oregon and reviewed the effects of livestock grazing, fire (wildfire and prescribed), OHV use, wild horses, and renewable energy development on these processes. In accordance with 40 CFR § 1500.4(j) and 1502.21, the BLM hereby incorporates this scientific synthesis into this analysis in its entirety. Highlights of these findings are summarized throughout the following section and other appropriate locations within this EIS (see *Watershed, Aquatic, Vegetation, Fire and Fuels*, and *Wildlife* sections) and are cited accordingly.

GHG Emission Estimates for BLM Heavy Equipment

Under all alternatives, BLM road maintenance crews would continue to maintain up to 100 miles of existing roads per year. This work could involve the use a variety of heavy equipment such as graders, dozers, loaders, excavators, backhoes, end dumps, and transports. This work includes not only the maintenance of the roadbed itself, but the mining and hauling of borrow material (rock, gravel, and cinder) from local mineral pits for use in road maintenance activities. On average, crews operate 2 pieces of equipment for approximately 6 hours per day, March-November, using approximately 30-35 gallons of diesel fuel per piece of equipment (Mike Clemens, personal communication). Assuming 2 pieces of equipment operate about 200 days per year and consume a total of about 60-70 gallons of diesel fuel per day, heavy equipment use associated with road maintenance would produce an estimated 33.4-38.9 metric tons of carbon dioxide emissions annually (Table 3-39).

Carbon Sequestration Impacts Associated with Livestock Grazing

Livestock grazing can affect stored carbon levels in rangelands, through changes in plant community and ecosystem processes, but the effects have been variable and inconsistent among the ecosystems studied (Schuman *et al*. 2009). Many changes in rangeland carbon from different grazing practices do not result in substantial changes in total carbon stocks, but simply redistribute carbon in the system, for example, from above-ground vegetation to root biomass (Derner and Schuman 2007). Overall, changes in rangeland carbon storage as a result of changes in grazing practices are likely to be small and difficult to estimate, especially in areas where a Rangeland Health Assessment has determined that rangeland health standards are being met. Some studies have found that grazing can result in increased carbon storage compared to no grazing, because of increased plant turnover and changes in plant species composition (Follett *et al*. 2001). For these reasons, this analysis does not attempt to quantify differences in carbon sequestration processes associated with grazing.

Table 3-39. Estimated Annual GHG Emissions by Sector

Sector	No Action/ Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
GHG Emission Estimates Associated with Wilderness Characteristics, OHV/Travel, and Livestock Grazing Management (Carbon Dioxide Equivalent in Metric Tons/Year)					
Transportation Sector					
OHV/Motorized Vehicle Management					
- Public Recreation Vehicle/OHV Use	413-953	308-704	369-835	413-953	413-953
- BLM Administrative Motor Vehicle Use	71.6	43-50.1	71.6	71.6	71.6
Heavy Equipment Use					
- BLM Road Maintenance	33.4-38.9	33.4-38.9	33.4-38.9	33.4-38.9	33.4-38.9
Transportation Sector Subtotal	518-1,064	384-793	474-946	518-1,064	518-1,064
Agriculture Sector					
Livestock Grazing Management	11,880-18,054	2,690-18,054	7,264-18,054	11,880-18,054	11,880-18,054
GHG Emission Estimates for Reasonably Foreseeable Future Actions (Carbon Dioxide Equivalent in Metric Tons/Year)					
Land Use Sector					
Wildland Fire	3,192-547,259	6,052-703,418	4,478-547,259	3,192-547,259	4,478-547,259
Vegetation Management					
- Cut and Leave	150-64,500	105-51,600	120-64,500	150-64,500	120-64,500
- Cut, Pile, and Burn	3,451-252,169	1,150-100,867	3,451-201,735	3,451-252,169	3,451-201,735
- Broadcast Burn	1,687-4,725	1,687-4,725	1,687-4,725	1,687-4,725	1,687-4,725
- Mowing and Mechanical	2,550-7,651	1,375-4,125	2,550-7,651	2,550-7,651	2,550-7,651
- Biomass Utilization	1,018-1,759	299-688	1,018-1,759	1,018-1,759	1,018-1,759
Land Use Sector Subtotal	12,195-878,504	10,675-865,438	13,604-827,628	12,195-878,504	13,604-827,628
Transportation Sector					
Heavy Equipment Use					
- Mining	2,533[1]	2,533[1]	2,533[1]	2,533[1]	2,533[1]
Total GHG Emissions	39,692-900,155	30,024-886,818	37,653-849,161	39,692-900,155	42,357-849,279

[1] Sources: BLM 2016r, 2018k, and 2020a.

Impacts of No Action Alternative, Alternative A, and Alternative D

OHV/Motorized Vehicle Management (Transportation Sector)

GHG Emission Estimates for Public Recreational Vehicle and BLM Motorized Vehicle Use

Based on BLM recreation data contained within the Recreation Management Information System (RMIS) the planning area experienced an annual estimate of 22,719 OHV visitor use days (1 visitor recreating for an 8-hour period) in 2018 and 2019. Assuming that there would be 1.5-2 visitors per vehicle, there would be an estimated 11,359-15,146 OHV trips per year. Assuming each OHV consumed 2-4 gallons of gasoline per trip, there would be an estimated 22,718-60,584 gallons of gasoline consumed per year. This would result in estimated emissions from OHVs ranging from 55-147 metric tons of carbon dioxide per year.

In addition, RMIS contains estimates for other recreational activities (camping, picnicking, fishing, hunting, site-seeing, etc.) in the planning area that involve the use of motorized vehicles to get to and from, the area of recreational interest. An estimated 88,810 visitor days occurred in 2018 and 2019. Assuming there were 2-3 people per vehicle, there were an estimated 29,603-44,405 recreational vehicle

trips to the planning area annually. Assuming each vehicle traveled 100-150 miles per visit and averaged 20 miles per gallon of gasoline, these vehicles would consume an estimated 148,016-333,037 gallons of gasoline and emit an estimated 358-806 metric tons of carbon dioxide per year.

These alternatives would also require the use of motorized vehicles during BLM management activities. Based on annual fuel consumption reports from 2018-2020, the BLM estimates it uses an average of 29,560 gallons of gasoline by its vehicle fleet annually. From these estimates, the amount of carbon dioxide emissions from BLM vehicles are estimated at 71.6 metric tons annually.

Between 1990 and 2016, the estimated annual transportation related GHG emissions in Oregon ranged from 21-24.3 million metric tons of carbon dioxide equivalents (ODEQ 2018, Appendix A, page 2). Between 1990 and 2019, the estimated annual total GHG emissions from all transportation sources in the U.S. ranged from 1469.1 to 1843.2 million metric tons carbon dioxide equivalents annually (EPA 2021). Based on these estimates, the annual contribution of GHG emissions from OHV/motorized vehicles under these alternatives would represent approximately 0.000145-0.000148% of the annual Oregon transportation-related emissions and 0.00000195-0.0000021% of the annual national transportation-related emissions.

OHV and Motorized Vehicle Effects on Sequestration

Motorized vehicle/OHV use could indirectly affect sequestration processes in a number of ways. Vehicle passage can crush or damage individual plants, impairing growth or causing mortality. Vehicles can also create fugitive dust which can temporarily impair photosynthesis and suppress plant growth, vigor, and reproduction. Vehicles can cause soil compaction and erosion, which can inhibit vegetation productivity and above-ground biomass (Ouren *et al.* 2007). Soil erosion can result in the loss of carbon from soils. However, debate surrounds the potential effects of erosion beyond the site/project scale, as erosion can simply transport carbon from one location to another (Diaz *et al.* 2009). Vehicles can also facilitate the spread of invasive species which can alter vegetation composition. Existing research has not directly linked changes in above-ground vegetation community composition from motorized vehicle use to changes in below-ground carbon storage (Laskowski *et al*. 2011).

However, the BLM estimates about 9,233 acres of soils would remain in a relatively permanent disturbed condition under these alternatives due to existing State/County highways, and BLM roads, primitive roads, and motorized trails (Tables 3-33 and 3-34). In addition, concentrated cross-country motorized vehicle (OHV) use could occur on an estimated 30,000-93,320 acre within the OHV Open area designations in the planning area under the No Action Alternative and Alternative A. Concentrated cross-country motorized vehicle (OHV) use could occur on an estimated 30,000-70,500 acres within the OHV Open area designations under Alternative D. These activities would result in the loss of above-ground vegetation and associated carbon storage loss, as well as altered below-ground carbon storage processes in these disturbed areas.

Impacts Common to No Action Alternative and Alternatives A, D, and E

Livestock Grazing (Agriculture Sector)

GHG Emission Estimates for Livestock

Livestock grazing results in methane emissions as a result of enteric fermentation during ruminant digestion. Methane emissions from cattle vary widely and depend on many variables (Johnson and Johnson 1995, DeRamus *et al*. 2003). Estimates for grazing cattle typically range from 80–101 kilograms of methane per year per animal (EPA 2009) or 6.7 to 9.2 kilograms of methane per month. This analysis utilizes an average of 8 kilograms of methane produced/released per animal unit month (AUM) of forage consumed by livestock. The following equation was adapted from IPCC (2006) methods for estimating methane emissions from enteric fermentation from non-dairy livestock and was used to estimate methane emissions from livestock under all alternatives:

Number of AUMs * (4.4/1,000) * 25 = total metric tons of carbon dioxide equivalent

The equation takes into account that 1 AUM of forage supports 1 cow-calf pair for 30 days. The multiplying factor was adjusted to 25, as this number represents the latest estimate of global warming potential for methane (EPA 2021). Under these alternatives, the total AUMs of forage consumed annually in the planning area could range from 108,000 (10-year average authorized use) to 164,128 AUMs (active preference). Based on this range, the carbon dioxide equivalent calculation associated with methane production estimates for livestock grazing in the planning area would vary from 11,880 to 18,054 metric tons carbon dioxide equivalent annually (Table 3-39).

An estimated 2.6 to 3 million metric tons of carbon dioxide equivalent emissions from methane were produced by livestock in Oregon between 1990 and 2015 (ODEQ 2018b, pages 19-20, Appendix A, page 4). Estimates of total U.S. methane emissions from livestock have ranged from 164.7 to 178.6 million metric tons carbon dioxide equivalent annually between 1990 and 2019 (EPA 2021, page 2-31). Based on these numbers, estimates of methane emissions from livestock on BLM-administered lands in the planning area could contribute an estimated 0.005-0.006% of the Oregon and 0.00001-0.00007% of the national annual GHG emissions from the agriculture sector under these alternatives.

Impacts of Alternative B

OHV/Motorized Vehicle Management (Transportation Sector)

GHG Emission Estimates for Public Recreational Vehicle/OHV and BLM Motorized Vehicle Use

The analysis of potential effects of this alternative on recreational uses/opportunities in the planning area indicate that there would be a shift across about two-thirds of the planning area from motorized recreation to more primitive, non-motorized recreation opportunities/uses (see *Recreation* section). While there would be less total motorized vehicle use associated with dispersed recreation opportunities (camping, hunting, sight-seeing, etc.) by users attempting to access large blocks of OHV Closed BLM-administered lands, it is not clear how much of a decline in total recreational cross-country OHV use would occur within the planning area or whether this existing level of use would simply shift and concentrate within the remaining OHV Open areas. For purposes of this analysis, the BLM estimates that there would be up

to a 20% reduction in recreational motorized vehicle use on open routes, cross-country OHV use levels would be reduced by up to 60%, and the remaining OHV use would be concentrated on fewer open areas/acres. Based on this, the BLM estimates that a total of 308-704 metric tons of carbon dioxide per year could be released by OHVs and other recreational motorized vehicle users (Table 3-39).

Under this alternative, the BLM estimates that over time it could use 30-40% less fuel for its vehicle fleet due to loss of access and less vehicle use associated with reduced management activity within the interior of Category C units, new Section 202 WSAs, and existing WSAs. This would result in an annual reduction to about 43-50.1 metric tons of carbon dioxide annually (Table 3-39). However, some of these reductions could be partly offset by increased GHG emissions from an increased reliance on aerial (helicopter and airplane) methods for BLM access, monitoring, and/or treatment.

GHG emissions from OHVs, motorized vehicles, and heavy equipment operating on BLM-administered lands in the planning area could contribute an estimated 0.000140 % of the annual Oregon transportation-related emissions and 0.0000019-0.000002% of the annual national transportation-related emissions.

OHV and Motorized Vehicle Effects on Sequestration

While existing research has not directly linked changes in above-ground vegetation community composition from motorized vehicle use to changes in below-ground carbon storage (Laskowski *et al*. 2011), an estimated 7,215 acres of soils would remain in a relatively permanent disturbed condition under this alternative due to existing State/County highways, and fewer open BLM roads, primitive roads, and motorized trails (Tables 3-33 and 3-34) in the planning area. In addition, concentrated cross-country motorized vehicle (OHV) use could occur on an estimated 10,460 additional acres (50,460 acres total) within the remaining Open OHV area designations in the planning area under this alternative. These activities could result in the loss of above-ground carbon storage due to loss of vegetation and altered below-ground carbon storage processes in these disturbed areas. However, the total disturbed acres where these potential effects could occur would be less than all of the other alternatives.

Livestock Grazing (Agriculture Sector)

Under this alternative there would be less livestock grazing in the planning area compared to all of the other alternatives. For analytical purposes the BLM estimates that grazing levels could be reduced anywhere from 0 to 139,674 AUMs (see *Livestock Grazing* section) over the long-term. This would result in an estimated reduction of methane emissions of 0-15,365 metric tons carbon dioxide equivalent per year from the agriculture sector compared to the No Action Alternative (Table 3-39).

Estimates of total methane emissions from livestock on BLM-administered lands in the planning area could contribute an estimated 0.00075-0.0060% of the Oregon and 0.000012-0.00007% of the national annual GHG emissions from the agriculture sector under this alternative.

Impacts of Common to Alternatives C and E

OHV/Motorized Vehicle Management (Transportation Sector)

GHG Emission Estimates for Public Recreational Vehicle and BLM Motorized Vehicle Use

The analysis of potential effects on recreational uses/opportunities indicates that there would be a shift from motorized recreation to more primitive, non-motorized recreation opportunities/uses within Category C units (372,218-411,033 acres) under these two alternatives (see *Recreation* section). While there would likely be slightly less total motorized vehicle use associated with recreational users attempting to access the interior of these units, all existing open motorized roads/routes in the planning area would remain under both alternatives. For this reason, the BLM assumes recreational motorized vehicle use associated with dispersed opportunities such as camping, hunting, sight-seeing, etc. under these two alternatives would continue at levels similar to the No Action Alternative. This would result in an estimated 358-806 metric tons of carbon dioxide emissions per year from motorized recreational uses under both alternatives.

However, cross-country OHV use within the planning area would be prohibited throughout the planning area (approximately 3.2 million acres including WSAs) under Alternative C. While cross-country OHV use would cease, it is unclear if some of this use would simply shift and result in increased levels of OHV traffic on existing routes. For this reason, the BLM estimates annual carbon dioxide emissions from OHV use could decrease by up to 80% (11-29.4 metric tons per year) under Alternative C.

Under Alternative E, cross-country OHV use would also be prohibited within Category C units (and WSAs; approximately 860,000 acres). It is unclear if there would be a reduction in total annual OHV use or whether the existing level of use would simply shift and concentrate within the remaining OHV Open areas. For purposes of this analysis, the BLM estimates that cross-country OHV use levels under Alternative E would be similar to the No Action Alternative (55-147 metric tons of carbon dioxide per year) but would be concentrated on fewer open areas/acres.

Under these two alternatives, motorized vehicle use associated with BLM management activities would be similar to the No Action Alternative. Therefore, the estimates of annual carbon dioxide emissions from BLM vehicles would be the same as the No Action Alternative (71.6 metric tons).

Under Alternative C, GHG emissions from OHVs, motorized vehicles, and heavy equipment operating on BLM-administered lands in the planning area could contribute an estimated 0.000143% of the annual Oregon transportation-related emissions and 0.0000020-0.00000189% of the annual national transportation-related emissions. Under Alternative E, GHG emissions from OHVs, motorized vehicles, and heavy equipment operating on BLM-administered lands in the planning area could contribute an estimated 0.000145-000148% of the annual Oregon transportation-related emissions and 0.0000021-0.00000195% of the annual national transportation-related emissions.

OHV and Motorized Vehicle Effects on Sequestration

While existing research has not directly linked changes in above-ground vegetation community composition from motorized vehicle use to changes in below-ground carbon storage (Laskowski *et al*. 2011), an estimated 9,233 acres of soils would remain in a relatively permanent disturbed condition under these two alternatives due to existing State/County highways, and BLM roads, primitive roads, and

motorized trails (Tables 3-33 and 3-34) in the planning area. Soil carbon storage processes in these areas would remain altered to the same degree as the No Action Alternative.

Concentrated cross-country motorized vehicle (OHV) use would be reduced on about 30,000 acres under Alternative C. As a result, the total disturbed acres where soil carbon storage process would be impacted would be less than all of the other alternatives.

Concentrated cross-country motorized vehicle (OHV) use could occur on an estimated 30,000-93,320 acres within the OHV Open area designations under Alternative E. These activities could result in the loss of above-ground carbon storage due to loss of vegetation and altered below-ground carbon storage processes in these disturbed areas similar to the No Action Alternative.

Impacts of Alternative C

Livestock Grazing (Agriculture Sector)

Under Alternative C, estimated livestock reductions could result in reductions anywhere from 0-41,964 AUMs of forage utilized annually (see *Livestock Grazing* section). This would result in an estimated reduction of methane emissions of 0-4,616 metric tons carbon dioxide equivalent per year compared to the No Action Alternative. Total methane emissions from livestock on BLM-administered lands in the planning area could contribute an estimated 0.0028-0.0060% of the Oregon and 0.000044-0.00010% of the national annual GHG emissions from the agriculture sector.

Cumulative Impacts Common to All Alternatives

Social Cost of Greenhouse Gases

The social cost of greenhouse gases (SC-GHG) is addressed separately in the *Monetized Impacts from Greenhouse Gases* portion of the *Social and Economic* section.

OHV/Motorized Vehicle Management (Transportation Sector)

GHG Emission Estimates from Heavy Equipment Use Associated with Locatable Mining

Since wilderness characteristics management would not limit the amount of locatable mining that likely would occur in the planning area (including within wilderness characteristics units), the BLM assumes the amount of future locatable mining would be similar under all alternatives. For this reason, the GHG emission estimates associated with this activity would be similar under all alternatives (Table 3-39).

Carbon dioxide would be generated during mining operations primarily from fuel consumption by heavy equipment use (dozers, drill rigs, excavators, graders, backhoes, loaders, etc.), vehicles (haul trucks, water trucks, etc.), and other mining equipment (generators). Carbon dioxide would also be generated during blasting operations utilizing ANFOs. GHG emissions have been calculated for several commercial mining operations in the planning area (BLM 2016r, 2018k, 2020a). These analyses are incorporated by reference in their entirety in accordance 40 CFR § 1502.21. The GHG emission estimates would total approximately 2,533 metric tons per year (Table 3-39) under all alternatives.

Cumulative Effects of No Action Alternative, and Alternatives A and D

Wilderness Characteristics Management Impacts (Land Use Sector)

There are no estimates available for GHG emissions associated with either rangeland, forest, or vegetation management activities specifically for Oregon. While EPA (2021) estimates total national annual emissions of carbon dioxide from wildfires and prescribed fires in forest lands, no estimates are provided for wildfire or prescribed fire emissions specifically in rangeland or grassland systems. However, EPA (2021) does provide an estimate of the total national annual flux in carbon dioxide emissions from grassland systems[11]. There has been considerable variation in estimated total carbon stocks in U.S. grassland systems between 1990 and 2019 which have been attributed to variable weather patterns and interactions with land management activities. Net changes in carbon stocks have led to net annual emissions to the atmosphere ranging from 8.3-14.5 million metric tons of carbon dioxide equivalents during this timeframe (EPA 2021). While not expressly stated, the BLM presumes these estimates also account for annual emissions from both prescribed and wildfires in grassland/rangeland systems. Based on these estimates, emissions from wildfire and vegetation treatments on BLM-administered lands in the planning area under these alternatives could contribute approximately 0.0015-0.061% per year of the cumulative total of all national GHG emissions from the land use sector.

GHG Emission Estimates for Wildfire

Wildfire represents a primarily natural process with the potential to release substantial quantities of GHGs into the atmosphere. Fires emit carbon dioxide, methane, and nitrous oxide during burning of live and dead biomass (Laskowski *et al*. 2011). Emission estimates from wildland fire are complicated by temporal variability in combustion (Ward and Hardy 1991), spatial variability in fuels (Burgan *et al.* 1998, Keanne *et al*. 2001), and spatial-temporal variability in fuel conditions (Bradshaw *et al*. 1984). Fire releases the carbon stored in plant material into the air as carbon dioxide gas (Hurteau and North 2009; Wiedinmyer and Hurteau 2010). However, the amount of carbon released by wildland fire depends upon the frequency of ignitions, fuel loading, moisture content, intensity of the burn, amount of area burned (Laskowski *et al.* 2011), and is difficult to predict with accuracy.

Rau *et.al.* (2009) found a large portion of the above-ground carbon stored in biomass is released during and after wildfire. Rau *et.al*. (2011) estimated that combustion of trees during wildfire may release up to 70% of the organic carbon stored in the above-ground biomass to the atmosphere. A low-intensity fire in the eastern Cascade forests consumes about 23% of above-ground carbon biomass, while a high-intensity fire consumes about 35% (Meigs *et al*. 2009). In another study, above-ground carbon emissions from a 41,000-hectare wildfire in a dry Ponderosa pine forest in central Oregon averaged an estimated 2.55 kilograms per square meter. To put these emissions in perspective, this estimate represented about 2.5% of Oregon's total emissions from fossil fuels and industrial processes for that year (Meigs *et al*. 2009). In some cases, carbon emission estimates from the subsequent decomposition of trees killed in wildfires exceeded the amount emitted from the fire itself (Diaz *et al.* 2009, Irvine *et al*. 2007). Several studies

[11] EPA (2021) defines grassland systems as pastures and rangelands used primarily for livestock grazing. Woodlands are also considered as grasslands if they do not contain enough tree cover to meet their definition of forest land (p. 6-73). Under this definition, sagebrush steppe and juniper woodlands are included under grasslands for purposes of estimating carbon cycling.

have also found that carbon release from forests under wildfire conditions is much greater than carbon release under prescribed fire conditions (Meigs *et. al*. 2009; Hurteau and North 2009; Wiedinmyer and Hurteau 2010).

Clinton *et al*. (2006) attempted to estimate the GHG emissions from several large wildland fires that collectively burned over 581,000 acres in 48 different vegetation types in southern California in 2003. Shrub vegetation types were the most common in the burned areas. Shrub and duff contributed the most biomass to the pre-burn fuel loading in the area, as well as contributed the most to emissions during burning. The average fuel loading across the burned areas was estimated at 21.5 metric tons per hectare (8.7 metric tons per acre). An estimated total of 18,285 metric tons of methane, 821 metric tons of nitrous oxide, 457,144 metric tons of carbon monoxide, and 6,016,000 metric tons of carbon dioxide were released during these wildfires.

Wildfires can occur in every vegetation community found in the planning area. Based on historic data contained in BLM's wildfire GIS database, the BLM estimates that about 10,020-19,450 acres of wildfire could occur annually under these alternatives (Table 3-26). The following equations were presented in BLM (2014q) and were adapted from IPCC (2006) to estimate carbon dioxide equivalent GHG emissions from fire:

- Carbon dioxide (metric tons) = metric tons of biomass consumed * 1.443[12]
- Methane (metric tons) = (metric tons of biomass consumed * 0.000492) * 25[13]
- Nitrous oxide (metric tons) = (metric tons of biomass consumed * 0.000065) * 298[14]

  (Where metric tons of biomass consumed = total metric tons of biomass * estimated percent consumption)

- Total carbon dioxide equivalents (metric tons) = the sum of these three calculations

Based on fuel loading estimates in Table 3-37, and assuming there would be 80-90% consumption of all plant biomass within burned acres, there could be an estimated 3,192-547,259 metric tons of carbon dioxide equivalent released annually due to wildland fires (Table 3-39) in the planning area. These estimates vary substantially due to the high variability in fuel loading across the various vegetation communities found in the planning area (Table 3-37) and the inability to accurately predict exactly where wildland fires would occur on the landscape in the future. GHG emissions from wildfires represent an estimated 13-62% of all annual emissions from BLM-administered lands in the planning area under these alternatives.

GHG Emission Estimates for Vegetation Management

Vegetation treatment methods could include cutting of Phase I western juniper within sagebrush steppe

[12] The multiplier of 1.443 represents a constant for converting biomass carbon into carbon dioxide through the combustion process. Presumably, it accounts for about half of all plant biomass weight being water (BLM 2014q).
[13] The multiplier of 25 represents the latest global warming potential for methane from EPA (2021).
[14] The multiplier of 298 represents the latest global warming potential for nitrous oxide from EPA (2021).

communities and leaving the cut trees on the landscape to naturally decompose over time. The Klamath Falls Field Office, BLM estimated the western juniper biomass component associated with several juniper treatment projects in nearby Klamath County varied from a mean of 4-15 green metric tons/acre across all juniper phases. These estimates compare well with another study in the Great Basin where the mean western juniper biomass production varied from 3.0-14.7 metric tons per acre across all juniper phases (Table 3-40) (Stebleton and Bunting 2009). One local study found approximately half of the live green weight of juniper biomass was comprised of water (Sabin 2008).

Table 3-40. Biomass Estimates for Western Juniper Phases

Live Fuel Loading	Green Biomass Range (metric ton/acre)	Mean (metric ton/acre)
Phase I	0.03-12.9	3.0
Phase II	1.3-21.3	7.9
Phase III	3.1-38.0	14.7

Under these alternatives, the BLM assumes for analytical purposes that up to 10,000 acres of Phase I western juniper within sagebrush steppe communities could be treated annually by cutting the juniper and leaving on-site (Table 3-25). Since prescribed fire would not be used under this treatment method, most of the carbon would remain stored in the dead woody biomass and would be released slowly back into this arid environment over several decades as the trees decompose. Assuming live green biomass of Phase I juniper varies from 0.03 to 12.9 metric tons per acre (Table 3-40) and about half of this green weight is carbon, an estimated 150 to 64,500 metric tons of carbon dioxide could be released annually during natural decomposition following this type of treatment. While natural decomposition would release this carbon back into the environment slowly, a subsequent wildfire occurring in the treatment area would also have the potential to release this stored carbon very quickly.

Vegetation treatment methods could also include cutting, piling, and prescribed burning of Phase II and III western juniper within sagebrush steppe communities. However, most of these treatments would occur in Phase II areas. Under these alternatives, the BLM assumes for analytical purposes that an estimated 3,000 to 5,000 acres of Phase II and III western juniper within sagebrush steppe communities could be treated annually by this method (Table 3-25). The objective of prescribed burning under this method would be to consume 60-90% of the piled juniper biomass. Assuming estimates of live green biomass in Phase II and III juniper vary from 1.3 to 38.0 metric tons per acre (Table 3-40) and the piles are 60-90% consumed, approximately 3,451-252,169 metric tons of carbon dioxide could be released into the atmosphere annually during pile burning.

Vegetation treatment methods could also include broadcast burning of riparian/wetland areas. Under these two alternatives, the BLM assumes for analytical purposes that an estimated 2,500-3500 acres in the Warner Wetlands would be treated with prescribed fire annually (Table 3-25). While fuel load estimates for wetland/ riparian communities in the planning area are not readily available in the literature, vegetation in the Warner Wetlands and other wet meadows in the planning area are typically dominated by dense herbaceous plants (sedges, rushes, cattails, tules, etc.) where fuel loads are likely slightly higher than native grass communities, but less than native shrub/grass communities listed in Table 3-37. Based on this assumption, the BLM estimates about 1.5-3 metric tons per acre of herbaceous biomass occurs in wetland areas and about half of this weight is water. In addition, prescribed fire in these communities tends to consume the majority of the above-ground biomass. Based on these assumptions, the BLM

estimates prescribed fire in these areas could result in an estimated 1,687-4,725 metric tons of carbon dioxide emissions annually.

While mechanical mastication leaves substantial levels of carbon in woody debris on the surface following treatment, this method may speed the loss of carbon from the system by accelerating the decomposition of the masticated wood bits when compared to leaving large intact woody debris (Throop and Lajtha 2018).

Under these alternatives, the BLM assumes for analytical purposes that an estimated 4,637 acres of mowed fuel breaks or mechanical fuel treatments could occur annually in sagebrush steppe/phase 1 juniper communities (Table 3-25). Assuming an estimated 1.1-3.3 metric tons of green shrub/herbaceous biomass per acre could be produced annually by this treatment method, and half this green weight is carbon, an estimated 2,550-7,651 metric tons of carbon dioxide could be released back into the environment over several years through plant decomposition in the absence of fire.

Under these alternatives, the BLM assumes for analytical purposes that an estimated 50-75 acres of Phase II or III western juniper or ponderosa pine forest could be harvested annually for firewood, posts, or poles (Table 3-25). The BLM also assumes that not every tree in a harvest unit would be removed and since the bole (trunk) is what is desired, an estimated 25% of the biomass in harvest units would be left on site in the form of live, old-growth trees, dead branches/tops, and needles. Based on these assumptions, the BLM estimates that 1,018-1,759 metric tons of carbon dioxide could be released annually due to firewood consumption (Table 3-39) in home wood heating systems. Harvested post/poles would continue to store carbon in the short-term but would release carbon back into the environment slowly over several decades as the woody material decomposes.

Sequestration Associated with Wildfire and Vegetation Management

Throop and Lajtha (2018) studied spatial and temporal changes in ecosystem carbon pools associated with juniper encroachment and removal and found substantial changes in carbon pools at Walker Butte in the northern portion of the planning area. Encroachment led to substantial increases in carbon storage over time as juniper size increased during the transition from a sagebrush-dominated site to a juniper encroached site. The largest pool of accumulation was above-ground live woody biomass and litter. Other important pools included surface soil carbon and juniper root systems. Juniper treatment/removal resulted in a net loss of surface carbon resulting from large decreases in litter carbon and small increases in soil surface carbon. They found sagebrush management had little impact on surface soil organic carbon pools when measured 7 years after treatment. They also found deep soil carbon was the largest carbon pool and did not appear to be sensitive to vegetation management changes.

Studies of juniper cut and leave treatments have shown variable effects on soil carbon storage. Bates *et al*. (2002) reported a 20% loss of soil carbon within 100 days following juniper cutting at one southeastern Oregon location whereas, Pierson *et al*. (2007) found no significant change in soil carbon within a sagebrush steppe community where juniper had been cut 10 years before. Other studies have evaluated the ecological effects of juniper cutting in the Great Basin and found a 2 to 12-fold increase in herbaceous biomass when compared to uncut juniper woodlands (Bates *et al*. 2005).

While Rau *et.al.* (2009) found that a large portion of the above-ground carbon stored in biomass was released during and after wildfire, much of the below-ground carbon was not affected. However, it is also likely that the remaining dead biomass, including below-ground roots, would decompose and release

additional carbon dioxide to the atmosphere over time (Johnson and Curtis 2001). Since most of the soil carbon is stored in the soil surface horizons, loss of topsoil from erosion following intense fires or vegetation removal can also reduce or disrupt soil organic carbon levels (Follet *et al*. 2001).

Nichols *et al*. (2021) found that increased fire frequency in semi-arid sagebrush steppe ecosystems can alter the biochemical soil properties and soil processes that underpin ecosystem structure and function. This study examined the effects of fire frequency on soil carbon in sagebrush steppe communities that had burned 1-3 times on a 4 to 5-year fire return cycle. The study found that fire reduced total soil carbon concentration and soil carbon in aggregates when compared to unburned areas, but only following the first fire. Presumably, the frequency of subsequent fire prevented recovery of soil carbon levels.

Studies have shown the effects of prescribed fire treatments on soil carbon storage are variable. While one study of prescribed fire effects in big sagebrush-steppe system resulted in reductions of ecosystem carbon stocks (Obrist *et al*. 2003), another study of prescribed fire in Wyoming big-sagebrush community in southeastern Oregon resulted in no change in soil organic carbon content up to 2 years after the burn when compared to unburned areas (Davies *et al*. 2007).

Following fire, carbon remaining from the surface ash and charred woody debris would be incorporated back into the soil. Wambolt *et al*. (2001) found carbon sequestration rates during the first and second years following fire were generally higher than pre-fire rates, reflecting the vegetation recovery that occurs following fire. Above-ground biomass of perennial grasses recovered more rapidly than sagebrush/shrubs. While recovery of sagebrush carbon stocks to pre-fire levels varies, it usually requires decades, but can eventually offset the short-term GHG emissions that resulted from the fire.

The rate would of sequestration following fire would depend upon the size of the fire, the intensity of the burn, burn pattern, the amount of residual plants that survived the fire, the amount of seed source in the soil, rehabilitation/revegetation methods used, re-establishment of fine-rooted vegetation, soil chemistry, soil productivity, soil texture, post-fire precipitation timing and amount, and the overall rate of vegetation recovery (Meigs *et al.* 2009, Brown *et al.* 2011, Laskowski *et al.* 2011). Nitrogen fixing vegetation that re-establishes after fire would also increase soil carbon content (Certini 2005, Gonzalez-Perez *et al*. 2004, Johnson and Curtis 2001).

Low to mid-elevation sagebrush communities in the planning area, if burned under wildfire conditions, would be at high risk of cheatgrass invasion or expansion following fire. Some studies have suggested that conversion from perennial shrub-steppe to annual grasslands would reduce the fire return interval and greatly reduce above-ground carbon and nitrogen pools (D'Antonio and Vitousek 1992, Bradley *et al*. 2006, Rau *et al.* 2009; Rau *et al.* 2010). Sagebrush steppe conversion to annual grass dominance can also reduce below-ground carbon pools due to altered below-ground interactions related to litter decomposition, root exudation, and soil biota (Schlesinger 1977; Norton *et al*. 2004).

Changes in these processes alter the input versus respiration balance which drives below-ground carbon and nitrogen accumulation (Norton *et al*. 2008). Much of the current research related to cheatgrass invasion and carbon has focused on above-ground biomass (Bradley *et al.* 2006). However, most carbon and nitrogen in these arid ecosystems are stored in the soils (Hooker *et al*. 2008). Research shows conflicting results regarding the influence of cheatgrass invasion on soil organic carbon. Ogle *et al*. (2004) reported an increase in organic carbon in shallow horizons. Others reported increased organic carbon through the entire soil profile (Hooker *et al*. 2008; Blank *et al*. 2008), and others reported

increases in organic carbon in near surface horizons but decreases deeper in the soil profile (Norton *et al.* 2004).

Rau *et al.* (2011) found that the extent of annual grass invasion had a statistically significant effect on soil organic carbon. As cheatgrass invasion progressed at a site, soil organic carbon decreased. This effect was particularly evident in the soils of heavily invaded sites below 60 cm depth which the authors attributed to a decrease in total root biomass below 45 cm depth. However, no statistically significant changes in soil nitrogen were attributed to annual grass invasion in this study.

Due to the wide-ranging variability of soil carbon storage potential across the planning area (described in the preceding *Affected Environment* section) and the wide variability of potential impacts of management actions on carbon/nitrogen sequestration processes described in the scientific literature in this section, it is not possible to quantify the potential changes in either above or below-ground sequestration due to the alternative management actions. However, the BLM can estimate the relative differences in acreages where sequestration processes would be impacted by the alternative management actions. Under these alternatives, sequestration processes on an estimated 10,020-19,450 acres could be impacted each year by wildland fire. An additional 34,015-56,940 acres could potentially be impacted each year by various types of vegetation treatments (Table 3-25).

Relationship to National and Global Emissions

Between 1990 and 2019, estimates of U.S. emissions of all GHGs have ranged from approximately 6.4494-6.5572 billion metric tons of carbon dioxide equivalent annually (EPA 2021, page 2-31). GHG emissions in the U.S. have been declining since 2007 (EPA 2021, pages 2-2 to 2-3). Between 2000 and 2019, estimates of global emissions of carbon dioxide ranged from 30.17-41.03 billion metric tons annually (Statista 2021). Under these alternatives, the total annual estimated GHG emissions from BLM-administered lands in the planning area in the land use, transportation, and agriculture sectors could contribute about 0.0000042-0.0000137% of the annual cumulative total U.S. emissions and 0.00000089-0.000022% of annual cumulative global emissions.

Cumulative Impacts of Alternative B

Wilderness Characteristics Management Impacts (Land Use Sector)

GHG Emission Estimates for Wildfire

Under this alternative there would be both less total vegetation management and less effective vegetation treatments within the interior of many WSAs and wilderness characteristics units. As a result, there could be more frequent, intense, and/or larger wildfires in these areas (see *Vegetation* and *Fire and Fuels* sections). For analytical purposes, the BLM estimates that 19,000-25,000 acres could be subject to wildfire annually under this alternative (Table 3-25). Using the fuel loading estimates in Table 3-37, and assuming there would be 80-90% consumption of all plant biomass within burned acres, there could be an estimated 6,052-703,418 metric tons of carbon dioxide equivalent released annually due to wildfires (Table 3-39). This represents 39-79% of all estimated GHG emissions from BLM-administered lands in the planning area under this alternative.

GHG Emission Estimates for Vegetation Management

Under this alternative, an estimated 7,000-8,000 acres of Phase I western juniper within sagebrush steppe communities could be treated annually by cutting and leaving on-site (Table 3-25). Most of the carbon would remain stored in the dead woody biomass and would be released slowly back into the environment over several decades as the trees decompose. Using the same assumptions and calculation methods described under the No Action Alternative, the BLM estimates 105-51,600 metric tons of carbon dioxide per acre could be released annually during natural decomposition from this type of treatment (Tables 3-34 and 3-35).

Under this alternative, the BLM estimates that 1,000 to 2,000 acres of Phase II and III western juniper within sagebrush steppe communities could be treated annually by this method (Table 3-25). Using the same assumptions and calculation methods described under the No Action Alternative, the BLM estimates approximately 1,150-100,867 metric tons of carbon dioxide could be released into the atmosphere annually during pile burning. Broadcast burning in riparian/wetland areas would produce the same annual GHG emission estimates (1,687-4,725 metric tons) as the No Action Alternative (Table 3-39).

Under this alternative, the BLM estimates that 2,500 acres of mowed fuel breaks or mechanical fuel treatments could occur annually in sagebrush steppe/phase I juniper communities. Using the same assumptions and calculation methods described under the No Action Alternative, the BLM estimates approximately 1,375-4,125 metric tons of carbon dioxide could be released back into the environment over several years through plant decomposition in the absence of fire (Table 3-39).

Under this alternative, the BLM estimates 15-30 acres of Phase II or III western juniper or ponderosa pine forest could be harvested annually for firewood, posts, or poles. Using the same assumptions and calculation methods described under the No Action Alternative, the BLM estimates approximately 299-688 metric tons of carbon dioxide could be released annually due to firewood consumption in home wood heating systems (Tables 3-34 and 3-35).

Sequestration Associated with Wildfire and Vegetation Management

Under this alternative, both above-ground and below-ground carbon levels could increase over the short-term as juniper continues to expand into, or becomes more dense within, sagebrush steppe and woodland communities. Compared to the No Action Alternative, there would be less total vegetation management and less effective vegetation treatments resulting in the buildup of additional biomass/fuel loading within the interior of many Category C units, new Section 202 WSAs, and existing WSAs (up to 2.1 million acres). This would likely lead to more frequent, intense, and/or larger wildfires occurring over time in many of these areas (see *Vegetation* and *Fire and Fuels* sections). This would result in more GHG emissions from wildfire and less above-ground carbon storage within the acres burned over the long-term compared to the No Action Alternative. Sequestration processes on an additional 21,115-28,630 acres could potentially be impacted each year by various types of vegetation treatments (Table 3-25).

Relationship to National and Global Emissions

Under this alternative, GHG emissions specifically from wildfire and vegetation treatments on BLM-administered lands in the planning area could contribute an estimated 0.0015-0.061% of the annual cumulative national GHG emissions from the land use sector.

The total annual estimated GHG emissions from BLM-administered lands in the planning area in the land use, transportation, and agriculture sectors could collectively contribute about 0.00000242-0.000135% of the annual cumulative total U.S. emissions and 0.00000052-0.0000022% of annual cumulative global emissions under this alternative.

Cumulative Impacts of Alternatives C and E

Wilderness Characteristics Management Impacts (Land Use Sector)

GHG Emission Estimates for Wildfire

Under these two alternatives there would be less total vegetation management and less effective vegetation treatments within the interior of 372,218-411,033 acres of Category C units. As a result, there could be more frequent, intense, and/or larger wildfires in these areas (see *Vegetation* and *Fire and Fuels* sections). For analytical purposes, the BLM estimates that 15,000-19,450 acres could be subject to wildfire annually under these alternatives (Table 3-25). Using the fuel loading estimates in Table 3-37, and assuming there would be 80-90% consumption of all plant biomass within burned acres, there could be an estimated 4,778-547,259 metric tons of carbon dioxide equivalent released annually due to wildfires (Table 3-39) under these two alternatives.

GHG Emission Estimates for Vegetation Management

Under these two alternatives, an estimated 8,000-10,000 acres of Phase I western juniper within sagebrush steppe communities could be treated annually by cutting and leaving on-site (Table 3-25). Most of the carbon would remain stored in the dead woody biomass and would be released slowly back into the environment over several decades as the trees decompose. Using the same assumptions and calculation methods described under the No Action Alternative, the BLM estimates 120-64,500 metric tons of carbon dioxide per acre could be released annually during natural decomposition from this type of treatment (Table 3-39).

Under these alternatives, the BLM estimates that 3,000 to 4,000 acres of Phase II and III western juniper within sagebrush steppe communities could be treated annually by this method (Table 3-25). Using the same assumptions and calculation methods described under the No Action Alternative, the BLM estimates approximately 3,451-201,735 metric tons of carbon dioxide could be released into the atmosphere annually during pile burning. Broadcast burning in riparian/wetland areas would produce the same annual GHG emission estimates (1,687-4,725 metric tons) as the No Action Alternative (Table 3-39).

Under these two alternatives, the BLM estimates that about 4,637 acres of mowed fuel breaks or mechanical fuel treatments could occur annually in sagebrush steppe/phase I juniper communities similar to the No Action Alternative. The BLM estimates approximately 2,550-7,651 metric tons of carbon dioxide could be released back into the environment over several years through plant decomposition in the absence of fire (Table 3-39).

Under these two alternatives, the estimated acres of Phase II or III western juniper or ponderosa pine forest could be harvested annually for firewood, posts, or poles would be the same as the No Action

Alternative. Therefore, the BLM estimates that 1,018-1,759 metric tons of carbon dioxide could be released annually due to firewood consumption in home wood heating systems (Table 3-39).

Relationship to National and Global Emissions

Under these two alternatives, GHG emissions specifically from wildfire and vegetation treatments on BLM-administered lands in the planning area could contribute an estimated 0.00164-0.0571% of the annual cumulative national GHG emissions from the land use sector.

The total annual estimated GHG emissions from BLM-administered lands in the planning area in the land use, transportation, and agriculture sectors collectively could contribute about 0.0000037-0.000129% of the annual cumulative total U.S. emissions and 0.00000079-0.000021% of annual cumulative global emissions under Alternative C.

The total annual estimated GHG emissions from BLM-administered lands in the planning area in the land use, transportation, and agriculture sectors collectively could contribute about 0.0000044-0.000129% of the annual cumulative total U.S. emissions and 0.00000095-0.000021% of annual cumulative global emissions under Alternative E.

Sequestration Associated with Wildfire and Vegetation Management

Under these two alternatives, both above-ground and below-ground carbon levels could increase over time as juniper continues to expand into, or becomes more dense within, sagebrush steppe and woodland communities within Category C units (372,218-411,033 acres). There would be less total vegetation management and less effective vegetation treatments resulting in the buildup of additional biomass/fuel loading within these units. As a result, there could be more frequent, intense, and/or larger wildfires occurring (15,000-19,450 acres) annually (see *Vegetation* and *Fire and Fuels* sections). Most of this increase would likely occur within Category C units. This would result in slightly more GHG emissions from wildfire and less above-ground carbon storage within the acres burned compared to the No Action Alternative. Sequestration processes on an additional 31,615-55,515 acres could potentially be impacted each year by various types of vegetation treatments (Table 3-25).

Soils

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect soils in the planning area?*

Affected Environment

Basins, tablelands, and mountains dominate the landscape throughout the planning area. In the semi-arid to arid environment across the region, soil processes such as accumulation of organic matter, clay formation, and nutrient cycling proceed slowly (BLM 2003a). Accordingly, site position on the landscape is the primary influence on soil development. Natural or geologic erosion rates on the steep land types proceed too fast to develop distinct, deep soil horizons. Soils in basin bottoms may have drainage limitations and accumulation of salts. Many of the fine-textured soils of the alluvial flats and upland plateaus are highly susceptible to wind erosion, but the presence of sagebrush and native grasses counteract erosion by developing coppices and coppice bench structures that collect and accumulate

wind-eroded soil, which also promote the formation of biological soil crusts (Wilding *et al*. 1983). Differences in topography, elevation, and internal drainage are reflected in the diversity of soil types, development, and productivity throughout the region (NRCS 1999a).

Data from the Natural Resources Conservation Service (NRCS) Soil Survey Geographic database (county soil surveys) classify the major soil orders in the planning area as andisols, aridisols, entisols, inceptisols, mollisols, and vertisols (NRCS 1999a, 2000, 2006, 2008, 2010a, 2010b) (Map S-1, Appendix 1). Soils categorized within a given order differ substantially with respect to soil properties and characteristics. Nonetheless, soils within each order are heterogeneous with respect to the presence or absence of diagnostic horizons (layers) or features that reflect soil forming processes (NRCS 1999b). Table 3-38 summarizes the soil orders found in the planning area.

The majority of the soils in the planning area (approximately 82%) are aridisols. The very dry aridisol soils are extensive throughout the northern and eastern half of the planning area and cover the greatest area at 2.6 million acres of BLM-administered lands. Characterized by a lack of water and/or accumulation of salts, aridisols contain less organic matter (humus) than mollisols. Aridisols are typically light-colored mineral soils with pH ranges from neutral to strongly alkaline.

Aridisols are also highly susceptible to wind erosion if they become barren; but the natural sagebrush and native grass vegetation builds soils by capturing Mazama and Lake loess soil (Nettleton and Peterson 1983). Elsewhere, these soils exhibit moderate to low susceptibility to wind erosion if protected by vegetation. As with Mollisols, a clay layer may be present in some aridisol soils. The clay layer indicates a much wetter climatic regime sometime in the past when these soils formed. Clay layers are located lower in the soil profile on these soil orders.

Mollisols occur in the planning area but are most widespread on neighboring Fremont National Forest lands. The dark, base-rich, surface horizons of mollisols are particularly high in organic matter. In some mollisol soils, a clay layer is present, indicating sufficient moisture was present at some period to cause clay movement and accumulation. The average percentage of clay in this order is comparable to aridisols. Increased clay content reduces water permeability rates.

If unprotected by vegetation, woody debris, or other barriers, mollisols are also prone to wind erosion. Wind erosion remains a persistent concern in the central portion of the planning area, specifically in the Fort Rock and Christmas Valley areas. Within the planning area, BLM-administered lands along Abert Rim, east of Valley Falls, and a narrow sliver of land from Plush to Adel contain mollisols most susceptible to wind erosion. As the climate becomes increasingly drier to the north and east, the semi-arid mollisol soils grade into aridisols.

Andisols are volcanic-derived soils located in the northwest quadrant of the planning area. Andisols display high infiltration and permeability rates. They have some of the highest erosion rates for wind erosion and are the most likely to lose soil from disturbed surfaces during local wind events, if native sagebrush steppe and natural grasses are lost from the encroachment of invasive juniper, fire, or human interference, as this vegetation effects the collection of andisol dust collection and the formation of coppices.

Other soil orders present in the planning area include the geologically young, undeveloped to minimally developed entisols and inceptisols. Found primarily on alluvial flats and low lake terraces, these soils also occur along shorelines and floodplains. Inceptisols and entisols in the Guano Valley, north of Hart

Lake, and east of Summer Lake are highly susceptible to wind erosion, as are the andisols and aridisols throughout the northern part of the planning area. This may be due to the higher average percent of silt that composes most of these soils. In some areas, very heavily clay-laden vertisols occur.

Biological Soil Crusts

Biological crusts are a combination of bacteria, algae, mosses, and lichens. They have a complex distribution as each individual component may have different abilities to colonize and utilize a particular soil area. Distribution is a function of seven factors that interrelate with one another: elevation, soils and topography, disturbance, timing of precipitation, vascular plant community structure, ecological condition, and microhabitats. Total crust cover is higher at lower elevations (below 3,000 feet). Some increase in distribution occurs as elevation increases but point vascular plant cover precludes their growth; biological soil crust distribution is highest when vascular plant cover is low. Crust cover is also highest when soil depth is shallow and soil texture is fine. Stable or embedded rocks near or at the soil surface can increase the percent crust cover by perching water and armoring the surface from physical disturbances (BLM 2001g).

Biological soil crusts have been identified in the planning area, but their aerial extent in the planning area has not been mapped, and are also known as cryptogamic, cryptobiotic, microbiotic, or microphytic soil crusts, and are located on aridisols, mollisols, and inceptisols. They do not appear on entisol soils, as these soils tend to be too sandy, wet, or unstable for crust development. The most critical physical factor for biological soil crust establishment is the presence of fine-textured surface soils such as silts, silt loams, and non-shrink/swell clays. Other factors that determine biological soil crust presence and development include, but are not limited to dominant shrub type, herbaceous plant density and form, annual precipitation, historical fire return, and current ecological condition. Plant communities that have a high potential for biological soil crust cover dominate the planning area. However, sites where modification of the vegetation structure has occurred due to introduction of invasive plants would have reduced potential for biological crusts (BLM 2001g).

Biological soil crusts contribute to soil stabilization by reducing wind and water erosion of soil surfaces. These soil crusts play an important part in ecosystem processes, such as carbon and nitrogen fixation, soil-water evaporation, seed germination time, and seedling growth rates. Biological soil crusts can also reduce germination and establishment of cheatgrass in warm/dry sagebrush ecosystems (Eckert *et al*. 1986, Kaltenecker *et al*. 1999). In addition to holding soil in place and restricting the amount of soil erosion, biological soil crusts also influence the type of material that may be eroded from the soil. Laboratory studies have demonstrated that water flow resulted in the erosion of mainly fine soil particles (silt and clay) from a sparsely covered crust surface, while the extensively covered surface lost only coarse sand. Since most soil nutrients are bound onto the silts and clays, the loss of these fine particles represents a reduction in soil fertility and hence, productivity. Wind would have similar erosional effects (BLM 2001g).

Environmental Effects

Analysis Assumptions

- Soil erosion is a natural process, but areas without protective soil cover or on steep slopes would have a greater risk of erosion.

- Based on professional experience within the planning area, the BLM assumes for analytical purposes that up to 20% of any open OHV area designations could result in high, concentrated motorized vehicle use (resulting in some bare ground) over the long-term.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Under this alternative, the BLM would not conduct or authorize additional discretionary ground-disturbing activities within a wilderness characteristics unit if it deemed it would diminish the size or cause the entire BLM inventory unit to no longer meet the minimum wilderness characteristics criteria. These measures would result in retaining adequate ground cover (including biological soil crusts) and reduced soil erosion potential across about 1.65 million acres (51.7%) of the planning area.

In general, the soils within areas that are in good ecological condition (*i.e.,* have sufficient ground cover, including biological soil crusts, to prevent erosion; Tables 3-13 to 3-15) would be maintained or protected in the absence of future disturbance. Soils within areas that are devoid of sufficient ground cover (including biological soil crusts) capable of preventing erosion would continue to be subject to erosion without active restoration.

Wildfire, fuel treatments, vegetation/habitat restoration, weed treatments, and prescribed fire activities would cause short-term impacts to soils due to ground cover removal (including biological soil crusts). Studies in sagebrush steppe landscapes have shown that runoff and erosion by water may increase 3 to 40 times immediately post-fire (Miller *et al.* 2013, page 79). Post-fire recovery of landscapes would vary depending on pre-fire ecological state, fire severity, post-fire weather, and post-fire restoration treatments (Miller *et al*. 2013, page 81). The rate of vegetation recovery and subsequent decrease in soil erosion over time is unpredictable and dependent upon site-specific conditions. In the long-term, these types of treatments would promote appropriate ground cover (including biological soil crusts) and reduce soil erosion potential.

OHV and Travel Management Impacts

Under this alternative, approximately 467,104 acres would remain Open to OHV use (Table 3-32; Map OHV-1, Appendix 1). Cross-country motorized vehicle use would continue to cause trampling of ground cover (including biological soil crusts), soil compaction, and high erosion potential (BLM 2003a, page 4-36; Map OHV-1, Appendix 1). Currently about 30,000 acres of these Open OHV area designations have been subject to concentrated motorized vehicle use and associated soil impacts. However, the potential for increased demand for OHV opportunities could increase concentrated soil impacts on up to an estimated 93,420 acres within Open OHV area designations over the long-term. Soils within the interior of Closed and Limited OHV area designations would not be subject to the effects of concentrated off-road vehicle use.

The area of highest impact to soils from motorized vehicle use would continue to occur within the confines of the surface of BLM's existing route network. Vehicle use on routes would continue to reduce ground cover (including biological soil crusts), compact soils, and increase soil erosion potential from route surfaces by wind, water, and vehicles. BLM's existing route network includes about 5,529 miles of roads, primitive roads, and motorized trails which represents about 8,024 acres of heavy soil disturbance

in the planning area that would continue to be heavily impacted by motorized vehicle use (Tables 3-33 and 3-34). BLM road maintenance activities would typically include re-blading road surfaces, cleaning ditches and culverts, and spot-rocking within the cross-section of the existing road prism disturbance and result in little or no additional soil disturbance. An additional 15-20 miles of BLM roads could disturb an estimated 22-26 acres of soils and crusts over the long-term.

Livestock Grazing Management Impacts

Up to 8.1% of the planning area would continue to be ungrazed for various reasons (Tables 3-39 and A5-3, Appendix 5). Soils/crusts in these areas would not be subject to livestock impacts. Livestock use would continue to have negative impacts on ground cover (including biological soil crusts) and soils, due to heavy grazing and trampling of vegetative cover and soil compaction in high concentration areas around water sources and trails along fences on about 42,000 acres within the planning area (Table 3-17). The BLM would continue to implement appropriate management changes to livestock grazing use in response to a rangeland health issue that is due to livestock grazing. These types of actions would have a positive effect on ground cover (including biological soil crusts), reduce soil erosion potential, and promote soil recovery in disturbed areas over time.

Periodic maintenance of existing water developments, fences, and other range improvements/facilities would typically be limited to replacing or repairing a structure to its original size and specifications and would result in little or no change in existing soil or crust disturbances associated with these activities.

Impacts of Alternative A

Wilderness Characteristics Management Impacts

This alternative would have the fewest restrictions to surface disturbing activities and the highest potential to impact ground cover (including biological crusts) and soils of all the alternatives. However, this alternative would also accommodate the highest amount of active restoration actions (non-native invasive species control, vegetation treatment, habitat restoration, etc.) compared to Alternatives B, C, D, and E. Though these types of management activities would have short-term negative effects on ground cover (including biological soil crusts) and soils during treatment, they would promote healthy, native sagebrush/grass and biological soil crust communities, resulting in increased herbaceous ground cover, increased root mass, and decreased soil erosion potential within the treated areas over the long-term.

OHV, Travel Management, and Livestock Grazing Management Impacts

The impacts of OHV/motorized vehicle use and livestock grazing on ground cover (including biological soil crusts) and soils within the planning area would be the same as those described for the No Action Alternative.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Under this alternative, ground disturbing activities and soil erosion potential would be substantially reduced within all wilderness characteristics units and WSAs. This would result in retaining adequate

ground cover (including biological soil crusts) and reduced soil erosion potential on up to 2.1 million acres (66%) of the planning area.

In general, the soils within areas that are in good ecological condition (*i.e.,* have sufficient ground cover, including biological soil crusts, to prevent erosion; Tables 3-13 to 3-15) would be maintained or protected in the absence of future disturbance. Soils within areas that are devoid of sufficient ground cover (including biological soil crusts) capable of preventing erosion would continue to be subject to erosion without active restoration.

The decrease in vehicle access on some interior closed routes under this alternative (see *Off-Highway Vehicle Use and Travel Management* section) would negatively impact BLM's ability to conduct vegetation and restoration treatments in some areas over the long-term. As some closed routes become impassable over time, the interior of large areas would become less accessible and active restoration would not be as feasible when compared to the No Action Alternative or Alternative A. In addition, post-wildfire restoration treatment methods would be limited (no drill seeding) in Category C units.

In new Section 202 WSAs, restoration activities must meet either the non-impairment standard or meet an exception to the non-impairment standard (BLM 2012h). In addition, the level of NEPA workload needed to complete restoration activities would be higher under this alternative than any other alternative within new Section 202 WSAs because the use of categorical exclusions are limited under the *WSA Management Manual* (BLM 2012h, p. 1-44). These factors would reduce BLM's ability to access treatment areas, as well as potentially reducing the effectiveness and timeliness of restoration treatments in some new Section 202 WSAs, and existing WSAs over the long-term (see *Vegetation* section). This could result in bare ground being exposed for a longer period of time in these areas.

Soil erosion potential could increase on up to 88,000 acres of encroaching (phase II) western juniper if these areas cannot be accessed and effectively treated under this alternative. Fewer and less effective treatments would result in conversion of phase I and II juniper in sagebrush steppe to phase III juniper stands over time with reduced or no vegetative understory, including biological soil crusts, resulting in an increase in soil erosion potential (Miller *et al*. 2013, page 56) over the long-term.

OHV and Travel Management Impacts

Closing all Category C units, new Section 202 WSAs, and existing WSAs to public motorized vehicle/OHV use (Map OHV-2, Appendix 1) would reduce ground disturbance and compaction by OHVs on up to 2.1 million acres, as well as allow for natural vegetation recovery on some closed routes. Increased ground cover (including biological soil crusts) would result in less soil erosion potential in these areas over time.

Public vehicle use and associated soil compaction would be eliminated on approximately 1,668 miles of internal closed routes. Soils on up to 2,115 acres (0.008%) of the planning area would directly benefit from route closures over time. Over time, ground cover (including biological soil crusts) would return and soil erosion would be reduced or eliminated on many of these closed routes. Periodic maintenance of remaining open roads would result in no change in existing soil or crust disturbances associated with these activities.

Approximately 261,642 acres in the planning area would remain open to motorized vehicle use and could be subject to trampling of ground cover (including biological soil crusts), soil compaction, and high

erosion potential (BLM 2003a, page 4-36). The potential for increased demand for OHV opportunities could increase soil and biological crust impacts on up to an estimated additional 20,460 acres (50,460 acres total) within the remaining Open OHV area designations under this alternative over the long-term.

Livestock Grazing Management Impacts

Under this alternative, livestock grazing and trampling on ground cover (including biological soil crusts) and soils could be reduced or eliminated on up to two-thirds of the planning area due to permit relinquishments or rangeland health issues. In particular, concentrated livestock use around many existing water developments and trailing along fences could be substantially reduced over time (10,000-20,500 acres). Some interior pasture fences that are no longer needed could be removed over time which would further reduce ground disturbance (up to an estimated 500 acres). Areas experiencing light to moderate livestock use could also be reduced across the planning area over time. Periodic maintenance of remaining water developments, fences, and other facilities would result in no substantial change in soil or biological soil crust disturbances associated with these structures.

Summary

Overall, this alternative would limit most anthropogenic ground disturbing activities and soil erosion potential within Category C units, new Section 202 WSAs, and existing WSAs (up to 2.1 million acres; 66% of the planning area) and would provide the highest level of protection to soils and biological soil crusts of all the alternatives. However, this alternative could delay some needed soil stabilization tactics to rehabilitate soils and protect them from wind and water erosion after wildfires.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Under this alternative, soil erosion potential would be substantially reduced within Category C units (approximately 411,033 acres), as they would be protected from most potential future ground-disturbing activities (*e.g.* salable and leasable mining, land use authorizations, etc.). In general, the soils within Category C units that are in good ecological condition (because they have sufficient ground cover, including biological soil crusts to prevent erosion; Table 3-15) would be maintained or protected in the absence of future ground disturbance. However, soils within areas that are devoid of sufficient ground cover (including biological soil crusts) capable of preventing erosion would continue to erode and degrade without active restoration management.

Within the interior of Category C units, post-wildfire restoration treatment methods would be limited (no drill seeding). This would reduce the effectiveness of restoration treatments and could result in bare ground being exposed for a longer period of time in these areas.

Impacts to soils in Category B units (1,162,311 acres) would be variable. The use of mechanical equipment for vegetation, invasive species, and fuels treatments could result in additional ground disturbance and related negative soil impacts. Applying BMPs for wilderness characteristics (see Appendix 7) during future restoration treatments in some of these units could result in less short-term disturbance impacts to soils, but less area being treated, or less effective treatments being implemented. On the other hand, this could result in bare ground being exposed and subject to soil erosion for a longer period of time in some of these areas.

There would also be potential for increased soil erosion on up to 22,774 acres with encroaching western juniper in Category C units under this alternative. Soils in juniper encroached portions of Category B units (65,280 acres) would also have the potential for more soil erosion over the long-term. Some of these areas might not be treated or would receive less effective treatments (*e.g.* thinning) due to application of BMPs (see Appendix 7) to retain vegetative screening for solitude opportunities. Fewer and/or less effective treatments would result in conversion of phase I and II juniper within sagebrush steppe communities to phase III juniper-dominated stands over time. Phase III stands would have substantially reduced or no vegetative understory, including biological soil crusts, which would result in an increase in soil erosion potential (Miller *et al*. 2013, page 56) over the long-term.

OHV and Travel Management Impacts

Ground cover trampling (including biological soil crusts) and soil compaction effects associated with public cross-country motorized vehicle use would be substantially reduced or eliminated throughout the entire planning area under this alternative (approximately 3.2 million acres; Map OHV-3, Appendix 1). In this respect, this alternative would provide the highest level of protection to soils from cross-country motorized vehicle impacts of all the alternatives analyzed. Soil impacts associated with BLM's existing road network, including maintenance and future potential road construction would be similar to those described for the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts

Livestock use would continue to have negative impacts on ground cover (including biological soil crusts) and soils around most existing water sources and along animal trails and fences similar to the No Action Alternative and Alternative A (Table 3-17). However, the intensity of such disturbances would be reduced on an estimated 5,000 acres within pastures or allotments where grazing is reduced. The temporary reduction of livestock grazing on up to 126,614 acres and 8,441 AUMs during the long-term would temporarily increase the rate of soil recovery, primarily in those areas impacted by concentrated livestock use. Potentially, up to an additional 7.1% of the ground cover (including biological soil crusts) and soils in the planning area could benefit from livestock removal/reduction under this alternative. However, grazing and associated effects on soils would likely resume in some of these areas during the long-term. The potential effects to soils from periodic maintenance of existing water developments, fences, and other range facilities implemented under this alternative would be similar to the No Action Alternative and Alternative A.

Summary

Overall, this alternative would provide less protection to soils in the planning area than Alternative B, but slightly more protections than the No Action Alternative, or Alternative A, D, or E, respectively.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Under this alternative, there would be very few changes in current management and associated ground-disturbing activities, and these would be limited to two Category C units (4,671 acres). Since vegetation management constraints would only apply to small Category C units under this alternative and there are

no existing weeds or juniper encroachment issues within these units, the effects of vegetation and fuels management on soils in these units would be largely similar to Alternative A.

Impacts to soils within Category B units would be variable. The use of mechanical equipment for vegetation, invasive species, and fuels treatments could result in additional ground disturbance and related negative soil impacts. If BMPs for wilderness characteristics (see Appendix 7) are applied during future restoration treatment NEPA analyses in some in these units, this could result in less area being treated or less effective treatments being implemented. On the one hand, this could result in less total short-term disturbance impacts to soils. On the other hand, this could result in bare ground being exposed and subject to soil erosion for a longer period of time in some of these areas.

There are about 45,691 acres of Phase II juniper within Category B units with the potential to become Phase III juniper if not treated. Soils in these areas would also have the potential for more soil erosion over the long-term. Some of these areas could receive less effective treatments (*e.g.* thinning) due to application of BMPs (see Appendix 7) to retain vegetative screening and solitude opportunities. These measures could limit the effectiveness of juniper treatments compared to Alternatives A and E. Less effective treatments would result in conversion of phase II juniper within sagebrush steppe communities to phase III juniper-dominated stands over time. Phase III stands would have substantially reduced or no vegetative understory, including biological soil crusts, which would result in an increase in soil erosion potential (Miller *et al*. 2013, page 56) over the long-term.

OHV and Travel Management Impacts

Approximately 70,500 acres would remain open to public motorized off-road vehicle use and could be subject to trampling of ground cover (including biological soil crusts), soil compaction, and high erosion potential (BLM 2003a, page 4-36). The potential for increased demand for OHV opportunities could increase concentrated soil impacts on up to an estimated 70,500 acres within Open OHV area designations (Map OHV-4, Appendix 1) under this alternative over the long-term. Soil impacts associated with BLM's existing road network, including maintenance activities, and new roads would be similar to the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts

Livestock use would continue to have negative impacts on ground cover (including biological soil crusts) and soils on about 42,000 acres around existing water sources and existing trails along fences, similar to the No Action Alternative. The potential effects to soils from periodic maintenance of existing water developments, fences, and other range facilities would also be similar to those described for the No Action Alternative and Alternative A.

Summary

Overall, the potential impacts to ground cover (including biological soil crusts) and soils (trampling, compaction, and erosion) from livestock grazing, public OHV use, and other ground disturbing activities would be similar to the No Action Alternative and Alternative A. This alternative would provide less protection to soils than Alternatives B, C, or E, respectively, but similar protections as the No Action Alternative and Alternative A.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Under this alternative, soil erosion potential would be substantially reduced within all Category C units (approximately 372,218 acres), as these areas would be protected from most potential ground disturbing activities (mining, land use authorizations, etc.). In general, the soils within Category C units that are in good ecological condition (because they have sufficient ground cover, including biological soil crusts, to prevent erosion) (Table 3-13) would be maintained or protected in the absence of future disturbance. Soils within areas that are devoid of sufficient ground cover (including biological soil crusts) capable of preventing erosion would continue to erode and degrade without active restoration.

Within the interior of Category C units, post-wildfire restoration treatment methods would be limited (no drill seeding). This would reduce the effectiveness of some restoration treatments and could result in bare ground being exposed for a longer period of time in these areas.

Impacts to soils in Category B units would be variable. The use of mechanical equipment for vegetation, invasive species, and fuels treatments could result in additional ground disturbance and related negative soil impacts. If BMPs for wilderness characteristics (see Appendix 7) are applied during future restoration treatments in some in these units, this could result in less area being treated or less effective treatments being implemented. On the one hand, this could result in less total short-term disturbance to soils. On the other hand, this could result in bare ground being exposed and subject to soil erosion for a longer period of time in some of these areas.

There would also be potential for increased soil erosion on up to 21,983 acres with encroaching western juniper in Category C units under this alternative. Soils in juniper encroached portions of Category B units (about 64,340 acres) would also have the potential for more soil erosion over the long-term. Some of these areas might not be treated or would receive less effective treatments (*e.g.* thinning) due to application of BMPs (see Appendix 7) in order to retain vegetative screening and solitude opportunities. Fewer and/or less effective treatments would result in conversion of phase I and II juniper within sagebrush steppe communities to phase III juniper-dominated stands over time. Phase III stands would have substantially reduced or no vegetative understory, including biological soil crusts, which would result in an increase in soil erosion potential (Miller *et al*. 2013, page 56) over the long-term.

OHV and Travel Management Impacts

Approximately 466,798 acres would remain open to public motorized off-road vehicle use and could be subject to trampling of ground cover (including biological soil crusts), soil compaction, and high erosion potential (BLM 2003a, page 4-36). While public cross-country motorized vehicle use would be prohibited within all Category C units under this alternative, this does not represent a substantial change from current OHV management (Maps OHV-1 and OHV-5, Appendix 1) specifically within these units. The potential for increased demand for OHV opportunities could increase concentrated soil impacts on up to an estimated 93,320 acres within Open OHV area designations over the long-term. Soil impacts associated with BLM's existing road network, including maintenance activities, and new roads would be similar to the No Action Alternative and Alternative A. For these reasons, the impacts to ground cover (including biological soil crusts) and soils (trampling, compaction, and erosion) associated with motorized vehicle use under this alternative would be similar to those described for the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts

Livestock use would continue to have negative impacts on ground cover (including biological soil crusts) and soils on about 42,000 acres around existing water sources and trails along fences similar to the No Action Alternative (Table 3-17). The potential effects to soils from periodic maintenance of existing water developments, fences, and other range facilities under this alternative would also be similar to the No Action Alternative and Alternative A.

Summary

Overall, this alternative would provide less protection to ground cover (including biological soil crusts) and soils in the planning area than Alternatives B or C but would provide slightly more protections than the No Action Alternative, Alternative A, or Alternative D, respectively.

Cumulative Impacts Common to All Alternatives

Under all alternatives, an estimated 8,227 acres of soils and biological soil crusts in the planning area would remain in a relatively permanent disturbed condition due to continuation of on-going resource management actions, including existing land use authorizations, mining, facilities, and recreation sites (Tables 3-6, 3-12, 3-35, 3-55).

Large-scale surface-disturbing activities would continue to be prevented within WSAs by compliance with the non-impairment standard (BLM 2012h). These measures would result in retaining adequate ground cover (including biological soil crusts) and reduced soil erosion potential across about 486,873 acres of WSAs (15.2% of the planning area) under all alternatives. Impacts of resource management actions on soils and ground cover (including biological soil crusts) outside of wilderness characteristics units would be the same as those described for Alternative D in the *Lakeview Proposed RMP/Final EIS* (BLM 2003a, pages 3-23 to 3-24, 4-36) and would be minimized by implementing appropriate BMPs (see Appendix 7) during project scale management actions. Wild horse and native ungulate grazing and trampling effects would continue to negatively impact ground cover (including biological soil crusts) and soils to a similar degree under all alternatives.

Cumulative Impacts of No Action Alternative

Under the No Action Alternative, reasonably foreseeable land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 1,944-2,289 additional acres of soils and ground cover (including biological soil crusts) (on top of the existing 8,227 disturbed acres associated with these activities) over the long-term (Tables 3-6, 3-9, 3-31, and 3-51). Most of these effects would occur outside of wilderness characteristics units.

Reasonably foreseeable vegetation/habitat restoration treatments could cause short-term loss of ground cover (including biological soil crusts) and increased soil erosion potential on an estimated 907,600-1,371,100 acres (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g.* juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. However, these effects would decrease following treatment as the treated areas recover to native or desired vegetation communities over the long-term (see *Vegetation—Cumulative Effects* section).

Reasonably foreseeable fuel breaks could be created on up to an estimated 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25) over the long-term. While this action would reduce total ground cover, particularly woody vegetation, it would not completely remove all ground cover (including biological soil crusts). This action would temporarily increase soil erosion potential within fuel breaks, but this impact would not be as high as other management actions that result in bare ground. These negative effects would be partially offset by helping keep the total acres burned by future wildfires and the related negative impacts to ground cover and soils from growing larger throughout the planning area over the long-term. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that an additional 200,400-389,000 acres (in addition to the estimated 400,758 acres that have burned since 1980) within the planning area could burn over the long-term. This would result in large areas of bare ground subject to increased soil erosion potential. However, these effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Vegetation* and *Fire and Fuels–- Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of soils and ground cover (including biological soil crusts) could be disturbed by livestock concentration or trailing associated with reasonably foreseeable range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17) (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative A

Under this alternative, reasonably foreseeable land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 2,170-2,310 additional acres of soils and ground cover (including biological soil crusts) throughout the planning area over the long-term (on top of the existing 8,277 disturbed acres; Tables 3-6, 3-9, 3-31, and 3-51).

Reasonably foreseeable vegetation/habitat restoration, wildland fire, and fuels management could cause similar temporary additive, incremental cumulative effects on soils and ground cover (including biological soil crusts) within the planning area similar as the No Action Alternative (Table 3-25) (see *Vegetation* and *Fire and Fuels–- Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of soils and ground cover (including biological soil crusts) could be disturbed by livestock concentration or trailing associated with reasonably foreseeable range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17) similar to the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative B

Under this alternative, reasonably foreseeable land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 1,862-1,961 additional acres of soils and ground cover (including biological soil crusts) throughout the planning area over the long-term (on top of the existing 8,277 acres of disturbance associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51). Most of these disturbances would occur elsewhere in the planning area outside of wilderness characteristics units where less restrictive management would apply.

Reasonably foreseeable vegetation/habitat restoration treatments could cause short-term loss of ground cover (including biological soil crusts) and increased soil erosion potential on an estimated 497,000-672,500 acres (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g.* juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. However, these effects would decrease following treatment as the treated areas recover to native or desired vegetation communities over the long-term (see *Vegetation—Cumulative Effects* section) and would occur on fewer acres than the No Action Alternative.

The potential negative effects to soils and ground cover (including biological soil crusts) from reasonably foreseeable fuel breaks could occur on up to an estimated 52,500 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25) over the long-term. However, fuel breaks would be precluded within all wilderness characteristics units. Fewer fuel breaks, coupled with fewer effective fuel reduction treatments, would likely result in greater wildfire risk, higher intensity wildfires, and more total acres burned within untreated areas lacking fuel breaks (*e.g.* wilderness characteristics units and WSAs) over the long-term. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that an additional 380,400-500,000 acres (on top of the estimated 400,758 acres that have burned since 1980) within the planning area could burn due to increased fuel loading over the long-term. This would result in large areas of bare ground subject to increased soil erosion potential. However, these effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 100,000-180,000 acres of seeding/planting) actions (Table 3-25) (see *Vegetation* and *Fire and Fuels—Cumulative Effects* sections).

An additional 444 to 868 acres of ground cover (including biological soil crusts) and soils could be disturbed by livestock concentration or trailing use associated with reasonably foreseeable range improvements over the long-term (on top of an estimated 21,500-32,000 acres of concentrated use; Table 3-17) (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative C

Under this alternative, reasonably foreseeable land use authorizations, mining, facilities, and recreation sites improvements could potentially disturb an estimated 1,961-2,206 additional acres of soils over the long-term (on top of the existing 8,227 disturbed acres associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51) outside of Category C units.

Reasonably foreseeable vegetation/habitat restoration treatments could cause short-term loss of ground cover (including biological soil crusts) and increased soil erosion potential on an estimated 935,600-1,202,100 acres (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g.* juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. However, these effects would decrease following treatment as the treated areas recover to native or desired vegetation communities over the long-term (see *Vegetation —Cumulative Effects* section).

Reasonably foreseeable fuel breaks could be created on up to an estimated 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25) over the long-term, including within Category C unit setbacks. While this action would reduce total ground cover, particularly woody vegetation, it would not completely remove all ground cover (including biological soil crusts). This action would temporarily increase soil erosion potential within fuel breaks, but this impact would not be as high as other

management actions that result in bare ground. These negative effects would be offset by helping keep the total acres burned by future wildfires and the related negative impacts to ground cover and soils from growing larger throughout the planning area over the long-term. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that an additional 300,000-389,000 acres (on top of the estimated 400,758 acres that have burned since 1980) within the planning area could burn over the long-term. This would result in large areas of bare ground subject to increased soil erosion potential. However, these effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Vegetation* and *Fire and Fuels –- Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of ground cover (including biological soil crusts) and soils could be disturbed by livestock concentration or trailing associated with reasonably foreseeable range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17) the same as the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative D

Under this alternative, reasonably foreseeable land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 2,065-2,310 additional acres of soils over the long-term (on top of the existing 8,227 disturbed acres associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51).

Reasonably foreseeable vegetation/habitat restoration treatments could cause a similar level of short-term loss of ground cover (including biological soil crusts) and increased soil erosion potential as the No Action Alternative (907,600-1,371,100 acres; Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. However, these effects would decrease following treatment as the treated areas recover to native or desired vegetation communities over the long-term (see *Vegetation –- Cumulative Effects* section).

Reasonably foreseeable fuel breaks could be created on up to an estimated 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25) over the long-term, including within Category C unit setbacks. These negative effects would be offset by helping keep the total acres burned by future wildfires and the related negative impacts to ground cover and soils from growing larger throughout the planning area over the long-term. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that an additional 300,000-389,000 acres (on top of the estimated 400,758 acres that have burned since 1980) within the planning area could burn over the long-term. This would result in large areas of bare ground subject to increased soil erosion potential. However, these effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Vegetation* and *Fire and Fuels–- Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of ground cover (including biological soil crusts) and soils could be disturbed by livestock concentration or trailing associated with reasonably foreseeable range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17) the same as the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative E

Under this alternative, reasonably foreseeable land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 1,965-2,210 additional acres of ground cover (including biological soil crusts) and soils over the long-term (on top of the existing 8,227 disturbed acres associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51) outside of Category C units.

Reasonably foreseeable vegetation/habitat restoration treatments could cause short-term loss of ground cover (including biological soil crusts) and increased soil erosion potential on approximately 935,600-1,202,100 acres (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. However, these effects would decrease following treatment as the treated areas recover to native or desired vegetation communities over the long term (see *Vegetation–-Cumulative Effects* section).

The potential negative effects to ground cover (including biological soil crusts) and soils from reasonably foreseeable fuel breaks could occur on up to 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25) over the long-term, including within Category C unit setbacks. These negative effects would be offset by helping keep the total acres burned by future wildfires and the related negative impacts to ground cover and soils from growing larger throughout the planning area over the long-term. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that an additional 300,000-389,000 acres (on top of the estimated 400,758 acres that have burned since 1980) within the planning area could burn over the long-term. This would result in large areas of bare ground subject to increased soil erosion potential. However, these effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Vegetation* and *Fire and Fuels - Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of ground cover (including biological soil crusts) and soils could be disturbed by livestock concentration or trailing associated with reasonably foreseeable range improvements constructed over the long-term (Table 3-17), the same as the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Watershed and Water Quality

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect watershed conditions, hydrology, and water quality in the planning area?*

Affected Environment

Watersheds

Basins and Subbasins

Hydrologic units define a hierarchy of geographic areas, including region, subregion, basin, subbasin, watershed, and subwatershed delineated U.S. Geological Survey protocol. Each hydrologic unit is

assigned a unique, two-digit numeric identifier called a hydrologic unit code or HUC. The planning area falls mostly within the Oregon Closed Basins (3rd level hydrologic unit or basin). A small portion of the planning area falls within the Upper Sacramento Basin and is comprised entirely of the Goose Lake Subbasin. The Oregon Closed Basins is comprised primarily of four subbasins (4th level hydrologic units): Summer Lake, Lake Abert, Warner Lakes, and Guano (Table 3-41). These subbasins are part of the larger Oregon Closed Basins Subregion within the Pacific Northwest Region. The topographies of these large areas direct surface and some shallow subsurface water to streams, lakes, reservoirs, or playas. They are all internally drained, closed subbasins and do not have an outflow to the sea.

Table 3-41. Subbasins in the Planning Area

Subbasin	Hydrologic Unit Code	Acres	Number of 5th-Level Watersheds
Summer Lake	17120005	2,624,000	19
Abert Lake	17120006	652,800	6
Warner Lakes	17120007	1,216,000	8
Guano	17120008	1,900,000	11
Goose Lake	18020001	696,398	5

Source: BLM GIS Watershed dataset.

The Summer Lake Subbasin is more than 2.5 million acres in size. Bounded by forested mountains on the western edge, with desert hills to the north, east, and south, there are 19, 5th-field watersheds in this subbasin. Major water bodies include Summer Lake, Silver Lake, Thompson Reservoir, Ana Reservoir, Duncan Reservoir, ZX Reservoir, and Detention Reservoir. Alkali Lake and North Alkali Lake are low-lying areas seasonally inundated with water. Paulina Marsh is a large seasonal wetland that drains into Silver Lake. The lakes in the area are large and shallow, so the shorelines change dramatically with seasonal filling and drying cycles.

The Lake Abert Subbasin is about 650,000 acres in size. Abert Rim forms the boundary to the east, forested mountains to the west and south, and desert hills to the north. The major waterbody is Lake Abert, a large, shallow, saline lake. There are six 5th-field watersheds in the subbasin. The Chewaucan River is the largest stream flowing into the lake and has upper and lower marshes associated with it. The Lake Abert subbasin contains internally drained catchments and many seasonally flowing streams.

The Warner Lakes Subbasin is more than 1 million acres in size. Hart Mountain forms the boundary to the east, Abert Rim and Warner Mountains to the west, desert hills to the north, and forested mountains to the south. There are eight 5th-field watersheds in the subbasin. It has many lakes, which form an interconnected chain parallel to the Hart Mountain uplifted fault block. These lakes are Crump, Hart, Anderson, Swamp, Flagstaff, Upper Campbell, Campbell, Turpin, Stone Corral, and Bluejoint. These lakes are associated with extensive wetlands. The major perennial streams flow from the Warner Mountains.

The Guano Subbasin is almost 2 million acres in size. Hart Mountain forms the boundary on the west and desert hills on the north, east, and south. There are 11, 5th-field watersheds in the subbasin. It has many seasonal lakes and wetlands. Dominated by streams that flow only seasonally, the subbasin also contains perennial, intermittent, and ephemeral streams; Guano Creek is a main intermittent stream that drains from Hart Mountain.

The Goose Lake Subbasin is over 696,000 acres in size. Goose Lake is the major waterbody lake in this subbasin. There are five fifth-field watersheds in the subbasin. Only a few thousand acres of BLM-administered lands in Oregon fall within this subbasin.

Watersheds

There are two main types of 5th-field watersheds in the planning area. One is the traditional watershed, which has considerable slope and a network of stream channels that start as ephemeral channels in the headwaters, and gradually feed more water downslope, transitioning to intermittent streams, and finally becoming perennial streams that can support a variety of aquatic species. The other type of watershed is more typical of drier climates where most of the precipitation received infiltrates local soils and supports the vegetation on site. While most water is captured on site, some water does move over land, downslope, or subsurface towards lakes, playas, or wetlands on valley bottoms. Both watershed types occur in the closed subbasins within the planning area, where the water collects in valley bottom lakes/playas and then evaporates.

Streams

The streams in the planning area originate in the higher-elevation hills and mountains, mostly in the adjacent National Forests (Table 3-42). They then flow to the lower-elevation valleys, lakes, wetlands, and playas. Most surface runoff is from snowmelt or rainfall at the higher elevations, producing peak discharges in the spring. Annual variability in precipitation influences streamflow in both quantity and duration. Water scarcity has led to increased water storage, water diversions, and groundwater withdrawal associated with irrigation. These projects have significantly altered natural flow regimes, which has changed habitat conditions, channel stability, and timing of sediment and organic material transport. Streamflow alterations throughout the planning area have occurred due to management activities, such as water impoundments, water withdrawal, road construction, and agricultural activities.

Table 3-42. Perennial Stream Flow Characteristics by Subbasin

Subbasin/ (hydrologic unit code)	Stream Name	Period of Record	Station Number (Location)	Drainage Area (Miles^2)	Average Annual Flow (CFS)[4]	Peak Flow (CFS)	Base Flow (CFS)
Summer Lake (17120005)	Buck Creek[1]	1989– 1991	10391050 (NE¼SW¼ Section 18, T.28S., R.14E.)	300	11.9	85	1.5
Lake Abert (17120006)	Chewuacan River[2]	1925– 1982	10384000 (SW¼NW¼ Section 26, T.33S., R.18E.)	275	146	6,490	9.4
Warner Lakes (17120007)	Twentymile Creek[2]	1911– 1982	10366000 (SW¼NW¼ Section 25, T.40S., R.23E.)	194	52	3,670	0.3
Warner Lakes (17120007)	Deep Creek[2]	1923– 1982	10371500 (SW¼NW¼ Section 15, T.39S., R.23E.)	249	134	9,420	1.7
Warner Lakes (17120007)	Honey Creek[2]	1950– 1982	10378500 (SW¼SW¼ Section 20, T.36S., R.24E.)	170	34	11,000	0.3

[1] Information from Oregon Water Resources Department (1992).
[2] Information from USGS (1984).
[3] No flow at times.
[4] CFS = cubic feet per second

The Summer Lake Subbasin includes Ana River and small streams, which flow off Winter Rim into Summer Lake. Ana River is a spring-fed system that flows to Summer Lake after initial capture in a reservoir. Buck, Bridge, and Silver Creeks are the main streams which flow into the Paulina Marsh and

then into Silver Lake. There are many intermittent streams and ephemeral drainages where the water infiltrates into the soil or evaporates. The intermittent streams have surface flows for some of the year or flows that move underground for a portion of the stream. They are in contact with the water table and either receive water from the groundwater system to surface flow or lose surface water to the groundwater. Ephemeral drainages are channels in which surface water flows immediately after snowmelt or rainfall and are always above the water table.

In the Lake Abert Subbasin, the Chewaucan River is the main water system. It has many headwater tributaries in the forested mountains. It flows through the Chewaucan Marsh in the valley bottom and supplies most of the water to Abert Lake. Many of the intermittent and ephemeral drainages dry up seasonally.

The major streams in the Warner Lakes Subbasin flow from the Warner Mountains. These include Twelvemile, Twentymile, Deep, and Honey creeks. Most surface water, if not diverted for irrigation, would flow into the Warner Lakes and wetlands. Many of the intermittent and ephemeral drainages dry up seasonally.

In the Guano Subbasin, Guano Creek is the major stream. It is intermittent, as are most of the other streams. There are many ephemeral streams, which have surface water in the channel only after snowmelt or rainfall. There are also a few perennial springs, which flow for a short length before moving underground.

Water Quality

Water quality, as defined by the Clean Water Act, includes all the physical, biological, and chemical characteristics that affect existing and designated beneficial uses. The State of Oregon is required to identify which beneficial uses a waterbody currently supports or could support in the future. The primary beneficial uses of surface water are domestic water supply, salmonid and resident fish habitat, irrigation, livestock watering, wildlife and hunting, fishing, water contact recreation, and aesthetic quality. Most streams in the planning area support state-designated beneficial uses. The State of Oregon has identified beneficial uses for the surface waters in the planning area and developed water quality standards designed to protect these uses (Tables 3-43 and 3-44).

Table 3-43. Beneficial Use Designations for Summer Lake, Lake Abert, and Warner Subbasins

Beneficial Uses	Goose Lake	Freshwater Lakes and Reservoirs	Highly Alkaline and Saline Lakes	Freshwater Streams
Private domestic water supply[1]		X		X
Industrial water supply		X	X	X
Irrigation		X		X
Livestock watering	X	X		X
Fish and aquatic life	X	X	X	X
Wildlife and hunting	X	X	X	X
Fishing	X	X	X	X
Boating	X	X	X	X
Water contact recreation	X	X	X	X
Aesthetic quality	X	X	X	X
Hydro power				
Commercial navigation and transportation				

[1] With adequate pre-treatment (filtration and disinfection) and natural quality to meet drinking water standards.

Table 3-44. Beneficial Use Designations for Fish

Geographic Extent of Use	Redband or Lahontan Cutthroat Trout (20˚C)	Redband or Hybrid Trout (20˚ C)	Cool Water Species (No Salmonid Use)
Summer Lake Subbasin			
- Rock-Buck Creek Watersheds[1]: Silver Creek, Buck Creek, and Bridge Creek	X		
- Rock-Buck Creek Watersheds[1]: All other streams			X
- Alkali Lake watershed[1]			X
All other Summer Lake Subbasin streams	X		
All other Goose and Summer Lakes Subbasin streams in Oregon	X		
All other highly alkaline and saline lakes in the Oregon Closed Basins	X		
Guano Subbasin		X	

[1] These are 5th-field watersheds.

Current water quality standards are located on the Oregon Department of Environmental Quality (ODEQ) website (http://www.oregon.gov/DEQ/). Elevated summer temperatures are the primary water quality problem identified by the state for some streams in the planning area (ODEQ 2018). While some streams have been monitored and violate the state standard for the resident fish and aquatic life water temperature numeric criteria, it is unknown if the natural temperature potential would meet the criteria (ODEQ 2018).

Elevated stream temperatures are typically caused by stream degradation such as removal of riparian vegetation and destabilization of streambanks, which increase stream channel width-to-depth ratios and decrease stream shading. The land use most commonly associated with these problems in the planning area is livestock grazing. Other land uses associated with degraded streams include roads, trails, water withdrawal, reservoir storage and release, altered physical characteristics of the stream, and wetlands alteration (ODEQ 2018).

Water Quality Impaired Stream Reaches

The State of Oregon has identified waters (updated biannually) that are water-quality impaired, as required by Section 303(d) of the Clean Water Act. Table 3-45 lists the stream reaches in the planning area currently identified by the ODEQ as being water-quality impaired.

Water Rights and Uses

In Oregon, management of water rights generally falls within the jurisdiction of the state of Oregon. Permits for water use from any source are required from the Oregon Water Resources Department, with some exceptions (*e.g.* stock water, firefighting, fish screens, etc.; ORS 537.141; ORS 537.545). Laws pertaining to the use of surface water and groundwater are based on the prior appropriation principle (first in time, first in right) and are limited to the quantity of water needed to satisfy the specified beneficial use without waste. There are over 2,000 livestock and wildlife related water developments on BLM-administered lands within the planning area; less than 1,000 have state-approved water rights. The availability of water in much of the area is limited and may hamper additional water developments. Future water development projects for wildlife, recreation, and livestock would require a state of Oregon permit before project implementation could occur.

Table 3-45. State of Oregon 303(d) Listed Waterbodies

Subbasin	Waterbody	State Record ID[1]	Parameters
Summer Lake	Silver Creek	12731	Temperature
Lake Abert	Chewaucan River	12697; 700	Temperature; Biological Criteria
Lake Abert	Willow Creek	681	Temperature
Warner Lakes	Camas Creek	12686	Temperature
Warner Lakes	Deep Creek	12672	Temperature
Warner Lakes	Drake Creek	12683	Temperature
Warner Lakes	Fifteenmile Creek	659; 8358; 24434	Temperature; Silver; Thallium
Warner Lakes	Honey Creek	12674; 14521	Temperature; pH
Warner Lakes	Horse Creek	12678	Temperature
Warner Lakes	Parsnip Creek	12684	Temperature
Warner Lakes	Snyder Creek	12687	Temperature
Warner Lakes	Twelvemile Creek	12679; 12680; 8359; 8360; 14538; 14556	Temperature; Silver; Arsenic; Thallium
Warner Lakes	Twentymile Creek	12673; 8361; 8348; 14498; 11853; 14515	Temperature; Silver; Arsenic; Dissolved

[1]The State Record ID is a unique combination of water body location, pollutant parameter, and season; designated by Oregon DEQ.
Source: Oregon DEQ 2012.

Additionally, federal reserved water rights may be applied to important springs and waterholes pursuant to Public Water Reserve No. 107, Executive Order of April 17, 1926, under the authority of section 10 of the Stock-Raising Homestead Act of 1916 (see Table 14 of BLM 2003b, page 96). Public Water Reserve 107 reserves only the minimum amount of water necessary to accomplish the primary purpose of the reservation. There was no intent to reserve the entire yield of each public spring or waterhole withdrawn by the Executive Order. The purposes for which these waters were reserved are limited to domestic human consumption and livestock watering on public lands. All waters from these sources in excess of the minimum amount necessary for these limited public watering purposes are available for appropriation through state water law and administrative claims procedures.

Environmental Effects

Analysis Assumptions

- Active restoration would move impaired watersheds, hydrology, and water quality toward desired future conditions faster than passive restoration. In some cases (i.e., weed infestation), active restoration would be the only way to achieve desired future conditions.
- Desired water quality would be supported when there is a healthy native riparian plant community present. Riparian areas are important natural filters that protect aquatic environments from excessive erosion and polluted surface runoff. Riparian vegetation would also provide shade to waterways, which helps moderate water temperature.
- Management actions that adversely affect riparian vegetation have the potential to affect hydrology and water quality through the alteration of stream temperature, streambank stability, stream channel dimensions, and sedimentation. Management actions that involve ground-disturbing activities within or near riparian areas have the most potential to negatively affect water quality through the process of sediment disturbance, transport, and delivery into waterbodies (Mebane 2001).

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Continuing current management would maintain or improve watershed, hydrology, and water quality conditions across most of the planning area, including within most wilderness characteristics units, as previously described for Preferred Alternative D in the *Lakeview Proposed RMP/Final EIS* (BLM 2003a, pages 4-39 to 4-48). The BLM has documented through monitoring in the recent past (2010-present), which has included PFC assessments (Tables 3-19 and 3-20), stream surveys, and photo monitoring (all on file at Lakeview BLM), and field reconnaissance, improving trends in watershed condition, hydrologic function, and water quality throughout much of the planning area. Photo points established in the 1970s–1990s, and retaken from 2005-present, show increases in native riparian vegetation, including willows, sedges, and rushes, as well as stream channel narrowing and deepening, and increases in streambank stability.

While the BLM would continue to implement management actions to maintain or restore watershed conditions, it could not conduct or authorize discretionary ground-disturbing activities within a wilderness characteristics unit if it deemed it would diminish the size or cause the entire BLM inventory unit to no longer meet the minimum wilderness characteristics criteria. These measures would result in retaining ground cover, reducing soil erosion potential (see *Soil – Environmental Effects* section), and contribute to maintaining watershed, hydrology, and water quality conditions across about 1.65 million acres (51.7%) of the planning area. Watersheds that are in relatively good ecological health (with little to no erosion, native vegetation is intact, lack of weed infestations, etc.) would largely remain in that condition in the absence of large-scale natural disturbance. While the BLM could continue to treat impaired stream channels, weed infestations, juniper encroached areas, unstable areas, etc., which would allow those areas to return to a relatively natural condition over time, modifying project design to ensure it would not diminish the size or cause an entire BLM inventory unit to no longer meet the criteria for wilderness characteristics could reduce the total acres that could be treated within a given watershed or reduce the effectiveness of the treatment measures utilized.

OHV and Livestock Grazing Management Impacts

Existing roads and primitive roads would continue to disturb an estimated 8,024 acres within watersheds in the planning area under this alternative. Areas of concentrated cross-country OHV use would continue to disturb 30,000 acres and could result in up to an estimated 93,320 acres of disturbance (37,972-101,270 acres total) within watersheds in the planning area. Concentrated livestock grazing use would continue to disturb an estimated 42,000 acres scattered in many watersheds in the planning area (Table 3-17; see also *Soil* and *Vegetation – Environmental Effects* sections). These management activities would continue to negatively affect watershed, hydrology, and water quality conditions due to bare ground, soil compaction, increased erosion potential, and sedimentation within a small (about 4.5%) percentage of BLM-administered lands in the planning area.

Summary

Overall, monitoring has shown that the management direction under this alternative has been adequate to maintain or move watershed, hydrology, and water quality conditions toward natural or desired conditions within the majority of the planning area over the long-term.

Impacts of Alternative A

Wilderness Characteristics Management Impacts

Watersheds that are in relatively good ecological health (with little to no erosion, native vegetation is intact, lack of weed infestations, etc.) would largely remain in the same condition in the absence of future large-scale natural disturbance (i.e. wildfire). However, this alternative would have the fewest restrictions to surface disturbing activities and the highest potential to impact ground cover, soils, hydrology, water quality, and watershed function out of all the alternatives.

These potential negative effects would be offset by the BLM being better able to treat watersheds in poor ecological condition (such as impaired stream channels, weed infestations, juniper encroached areas, unstable areas, etc.), without additional constraints for wilderness characteristics. This alternative would accommodate the highest amount of active restoration actions (non-native invasive species control, vegetation treatment, habitat restoration, etc.) compared to Alternatives B, No Action, C, E, and D, respectively.

Though these types of active management activities would have short-term negative effects on hydrology, water quality, and watershed conditions during treatment, they would promote healthy, native sagebrush/grass communities, increased ground cover, increased root mass, decreased soil erosion potential, and improved hydrology/water quality/watershed conditions within the treated areas over the long-term, as evidenced by the watershed conditions the BLM has documented through monitoring in the recent past (2003-2010; prior to management under the 2010 Settlement Agreement). As a result, treated watersheds would return to relatively natural or desired conditions at slightly faster rate than the No Action Alternative.

OHV and Livestock Grazing Management Impacts

The effects of existing roads and primitive roads, cross-country OHV use, and concentrated livestock grazing use on watershed, hydrology, and water quality conditions would be the same as the No Action Alternative (Tables 3-17, 3-32, and 3-33; see also *Soil and Vegetation – Environmental Effects* sections).

Summary

Overall, Alternative A would have the least protections on watersheds in good condition but would have fewer restrictions on active watershed restoration management actions and would allow for the restoration of degraded watershed conditions, hydrology, and water quality at the most rapid rate of all the alternatives.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Alternative B would generally result in a mix of beneficial and negative effects on watershed, hydrology, and water quality conditions across portions of the planning area. Portions of watersheds within Category C units and New Section 202 WSAs (and existing WSAs) that are in relatively good ecological health (with little to no erosion, native vegetation is intact, lack of weed infestations, etc.) would largely remain in that condition in the absence of future large-scale disturbance. Restrictions on ground disturbing

management actions in these areas would tend to maintain existing watershed, hydrology, and water quality conditions across those portions of watersheds that are currently in a natural or desired condition.

While watershed restoration and enhancement actions could occur within degraded portions of Category C units and new Section 202 WSAs, they would be more difficult or expensive to implement, or less effective due to application of BMPs for wilderness characteristics (see Appendix 7 and *Vegetation* and *Fire and Fuels* sections) or meeting the non-impairment standard in new Section 202 WSAs. Though the BLM would initially have adequate administrative access to treat degraded areas (impaired stream channels, weed infestations, juniper encroached areas, unstable areas, etc.) within Category C units and new Section 202 WSAs (and existing WSAs), over time access would be hindered as some routes degrade (due to lack of maintenance or use, erosion, and revegetation) and some degraded areas become inaccessible. Untreated areas would remain in a degraded condition into the foreseeable future. Weed infestations could continue to spread throughout watersheds, replacing native vegetation. Juniper would continue to increase across watersheds, moving watershed conditions further from their natural state (desired condition). While passive restoration methods could eventually restore some stream channels and watershed conditions to a stable condition, based on past, local experience, this would take many decades. Passive restoration would not likely restore stable stream or watershed conditions in degraded areas within the 20-year analysis timeframe. For these reasons, this alternative would result in further degradation of watershed, hydrology, and water quality conditions in many degraded portions of Category C units, new Section 202 WSAs, and existing WSAs over the long-term.

OHV and Livestock Grazing Management Impacts

Under this alternative, there would be some net reduction in ground disturbances associated with roads, primitive roads, and motorized trails (to about 5,909 acres), concentrated OHV use (20,460-50,460 acres), and concentrated livestock use (10,000-20,500 acres) within wilderness characteristics units and WSAs over the long-term compared to the No Action Alternative. As a result, the potential negative effects associated with these management activities (bare ground, compaction, increased erosion potential, and sedimentation) on watershed, hydrology, and water quality conditions would be reduced in these areas.

Summary

Overall, Alternative B would provide the most protections to watersheds in good condition of all the alternatives, but it would also allow degraded watershed conditions, hydrologic function, and water quality within some wilderness characteristics units and WSAs to further deteriorate at the most rapid rate of all the alternatives, due to less ability to actively treat/restore degraded areas over the long-term.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Portions of watersheds within Category C units that are in relatively good ecological health (with little to no erosion, native vegetation intact, lack of weed infestations, etc.) would largely remain in that condition or improve over time in the absence of large-scale natural disturbance. The BLM would also be able to treat the majority of impaired stream channels, weed infestations, juniper encroached areas, unstable areas, etc., in Category C, B, and A units, which would allow those areas to return to a relatively natural or desired conditions over the long-term. However, restoration and enhancement actions in Category C and B units could be slightly more difficult or expensive to implement, or less effective due to application

of BMPs for wilderness characteristics (see Appendix 7). Watershed restoration management within Category B units would have similar positive effects on watershed, hydrology, and water quality conditions as restoration management within Category A units.

OHV and Livestock Grazing Management Impacts

Under this alternative, existing roads and primitive roads would continue to disturb an estimated 8,024 acres within watersheds in the planning area. Ground disturbance associated with areas of concentrated cross-country OHV use would be reduced to 0 acres within watersheds in the planning area. Concentrated livestock grazing use and associated impacts could be temporarily reduced within an estimated 10,000-20,500 acres within some watersheds in the planning area (Table 3-17; see also *Soil* and *Vegetation – Environmental Effects* sections). For this reason, the negative effects of these management activities (bare ground, compaction, increased erosion potential, and sedimentation) on watershed, hydrology, and water quality conditions would be reduced within a small percentage of the planning area compared to the No Action Alternative.

Summary

Alternative C would generally maintain or improve watershed, hydrology, and water quality conditions across most of the planning area. Overall, Alternative C would provide almost as much protection to watersheds in good condition as Alternative B, but would move most degraded watershed conditions in the planning area towards natural or desired conditions via active restoration at a similar rate as Alternative A.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Given the small number of acres (4,671 acres) that would be managed as Category C units under this alternative and lack of perennial streams or natural waterbodies, juniper encroachment, or other watershed health issues in those units, the existing watershed and hydrology conditions would continue or improve slightly over time in the absence of large-scale natural disturbance.

The BLM would be able to treat the majority of impaired stream channels, weed infestations, juniper encroached areas, unstable areas, etc., in Category B and A units, which would allow those areas to return to a relatively natural or desired conditions over the long-term. Watershed restoration management within Category B units would have similar positive effects on watershed, hydrology, and water quality conditions as within Category A units. However, they could be slightly more difficult or expensive to implement, or less effective if BMPs for wilderness characteristics (see Appendix 7) are applied.

OHV and Livestock Grazing Management Impacts

Roads would disturb ground cover and soils within watersheds in the planning area at a similar level (8,024 acres) as the No Action Alternative. However, concentrated cross-country OHV use could increase by up to an estimated 40,500 additional acres (30,000-70,500 acres) within some watersheds in the planning area (see also *Soil* and *Vegetation – Environmental Effects* sections). The effects of concentrated livestock grazing use would also continue to disturb ground cover and soils in scattered portions of watersheds in the planning area similar to the No Action Alternative (42,000 acres; Table 3-

17). The negative effects of these management activities (bare ground, compaction, increased erosion potential, and sedimentation) on watershed, hydrology, and water quality conditions would occur on slightly fewer acres of the planning area compared to the No Action Alternative.

Summary

Alternative D would generally maintain or improve watershed, hydrology, and water quality conditions across most of the planning area similar to the No Action Alternative. Overall, the effects of this alternative on watershed, hydrology, and water quality conditions in the planning area would be similar to the No Action Alternative.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Portions of watersheds in Category C units that are in relatively good ecological health (with little to no erosion, native vegetation is intact, lack of weed infestations, etc.) would largely remain in this condition in the absence of future large-scale disturbance. The BLM would also be able to treat the majority of impaired stream channels, weed infestations, juniper encroached areas, unstable areas, etc., in Category C, B, and A units, which would allow those areas to return to a relatively natural or desired conditions over the long-term. However, watershed restoration and enhancement actions in Category C and B units could be slightly more difficult or expensive to implement, or less effective due to the application of BMPs (see Appendix 7) for wilderness characteristics. Watershed restoration management within Category B units would have similar positive effects on watershed, hydrology, and water quality conditions as within Category A units. As a result, watershed, hydrology, and water quality conditions across the majority of the planning area would be maintained or improved.

OHV and Livestock Grazing Management Impacts

The effects of roads, concentrated cross-country OHV use, and concentrated livestock grazing use on watershed, hydrology, and water quality conditions under this alternative would be the same as the No Action Alternative (Table 3-17; see also *Soil* and *Vegetation – Environmental Effects* sections).

Summary

Overall, Alternative E would have similar effects on watershed, hydrology, and water quality as Alternative C and would maintain or improve watershed, hydrology, and water quality conditions across most of the planning area.

Cumulative Impacts Common to All Alternatives

Existing and On-Going Disturbances

An estimated 8,227 acres scattered throughout watersheds in the planning area would remain in a relatively permanent disturbed condition due to existing land use authorizations, mining, facilities, and recreation sites (Tables 3-6, 3-9, 3-31, and 3-51) (see also *Soil* and *Vegetation – Environmental Effects* sections).

Climate Change

The terrestrial ecosystems in the watersheds surrounding streams in the planning area could change in response to changing climate and fire regimes (*see Cumulative Effects – All Vegetation Communities* and *Fire and Fuels* sections). Hydrologic changes in the western United States in recent decades include both changes to timing of streamflow and the water balance. There are linkages between the two, in that changes in precipitation could cause changes to the timing of streamflow (Luce and Holden 2009). The principal changes attributable to warming include reduced precipitation as snow, reduced spring snowpack, and earlier runoff timing (Knowles *et al.* 2006, Pierce *et al.* 2008). Warming temperatures could cause less precipitation to fall as snow and more to fall as rain, and higher snowline elevations for individual storms (Knowles *et al.* 2006). This could result in some fall and winter storms, which historically produced more snow, instead producing runoff, shifting some mountain streams from snowmelt-dominated hydrographs, with peak runoff in the spring, to rain-dominated or transitional hydrographs, where the timing of flows is more related to the timing of precipitation (Stewart *et al.* 2005). This would result in more streamflow in fall and winter and less in the spring and summer. Such changes would happen soonest at mid-elevation sites above already rain-dominated streams, but below places where winter temperatures remain cold enough for snow (Regonda *et al.* 2005).

If warmer climate change trends in the western United States occur within the planning area, stream temperatures could increase, summer low flows could decline, and winter floods could occur more often in places where snowmelt is the main source of water (Luce and Holden 2009). Some of these changes could be subtle, others more noticeable (Regonda *et al.* 2005, Stewart *et al.* 2005). The impacts described above could occur under either a warmer/drier or warmer/wetter future climate scenario, although the impacts of reduced summer low flows could be partially ameliorated by the warmer/wetter scenario, due to the potential for increased summer precipitation.

Cumulative Impacts of No Action Alternative

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could have incremental, additive long-term cumulative effects on ground cover and associated hydrology and watershed conditions within an estimated 1,944-2,289 acres within watersheds in the planning area over the long-term (on top of the existing 8,227 disturbed acres associated with these past or on-going activities) (Tables 3-6, 3-9, 3-31, and 3-51).

Vegetation/habitat restoration treatments could cause short-term loss of ground cover and increased soil erosion potential on an estimated 907,600-1,371,100 acres (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g.* juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. These effects would be offset by substantial improvements in ecological health, hydrologic function, water quality, and overall watershed health within these treated areas over the long-term (see *Soil* and *Vegetation– Cumulative Effects* sections).

The creation of new fuel breaks could reduce ground cover on up to an estimated 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25). While this action would reduce total ground cover, particularly woody vegetation, it would not completely remove all ground cover within the fuel break. This action would temporarily increase soil erosion potential within fuel breaks, but this impact would not be as high as other management actions that result in bare ground. Since fuel breaks can reduce the size

of future wildfires in the surrounding area, these effects would be offset by helping keep the total acres burned by wildfire and the related negative impacts to watershed health, hydrologic function, and water quality from growing larger throughout the planning area over the long-term Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that an additional 200,400-389,000 acres (on top of the estimated 400,758 acres that have burned since 1980) within the planning area could burn over the long-term. This would result in large areas of bare ground subject to increased soil erosion potential. However, these effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Soil, Vegetation,* and *Fire and Fuels–- Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of ground cover could be disturbed by livestock concentration or trailing associated with new range improvements constructed. This would have an incremental, additive, long-term negative cumulative effect (on top of the existing 42,000 acres of concentrated livestock use; Table 3-17) on watershed, hydrology, and water quality conditions in small portions of the planning area over the long-term (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative A

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially have incremental additive long-term cumulative effects on ground cover and associated hydrology and watershed conditions within an estimated 2,170-2,310 additional acres (on top of the existing 8,227 acres associated with these past and on-going activities) over the long-term (Tables 3-6, 3-9, 3-31, and 3-51).

Vegetation/habitat restoration, wildland fire, fuels, and range improvement management could cause similar temporary additive, incremental cumulative effects on ground cover and associated hydrology and watershed conditions within the planning area as the No Action Alternative (Tables 3-17 and 3-25) (see *Soil, Vegetation*, *Fire and Fuels,* and *Livestock Grazing–- Cumulative Effects* sections).

Cumulative Impacts of Alternative B

New land use authorizations, mining, facilities, and recreation sites could have incremental additive long-term cumulative effects on ground cover and associated hydrology and watershed conditions within an estimated 1,862-1,961 additional acres in the planning area over the long-term (on top of the existing 8,277 acres of disturbance associated with these past and on-going activities; Tables 3-6, 3-9, 3-31, and 3-51). Most of these disturbances would occur outside of wilderness characteristics units where less restrictive management would apply.

Vegetation/habitat restoration treatments could cause short-term loss of ground cover and associated additive, incremental negative effects to watershed, hydrology, and water quality conditions on an estimated 497,000-672,500 acres (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. These effects would decrease following treatment as the treated areas recover to native or desired vegetation communities over the long-term (see *Cumulative Effects – Vegetation Communities* section) and would occur on fewer acres than the No Action Alternative. While treated areas would improve in watershed health, hydrologic function, and water

quality over the long-term, these benefits would occur on fewer acres compared to the No Action Alternative (see *Soil* and *Vegetation–- Cumulative Effects* sections).

The potential negative effects to ground cover and associated hydrology and watershed conditions from creating new fuel breaks could occur on up to an estimated 52,500 acres under this alternative (on top of the 5,350 acres of existing fuel breaks; Table 3-25) over the long-term. However, fuel breaks would be precluded within all Category C units. While fuel breaks would not specifically be precluded in new Section 202 WSAs, the requirement to meet VRM Class I objectives and the non-impairment standard likely would preclude them except under very rare circumstances where an exception could apply. Fewer fuel breaks, coupled with fewer effective fuel reduction treatments, would likely result in greater wildfire risk, higher intensity wildfires, and more total acres burned within untreated areas lacking fuel breaks (*e.g.* wilderness characteristics units and WSAs) over the long-term. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that an additional 380,400-500,000 acres (on top of the estimated 400,758 acres that have burned since 1980) within the planning area could burn due to increased fuel loading over the long-term. This would result in larger areas of bare ground subject to increased soil erosion potential and associated negative effects to watershed, hydrology, and water quality conditions compared to the No Action Alternative. However, these effects would decline over the long-term due to natural revegetation and emergency rehabilitation (estimated 100,000-180,000 acres of seeding/planting) actions (Table 3-25) (see *Soil, Vegetation,* and *Fire and Fuels–- Cumulative Effects* sections).

An additional 444 to 868 acres of ground cover could be disturbed by livestock concentration or trailing use associated with new range improvements. This would have an incremental, additive, long-term negative cumulative effect (on top of an estimated 21,500-32,000 acres of concentrated livestock use; Table 3-17) on watershed, hydrology, and water quality conditions in small portions of the planning area over the long-term (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative C

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 1,961-2,206 additional acres over the long-term (on top of the existing 8,227 acres associated with these past and on-going activities; Tables 3-6, 3-9, 3-31, and 3-51) outside of Category C units.

Vegetation/habitat restoration treatments could cause short-term loss of ground cover and associated negative effects on watershed, hydrology, and water quality conditions on an estimated 935,600-1,202,100 acres throughout the planning area (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g.* juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. These effects would decrease as the areas recover to native or desired vegetation communities resulting in substantial improvements in hydrologic function, water quality, and watershed health within treated areas over the long-term (see *Soil* and *Vegetation–- Cumulative Effects* sections).

New fuel breaks could be created on up to an estimated 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25) over the long-term, including within Category C unit setbacks. While this action would reduce ground cover, particularly woody vegetation, it would not completely remove all ground cover. This action would temporarily increase soil erosion potential within fuel breaks, but this impact

would not be as high as other management actions that result in bare ground. These negative effects would be offset by helping keep the total acres burned by future wildfires and the related negative impacts to watershed health, hydrologic function, and water quality from growing larger throughout the planning area over the long-term. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that an additional 300,000-389,000 acres (on top of the estimated 400,758 acres that have burned since 1980) within the planning area could burn over the long-term. This would result in large areas of bare ground and associated negative effects to watershed, hydrology, and water quality conditions. However, these effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Soil, Vegetation,* and *Fire and Fuels–- Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of ground cover could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17). This would have same additive, incremental cumulative effect on watershed, hydrology, and water quality conditions in small portions of the planning area as described for the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative D

Overall, the potential cumulative effects of this alternative would be similar to Alternative A. New land use authorizations, mining, facilities, and recreation sites could potentially have incremental additive long-term cumulative effects on ground cover and associated hydrology and watershed conditions within an estimated 2,065-2,310 additional acres over the long-term (Tables 3-6, 3-9, 3-31, and 3-51) outside of Category C units.

Vegetation/habitat restoration treatments could cause a similar level of short-term loss of ground cover and associated negative effects on watershed, hydrology, and water quality conditions as the No Action Alternative (907,600-1,371,100 acres; Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. These effects would decrease as the areas recover to native or desired vegetation communities resulting in substantial improvements in ecological health, hydrologic function, water quality, and watershed health within treated areas over the long-term (see *Soil* and *Vegetation–- Cumulative Effects* sections).

New fuel breaks could be created on up to an estimated 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25) over the long-term, including within Category C unit setbacks. These negative effects would be offset by helping keep the total acres burned by future wildfires and the related negative impacts to ground cover, watershed health, hydrologic function, and water quality from growing larger throughout the planning area over the long-term. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that an additional 300,000-389,000 acres (on top of the estimated 400,758 acres that have burned since 1980) within the planning area could burn over the long-term. This would result in large areas of bare ground and associated negative effects to watershed, hydrology, and water quality conditions. However, these effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Soil, Vegetation,* and *Fire and Fuels–- Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of ground cover could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17). This would have same additive, incremental cumulative effect on watershed, hydrology, and water quality conditions in small portions of the planning area as described for the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative E

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb ground cover and associated hydrology and watershed conditions within an estimated 1,965-2,210 additional acres over the long-term (on top of the existing 8,227 acres associated with these past and on-going activities; Tables 3-6, 3-9, 3-31, and 3-51) outside of Category C units.

Vegetation/habitat restoration treatments could cause short-term loss of ground cover and associated negative effects on watershed, hydrology, and water quality conditions on an estimated 935,600-1,202,100 acres throughout the planning area (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. These effects would decrease as the areas recover to native or desired vegetation communities resulting in substantial improvements in ecological health, hydrologic function, water quality, and watershed health within treated areas over the long-term (see *Soil* and *Vegetation–- Cumulative Effects* sections).

The potential negative effects to ground cover from creating new fuel breaks could occur on up to 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25) over the long-term, including within Category C unit setbacks. These negative effects would be offset by helping keep the total acres burned by future wildfires and the related negative impacts to watershed health, hydrologic function, and water quality from growing larger throughout the planning area over the long-term. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that an additional 300,000-389,000 acres (on top of the estimated 400,758 acres that have burned since 1980) within the planning area could burn over the long-term. This would result in large areas of bare ground and associated negative effects to watershed, hydrology, and water quality conditions. However, these effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Soil, Vegetation,* and *Fire and Fuels - Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of ground cover could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (Table 3-17), This would have same additive, incremental cumulative effect on watershed, hydrology, and water quality conditions in small portions of the planning area as described for the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Fish and Aquatic Wildlife

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect fish, other aquatic species including special status aquatic species, and associated aquatic habitats in the planning area?*

Affected Environment

The BLM is responsible for managing a wide array of aquatic habitats, for both native and introduced fish and other aquatic species. In general, the Oregon Department of Fish and Wildlife (ODFW) is responsible for managing fish and other aquatic animal populations. However, an animal is inseparable from its habitat, and effective management strategies must consider both the animal and its habitat.

Fish habitat includes perennial and intermittent streams, springs, lakes, and reservoirs that support fish through at least a portion of the year. Amphibians, reptiles, and aquatic invertebrates are integral components of the aquatic community. The condition of aquatic habitat is related to hydrologic conditions of the upland and riparian areas associated with, or contributing to, a specific stream or waterbody, and to stream channel characteristics. Riparian vegetation reduces solar radiation by providing shade and thereby moderates water temperatures, adds structure to the banks to reduce erosion, provides overhead cover for fish, and provides organic material, which is a food source for macroinvertebrates. Intact vegetated floodplains dissipate stream energy, store water for later release, trap fine sediment, and provide rearing areas for juvenile fish. Water quality (especially factors such as temperature, sediment, and dissolved oxygen) also greatly affects fish habitat.

Habitat quality varies by stream reach, with canyons generally being in better condition due to inaccessibility to livestock and rock armoring. In these reaches, pool quality and quantity are usually good, and channel condition is not dependent on vegetation. On less confined, deep soil reaches, vegetation plays more of a role controlling habitat conditions that vary depending on past and present management. Generally, the condition of these sites has improved in the planning area over the last 20 years due to livestock management and exclusion. Some degraded sites will require many years for the streams to improve to desired condition. Large wood is usually not a factor in determining function of the streams within the planning area. Most of the streams on BLM-administered lands are not forested and naturally lack a source of large wood. Therefore, standards for large wood are not applicable to the planning area.

Habitat Connectivity, Strongholds, and Refugia

The watersheds that supply the majority of water to the Warner Valley are identified as refugia and strongholds for Warner Sucker and Redband Trout. Deep, Twentymile, and Honey Creek Watersheds all contain a considerable number of BLM-managed lands and perennial stream reaches (approximately 85 miles of Redband trout stream habitat; approximately 25 miles of Warner Sucker stream habitat; approximately 8,000 acres of lake habitat in Warner Valley) that provide significant habitat for fish species, including Warner Sucker and Redband Trout. The perennial waters of the Twentymile (except Horse and Fifteenmile Creeks), and Honey Creek Watersheds provide habitat for Warner Suckers. The perennial reaches of Twelvemile and Twentymile Creeks in Oregon have been identified as critical habitat for Warner Sucker. Generally, these sucker-bearing streams, along with Fifteenmile Creek and the perennial streams of the Deep Creek Watershed provide habitat for Redband Trout. The Lakeview

Field Office administers approximately 100 miles of perennial stream fish habitat in the Warner, Chewaucan, and Silver Lake Basins.

The major factor limiting fish habitat is a lack of connectivity to the Warner Lakes. Deep and Twentymile Creeks have had substantial modifications and diversions that limit upstream movement and fish access to the upper reaches of the stream. Diversions block upstream movement of fish from the lower reaches of streams and lakes to upper spawning areas. Due to a natural water fall on Deep Creek, 2.3 miles of stream between Adel and the falls are affected by this connectivity concern. Historically, there were two major man-made obstacles on Twentymile and three on Deep Creek. Honey Creek has the most direct connection between the stream and the Warner Lakes, but several diversions remain that need modification in order to reestablish connectivity. These diversions are all privately operated, with all but one located on private land. Significant progress on addressing fish passage issues in the Warner Lakes Basin has occurred in recent years, with the replacement of several diversions with new structures capable of allowing fish passage. The BLM is a core member of the recently formed Warner Basin Aquatic Habitat Partnership, whose primary goal has been restoring fish connectivity throughout the Warner Lakes Basin, while ensuring local irrigators have safe and efficient access to their legal irrigation water.

Fish Habitat Conditions

Many past activities have affected the habitat conditions for fish in the planning area. Road construction has altered the ability of many streams to access their full floodplain or has constricted their floodplain and has straightened or constricted many channels, resulting in channel incision. Logging and associated road construction has removed overstory cover on many watersheds (mostly outside BLM-administered lands), changing peak and base flows downstream. Grazing has affected banks directly by removing bank-stabilizing vegetation.

Water withdrawal since the turn of the century has affected the ability of fish to thrive in many streams. Irrigation water withdrawn from the major streams in the area reduces summer flows and indirectly raises water temperature. Channel incision and habitat loss has occurred as a result of channeling of streams to better control the spread of water, and removal of willows, to create irrigated pasture and hay fields.

Aquatic Habitat Surveys

Completion of aquatic habitat surveys of many various types (such as riparian, stream habitat typing, biological monitoring) has occurred in the planning area beginning in the late 1960s and continuing to the present time. The Fremont National Forest completed many surveys on forestlands during these years as well. While some of the data collected from these surveys have yet to be analyzed, analysis of the data used in the Deep Creek Watershed Analysis (FS and BLM 1998b) indicated that stream temperature was the major limiting factor on the watershed's streams, resulting in a generally poor overall rating on most stream reaches. Temperatures greater than the state standard are the result of several factors, including water withdrawal, loss of streamside vegetation, channel widening, and lower summer flows.

Stream channel entrenchment has prevented water storage in floodplain soils, reducing water storage that would promote longer-duration streamflow. It has also reduced or eliminated interflow between cool/cold underground waters in the riparian area (floodplain) and surface streamflow. Even under pristine conditions, it is unlikely that achievement of state standards for temperature could occur on BLM stream reaches. However, most other elements (pools per mile, large wood per mile, pools per mile greater than

2.6 feet deep, unstable banks, proper functioning condition rating, and sediment rating) were good to fair, with only a few poor ratings.

While most stream conditions provide adequate habitat for suckers and trout, there are still opportunities to enhance some habitat components, such as the creation of deep pools and reduction of stream width-to-depth ratios with structural controls.

Stream surveys, photo monitoring (on file at Lakeview BLM), field reconnaissance, and proper functioning condition (PFC) assessments (Tables 3-19 and 3-20) generally indicate improving trends in fish habitat and riparian conditions throughout the planning area. Photos points established in the 1970s–1990s, and retaken in the last five years, show increases in native riparian vegetation, including willows, sedges, and rushes, as well as stream channel narrowing and deepening and increases in streambank stability.

Aquatic Habitat Integrity

The ICBEMP (FS *et al.* 2004) rated the aquatic habitat integrity of the subbasins throughout the region. An aquatic system that exhibits high integrity has a mosaic of well-connected, high-quality water and habitats that support a diverse assemblage of native and desired nonnative species, the full expression of potential life histories, dispersal mechanisms, and the genetic diversity necessary for long-term persistence and adaptation in a variable environment. Subbasins exhibiting the greatest level of these characteristics were rated high, and those exhibiting the least were rated low. The Guano Subbasin was rated as having moderate aquatic integrity, while the other three subbasins in the planning area, Warner Lakes, Lake Abert, and Summer Lake, were rated as having low aquatic integrity. Subbasins with low aquatic integrity may support populations of key salmonids or have other important aquatic values (that is, threatened or endangered species, narrow endemics, and introduced or hatchery-supported sport fisheries). In general, however, extensive habitat loss or disruption has strongly fragmented the component watersheds, most notably through disruption of the main stem corridor.

Fish and Aquatic Species

Water bodies associated with public lands provide habitat for a variety of fish species, two of which are federally listed under the Endangered Species Act (ESA, 16 U.S.C. § 1531 et seq.). Introduction of several non-native sport fish has also occurred in the planning area. Except for some small reservoirs in the planning area, the Oregon Department of Fish and Wildlife (ODFW) currently stocks hatchery trout only in Ana River.

Trout Species

No known anadromous salmonids (such as salmon and steelhead that return from saltwater to spawn) reside in the planning area. Redband Trout, a relative of Rainbow Trout, is the only native trout in the planning area (see Special Status Aquatic Species section).

Neither Rainbow nor Brook Trout are native to the Great Basin. Introduction of Brook Trout, which are native east of the Rocky Mountains, occurred in sport fisheries. Brook Trout have competed for limited resources with Redband Trout, but Brook Trout typically occur only on the upper reaches of streams on private and Fremont-Winema National Forest lands, with a few observed in the lower Chewaucan River on BLM-administered lands in the planning area.

Hatchery Rainbow Trout may have come from coastal streams. Stocked Rainbow Trout are less able to survive the high temperatures and low oxygen levels of the local streams. ODFW has discontinued stocking of any type of trout on BLM-administered lands except for Sid Luce, Big Rock, Lucky, Sunstone, Sherlock, Spaulding, Duncan, Priday, and Mud Lake Reservoirs during years with adequate water. Spawning habitat is lacking in most of these reservoirs and natural reproduction does not occur.

Cutthroat Trout were introduced in 1957 and only occur in Guano Creek. The early introductions were from Lahontain stock, but subsequent introductions from other stocks have altered the Lahontain genetic pattern of these fish. Guano Creek is intermittent; that is, it flows only in response to rain or snowmelt. Therefore, the trout are found only during spring runoff and in the longer-lasting pools on the Shirk Ranch. They survive in the perennial reaches of the stream on Hart Mountain Refuge and in Jacobs Reservoir.

Special Status Aquatic Species

There are two categories of BLM special status species: (1) federally threatened, endangered, and/or proposed for listing (candidate) under the ESA, and (2) BLM sensitive species where the species requires special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA (BLM 2008i). Table 3-46 lists special status fish and aquatic species known or suspected to occur in the planning area.

Warner Sucker (Listed Threatened)

Warner Suckers (*Catostomus warnerensis*) are endemic to the Warner Valley and were listed as a Federally threatened species in 1985. There are 43 miles of designated critical habitat in the planning area, including 13.5 miles of designated habitat on BLM-administered lands. The BLM initiated formal consultation with the U.S. Fish and Wildlife Service (FWS) in 1994 (in compliance with section 7 of the ESA) to determine the effects of grazing on pastures that were determined may affect Warner Suckers (Table 3-47). The FWS issued a Biological Opinion in 1997. This resulted in the majority of occupied Warner Sucker stream habitat on BLM-administered lands being excluded from livestock grazing (Table 2-2). The consultation has been amended periodically through annual monitoring reports and letters, as conditions have changed and/or slight modifications to grazing strategies were proposed to reduce the impacts of grazing to Warner Sucker (FWS 1997, as amended 2002).

Where grazing has occurred that is inconsistent with the Biological Opinion, the issue has been documented in the annual monitoring report and corrective action has been taken to remedy the issue. Corrective actions ensure that the issue does not persist and that the effects are consistent with those described in the Biological Opinion and remain in compliance with the consultation. When changes are made to the actions proposed in the original consultation, the consultation process has to be re-initiated.

As needed, biological evaluations and the consultation process occur on all federal actions taken by the BLM in the Warner Lakes Basin south of Bluejoint Lake. Consultations have also been completed on several fence construction projects, non-native invasive species control, road construction, waterhole maintenance, prescribed fire, commercial recreation permits, a wetland management plan, the Ruby Pipeline Project, and a pump station/fish screen project in the Warner Wetlands.

Table 3-46. Special Status Fish and Aquatic Species

	Habitat	Status
Fish		
Warner Sucker (*Catostomus warnerensis*)	Warner Lakes Basin endemic. Addressed in more detail in the following section.	FT
Oregon Great Basin Redband Trout (*Oncorhynchus mykiss*)	In most fish-bearing streams in the Great Basin, including the Goose, Warner, Summer Lake, Chewaucan, Guano, and Silver Lake Basins.	SEN
Foskett Speckled Dace (*Rhinichthys osculus*)	Original population at Foskett Spring was Federally listed in 1985. Second population established at nearby Dace Spring in 2010; Delisted in October 2019. The 2 springs where this species occurs are managed under a recovery plan (FWS 1998) and Cooperative Management Plan (FWS *et al*. 2015) and are excluded from livestock and OHV use. None of the alternative management actions would affect this species. Therefore, it will not be addressed further.	SEN
Hutton Tui Chub (*Gila bicolor*)	Listed as threatened in 1985 and is covered by a recovery plan (FWS 1998). Exists only at Hutton and 3/8 Mile Springs near Alkali Lake; both on private lands surrounded by BLM-administered lands. The landowner has excluded grazing from the spring and has restricted public access in an effort to protect the chub habitat. None of the management alternatives would affect this species. Therefore, it will	FT
Goose Lake Tui Chub *(Siphateles bicolor thalassina)*	Goose Lake Basin endemic. Exists in Drews Reservoir, where BLM administers a few small, scattered parcels. None of the management alternatives would have any effect on the species. Therefore, it will not be addressed further.	SEN
Oregon Lakes Tui Chub (*Siphateles bicolor oregonensis*)	The Oregon Lakes tui chub complex, as originally described by Snyder (1908), consisted of tui chub populations in five isolated basins of south-central Oregon: Silver, Summer, Abert, Alkali, and Warner.	SEN
Sheldon Tui Chub (*Siphateles bicolor eurysoma*)	Occurs in the Guano and Catlow Valleys of northwestern Nevada and southeastern Oregon.	SEN
Modoc Sucker (*Catostomus microps*)	Goose Lake Basin endemic. The species does not occur on BLM administered lands and none of the BLM management alternatives would have any effect on this species. Therefore, it will not be addressed further.	SEN
Goose Lake lamprey (*Entosphenus sp.)*	Goose Lake endemic species; presumably derived from Pacific lamprey or its derivatives from the Klamath River drainage. The species does not occur on BLM administered lands and none of the management alternatives would affect this species. Therefore, it will not be addressed further.	SEN
Pit Roach (*Lavinia symmetricus mitrulus*)	Subspecies of California roach represented by populations in tributary streams of the upper Pit River and Goose Lake Basins of California and Oregon. The species does not occur on BLM administered lands and BLM management has no influence on the species, so it will not be discussed further.	SEN
Pit Sculpin (*Cottus pitensis*)	The only sculpin in the Goose Lake Basin; populations documented in the Upper Pit River outside of the planning area. The species does not occur on BLM administered lands and none of the management alternatives would affect this species. Therefore, it will not be addressed further.	SEN
Goose Lake Sucker (*Catostomus occidentalis lacusanserinus*)	Goose Lake Basin endemic. Exists in Drews Reservoir, where BLM administers a few small, scattered parcels. None of the management alternatives would affect this species. Therefore, it will not be addressed further.	SEN
Amphibians		
Columbia Spotted Frog (*Rana luteiventris*)	Springs, ponds, and riparian areas with deep pools. Documented within the planning area.	SEN
Northern Leopard Frog (*Lithobates pipiens*)	Springs, slow streams, marshes, lakes with rooted aquatic vegetation. Species historical range includes the planning area; however, there are no documented observations, and the species is nearly extirpated from almost all of its historical range in Oregon. For this reason, this species will not be addressed further.	SEN
Reptiles		
Pacific (Western) Pond Turtle (*Actinemys marmorata*)	Permanent and intermittent waters, including marshes, streams, rivers, ponds, and lakes. This species has been documented on other ownerships in the planning area.	SEN
Invertebrates		
Crooked Creek Springsnail (*Pyrgulopsis intermedia*)	Springs and spring-influenced creeks with moderately swift water and gravel-boulder substrate. Documented in Lake Abert.	SEN
Great Basin Ramshorn (*Helisoma carinifex newberryi*)	Lakes, slow rivers, spring-fed creeks. Burrows in soft mud; Confined to the periphery of the Great Basin. Documented in several springs and lakes scattered	SEN

	Habitat	Status
Modoc Pebblesnail (*Fluminicola modoci*)	Springs and coldwater streams with high dissolved oxygen. Species is suspected in the planning area; however, there are no documented observations.	SEN
Jackson Lake Springsnail (*Pygulopsis robusta*)	Lakes, spring-influenced small streams. Species is suspected in the planning area; however, there are no documented observations.	SEN
Topaz Juga (*Juga acutifilosa*)	Cold to cool, clear, well-oxygenated water of streams or springs with high water quality and low nutrient levels; soft or hard substrate; documented on Lakeview	SEN
Western Ridged Mussel (*Gonidea angulata*)	Benthos of streams, rivers and lakes with substrates that vary from gravel to firm mud, and include at least some sand, silt, or clay. Associated with constant flow, shallow water (<3 m in depth), and well oxygenated substrates. Species is suspected in the planning area; however, there are no documented observations.	SEN

[1]In an agreement between the BLM and the Oregon Biodiversity Information Center (ORBIC), ORBIC maintains a database on Oregon's rare, threatened, and endangered plants, animals, and ecosystems. Inclusion of any given taxon on these lists is contingent on specific criteria: the most important factors are the total number of known, extant populations in Oregon and worldwide and the degree to which they are potentially or actively threatened with destruction. Other criteria include the number of known populations considered securely protected, size of various populations, and the ability of the taxon to persist at a known site. Amendment of these lists occur every other year as inventory/monitoring provides new information (ORBIC 2016).

[2]Data for all of the special status species in the planning area is located on the Interagency Special Status /Sensitive Species Program (ISSSSP) website (https://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/).

Table 3-47. Allotments and Pastures under Consultation for Effects to Warner Suckers

Allotment	Pasture (Stream)
Fish Creek (00519)	Deppy (Honey and Twelvemile Creeks)
Hickey Individual (00202)	Parsnip Seeding; Camas Riparian (Parsnip and Camas Creeks)
Lane Plan I (00207)	Juniper Lake (Twentymile Creek)
Lane Plan II (00206)	Parsnip Riparian; Thompson (Parsnip and Drake Creeks)
Rahilly/Gravelly (00212)	Horse Creek (Twelvemile and Horse Creeks)
Round Mountain (00211)	North; West (Twentymile, Twelvemile, and Fifteenmile Creeks)
Sagehen (00208)	Riparian (Deep and Camas Creeks)
Vinyard (00201)	Sq__ Flat; Seeding (Deep Creek)

Source: BLM fisheries files.

In 1998, a recovery plan for the Warner Sucker was approved (FWS 1998). It included descriptions, life histories, distribution, reasons for decline, current conservation efforts, and recovery strategy of the species. Most importantly, it lists the actions necessary to remove the species from the endangered species list. Many of the needed actions required to remove the species from listing, such as screening and providing passage over irrigation diversions, occur on private lands, and are beyond the scope of this plan. The BLM has worked on determining the population status of the species to establish the self-sustaining meta-population requirements of the plan. BLM has also worked to identify existing habitats, assess their quality, and improve habitats by managing and excluding livestock, and working to facilitate addressing fish passage and screening issues in the basin.

Redband Trout (Sensitive)

Redband Trout occur in mid- to high-elevation streams that do not have outlets to the ocean. These trout occur in nearly all perennial streams (consisting of approximately 60 miles on BLM-administered land) of the Warner Lakes, Goose, Lake Abert, and Summer Lake subbasins. These subbasins make up four of six separate desert basin populations of interior native Redband Trout (Behnke 1992).

Redband Trout are generally more tolerant of higher temperatures than are planted Rainbow Trout. The introduction of hatchery-raised Rainbow Trout as early as 1925 may have altered many of the unique characteristics of the native Redband Trout. Neither the extent of the loss of genetic purity, nor the locations of the most pure strains of Redband Trout are known. In September 1997, a petition was filed

to list the Great Basin Redband Trout as threatened. This petition included the four sub-populations in the planning area. After considering all available information and analyzing public comment, the USFWS determined that listing the species was not warranted (FWS 2000). BLM currently considers this to be a sensitive species.

Other Sensitive Fish Species

Other BLM sensitive fish species include, due to limited habitat and range, the Sheldon Tui Chub (*Siphateles bicolor eurysoma*) in the Guano Basin and Oregon Lakes Tui Chub (*Siphateles bicolor oregonensis*) in the Chewaucan Basin.

Other Sensitive Aquatic Species

One special status reptile, the Western Pond Turtle, one special status amphibian, the Columbia Spotted Frog, and several invertebrate species are BLM sensitive species that are known to occupy suitable habitat within the planning area (Table 3-46).

Western Pond Turtle

Although Western Pond Turtles (*Actinemys marmorata*) are considered aquatic, they nest on land and may overwinter either on land or buried in the substrate of a waterbody. This turtle is a BLM sensitive species that is currently under consideration for Federal listing (candidate species). The planning area falls on the far eastern edge of western pond turtle range. The species has been documented (Crooked Creek and Lakeview Township) within the planning area, but in low numbers. Detectability by visual encounter has been low. Little is known about turtles this far east of the Cascade Range. It is uncertain whether the few turtles that have been observed in the planning area are remnant individuals of a historic Great Basin population (Bury 2017) or are illegal transplants from other parts of the species' range. A genetic sample was taken of an individual found in the Warner Mountains in 2019, but results are pending and only represent one individual. It is also unknown whether the species is successfully reproducing in Lake County. Isolated inclusions of BLM-administered land surrounded by the Fremont National Forest and/or private lands or water bodies at the forest fringe are the most likely areas to be occupied by pond turtles.

Columbia Spotted Frog

This frog (*Rana luteiventris*) is a BLM Sensitive species and is known to occur in four locations (Upper Deep Creek and Parsnip Creek) on BLM-administered lands in the Warner Lakes Basin. This species is suspected to occur in other suitable locations but has not been confirmed.

Invertebrates

Crooked Creek Spring Snails (*Pyrogulopsis intermedia*) have been documented in Lake Abert. Other spring snails and freshwater molluscs including the Great Basin Ramshorn (*Helisoma newberryi*) and the Topaz Juga (*Juga acutifilosa*), have been documented in several springs, streams, and lakes scattered around the planning area. Springsnails tend to be endemic to the spring in which they occur and some distinct spring snail species have been documented (such as XL and Abert), but other specimens have yet to be identified as unique. The sensitive species Modoc Pebblesnail (*Fluminicola modoci*), Jackson Lake

Spring snail (*Pygulopsis robusta*), and Western Ridge Mussel (*Gonidea angulata*), could occur within the Lakeview Field Office but have not been documented to date.

Other Fish Species

The ODFW no longer routinely stocks warm-water fish species, but Largemouth Bass, Black Crappie, White Crappie, and Brown Bullhead have become established from previous introductions in the Warner Lakes and some smaller reservoirs scattered across the planning area.

Environmental Effects

Analysis Assumptions

- Healthy and sustainable fish, and other aquatic amphibian, reptile, and invertebrate populations are supported when there is a healthy aquatic and associated native riparian plant community present. Riparian areas are important natural filters that protect aquatic environments from excessive erosion and polluted surface runoff. Riparian vegetation also provides shade to waterways, which helps moderate water temperature.
- Management actions that adversely affect riparian vegetation have the potential to affect water quality and aquatic/fishery resources through the alteration of stream temperature, streambank stability, sedimentation, stream channel dimensions, and insect availability. Management actions that involve ground-disturbing activities within or near riparian areas have the most potential to negatively affect fish and other aquatic amphibian, reptile, and invertebrate habitat through the process of sediment disturbance, transport, and delivery into waterbodies.
- Disturbance to a species or its habitat can affect a species' use of an area.
- Based on professional judgment and past, local experience, redband trout are assumed present in all fish-bearing streams, unless available information or data determines or states otherwise.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Under this alternative, the BLM could continue to implement management actions that maintain or restore fish/aquatic/riparian habitats, provided such actions would not be deemed by the BLM to diminish the size or cause the entire inventory unit to no longer meet the criteria for wilderness characteristics. Continuing existing riparian/fish/aquatic habitat management would maintain or improve fish/aquatic habitat conditions across the majority of the planning area, including special status aquatic species habitat (BLM 2003a, pages 4-48, 4-53 to 4-55).

Management actions that cause ground disturbance within or near fish/aquatic/riparian habitats would continue to have the most potential to negatively affect fish/aquatic species and habitats through soil disturbance, transport, and sediment delivery into waterbodies (Mebane 2001). However, these potential effects would be reduced by implementing appropriate BMPs (see Appendix 7).

The BLM would continue to actively manage impaired riparian areas, juniper encroached riparian areas, stream channels, wetlands, etc., to allow treated areas to return to a relatively natural condition over time.

However, modifying project proposals to ensure that they do not diminish the size or cause an entire inventory unit to no longer meet the criteria for wilderness characteristics could reduce the overall effectiveness of some of the fish/aquatic/riparian habitat restoration measures utilized within wilderness characteristics units.

OHV and Travel Management Impacts

Under this alternative, about 49 miles (75.2%) of perennial stream/aquatic habitats in the planning area would fall within the OHV Limited or Closed (portion of Buck Creek) area designations and would not be subject to potential negative effects of OHV use. Under this alternative, approximately 16.3 miles (24.8%) of perennial stream/riparian areas are currently located within OHV Open area designations and would continue to be subject to cross-country motorized vehicle use and potential associated negative impacts to fish/aquatic/riparian habitats and associated species, including special status species. While off-road vehicle use could cause ground disturbance and potentially cause negative impacts to riparian and stream habitats from erosion and sedimentation, the BLM has not documented any such habitats being negatively impacted by high concentrations of off-road motorized vehicle use anywhere in the planning area during PFC and rangeland health assessments conducted to date.

Under this alternative, most of the designated critical habitat and occupied habitat for Warner suckers on public lands within the planning area fall within the OHV Limited area designation. While a few small areas of designated critical/occupied habitat fall within OHV Open areas, there are very few roads and steep, rocky terrain that limits motorized access in these areas. For these reasons, current OHV use has little or no effects on Warner Suckers or its habitat.

In addition, should the BLM identify areas in the future where existing roads are causing negative effects to aquatic stream habitats, the route would be removed or relocated (BLM 2003b, pages 31-32, 44, 98-99, as maintained; see BLM 2013ac, 2017f).

Livestock Grazing Management Impacts

The effects of existing livestock grazing management on fish/aquatic/riparian habitats and associated species, including special status aquatic species, would generally be the same as those described for riparian areas in the *Environmental Effects – Riparian and Wetland Vegetation Communities* section. Active riparian grazing management on nearly all perennial and many intermittent streams (Table 3-21) in the planning area has resulted in improved fish/aquatic/riparian habitat conditions over the last 25 years. These habitat trends would likely continue over the long-term under this alternative.

Approximately 39% of the riparian/wetland acres in the planning area would continue to be excluded from, or unallotted to, livestock grazing use (Tables 2-2, 3-25). Key perennial and palatable woody vegetation (sedges, rushes, and willows) would be maintained or improved in these areas and would continue to provide shade/reduced stream temperatures. Most existing exclosures in the planning area (>90%) have been successful in preventing grazing use, but occasionally livestock still find their way into an exclosure and grazing occurs.

Consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act for Warner Suckers has resulted in the BLM constructing additional exclosure fencing in Warner Sucker habitat and conducting annual monitoring to locate and remove unauthorized grazing use. These actions

have made most of the exclosures in the Warner Lakes Basin more effective in preventing livestock grazing use in occupied and designated critical Warner Sucker habitats.

Rest rotation and winter grazing systems would also maintain or improve the composition of the key perennial species on about 57% of grazed riparian/wetland communities and would continue to benefit habitat for fish/aquatic/riparian species in these areas. See the *Environmental Effects – Riparian and Wetland Vegetation Communities* section for additional discussion.

Summary

Monitoring, stream survey data, photo monitoring (all on file at Lakeview BLM), PFC assessments (Tables 3-19 and 3-20), and field reconnaissance generally indicate improving trends in fish habitat throughout the planning area. Photos points established in the 1970s–1990s, and retaken from 2005-present, show increases in native riparian vegetation, including willows, sedges, and rushes, as well as stream channel narrowing and deepening and increases in streambank stability. Recent monitoring data (2010-present) demonstrates that the management direction in the *Lakeview RMP/ROD* (BLM 2003b), including current livestock grazing management, would continue to maintain, improve, or protect fish/aquatic/riparian habitat conditions.

Overall, the No Action Alternative would maintain existing fish/aquatic/riparian habitats and move or restore degraded habitat toward desired future conditions at the most rapid rate of all the alternatives, with the exception of Alternatives A and D.

Impacts of Alternative A

Wilderness Characteristics Management Impacts

Alternative A would maintain or improve fish/aquatic/riparian habitat conditions for associated fish and aquatic amphibians, reptiles, and invertebrate species, including special status species, across the majority of the planning area (BLM 2003a, pages 4-48, 4-53 to 4-55). Alternative A would have the fewest restrictions to surface disturbing activities and the highest potential to for negative impacts to water quality and associated fish/aquatic/riparian habitat conditions out of all the alternatives. However, these potential negative effects would be offset by the BLM being better able to implement management actions that maintain or restore fish/aquatic/riparian habitats (impaired riparian areas, juniper encroached riparian areas, impaired stream channels, wetlands, etc.), including special status species habitats, without needing to modify restoration project designs to prevent loss of wilderness characteristics. This alternative could accommodate the highest amount of active fish/aquatic/riparian habitat restoration actions compared to Alternatives B, No Action, C, E, and D, respectively. This would allow those areas to return to a relatively natural or desired ecological condition at a slightly faster rate compared to the No Action Alternative. Fish/aquatic/riparian habitat conditions would be maintained or improved over the long-term, as evidenced by the conditions BLM has documented through stream/riparian monitoring from 2003-2010 (prior to management under the Settlement Agreement).

OHV and Livestock Grazing Management Impacts

Under this alternative the effects of off-road vehicle and livestock grazing use on fish/aquatic/riparian habitats and associated fish and aquatic amphibians, reptiles, and invertebrate species, including special status aquatic species, would be the same as the No Action Alternative.

Summary

Overall, Alternative A would have similar effects to fish/aquatic/riparian habitats as Alternative D and would maintain existing fish/aquatic/riparian habitats and allow for the restoration of degraded habitats at the most rapid rate of all the alternatives.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Under Alternative B, over 40% of the perennial stream habitat in the planning area that provides habitat for fish and other aquatic species would be located within Category C units and new Section 202 WSAs (no fish-bearing aquatic habitat occurs within existing WSAs). The additional restrictions on ground disturbing management activities in the proximity of fish/aquatic/riparian habitats within Category C units and new Section 202 WSAs would maintain or benefit these habitats, and the associated fish and aquatic amphibians, reptiles, and invertebrate species, including special status aquatic species, where they are currently in desired condition.

In areas where fish/aquatic/riparian habitats are not currently in desired condition, managing to protect Category C units and new Section 202 WSAs could hinder BLM's ability to actively restore some of these habitats or continue fish stocking activities within some Category C units or new Section 202 WSAs. Though BLM would retain administrative access to the 2.1 million acres of OHV Closed areas within the planning area, this access would deteriorate over time as some closed routes become impassable (due to lack of maintenance or use, erosion, and revegetation). This would limit BLM's ability to actively access and treat or stabilize some impaired (juniper or weed encroached) riparian areas and stream channels over the long-term.

While passive restoration could eventually restore some stream channels to a stable condition, it would take decades, and based on past, local experience, would not likely restore stable stream conditions within the lifetime of the plan amendment. Untreated weed infestations would continue to spread throughout riparian and wetland areas, replacing native vegetation. Untreated juniper would continue to increase in riparian areas and mechanical stream bank stabilization would be restricted. This could result in fish/aquatic/riparian habitat conditions moving further from their natural state (desired condition). For these reasons, untreated areas would likely remain in a degraded condition over the long-term.

OHV and Livestock Grazing Management Impacts

Under this alternative, an additional 3.4 miles of perennial stream/aquatic/riparian habitats in the planning area would fall within the OHV Closed area designation (52.4 miles total in OHV Limited or Closed area designations; 80.4%) and would not be subject to potential negative effects (erosion and sedimentation) of

OHV use. Approximately 12.9 miles (19.6%) of perennial stream/riparian areas would remain within OHV Open area designations under this alternative and could be subject to cross-country motorized vehicle use and associated potential impacts to fish and aquatic species similar to those described for Open areas under the No Action Alternative. However, these potential effects would occur on fewer total stream miles.

Under this alternative, most of the critical/occupied habitat for Warner suckers on public lands in the planning area would fall within the OHV Limited or Closed area designations. While a few small areas of critical/occupied habitat would fall within OHV Open areas, very few roads or other motorized access occurs in these areas. For these reasons, OHV use management under this alternative would have little or no effects on Warner Suckers or its habitat, similar to the No Action Alternative.

However, should the BLM identify areas in the future where existing roads are causing negative effects to fish/aquatic/riparian habitat, the route would be removed or relocated (BLM 2003b, pages 31-32, 44, 98-99, as maintained) similar to the No Action Alternative.

While this alternative has the potential to remove or reduce livestock grazing on a substantial portion of the planning area, it would not result in substantial benefits to perennial stream/riparian habitats because most of these areas are already excluded from livestock grazing under current management (Tables 2-2, 3-39).

Reductions in OHV and grazing use under Alternative B would likely result in some limited benefits to water quality which could benefit fish/aquatic habitats and riparian zones around lakes and reservoirs. However, naturally varying water levels due to precipitation and climatic factors and lack of suitable spawning habitats would continue to be the primary factors limiting self-sustaining fish and aquatic species habitats and populations in the planning area rather than livestock grazing or OHV use (see *Cumulative Effects Common to All Alternatives* section).

Summary

Overall, Alternative B would generally result in a mix of beneficial and negative effects on perennial fish and aquatic habitats across portions of the planning area. While it would provide a higher level of protections to some (approximately 40%) of these habitats, it would negatively impact BLM's ability to actively manage degraded fish/aquatic habitats and would allow habitat conditions to deteriorate further over the long-term, at the most rapid rate of all the alternatives.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Alternative C would maintain or improve fish/aquatic/riparian habitat conditions, including habitats for special status aquatic species, across most of the planning area. About 15% of the perennial stream habitat in the planning area that provides habitat for fish and other aquatic species would be managed as Category C units. Fish and aquatic habitats in these units that are in relatively good ecological health (*i.e.* little to no erosion, native vegetation intact, lack of weed infestations, etc.) would largely remain in the

same condition or improve in condition in the absence of large-scale natural disturbance over the long-term.

Alternative C would provide adequate administrative access to allow the BLM to actively manage the majority of the impaired stream channels, weed infestations, juniper encroached areas, unstable areas in riparian areas, etc., inside Category C and B units which would allow treated areas to return to a relatively natural condition over time. This would benefit fish/aquatic/riparian habitat conditions in these areas but could be more difficult or expensive to implement if BMPs (see Appendix 7) are applied. In Category A units and the remainder of the planning area, fish/aquatic/riparian habitat conditions would be maintained or improved similar to Alternative A, as evidenced by the conditions the BLM has documented through monitoring from 2003-2010 (prior to the Settlement Agreement).

OHV and Travel Management Impacts

Under this alternative there would be no miles (0%) of perennial stream/riparian habitats and no lake habitats (0%) located within OHV Open area designations. All fish/aquatic/riparian habitat on public lands in the planning area, including critical/occupied habitat for Warner suckers and other special status aquatic species habitat, would fall within the OHV Limited area designation. In addition, should the BLM identify specific roads in the future that are causing negative effects to stream/riparian areas, the route would be removed or relocated (BLM 2003b, pages 31-32, 44, 98-99, as maintained) similar to the No Action Alternative. For these reasons, motorized vehicle use would have little or no potential negative effects on fish/aquatic/riparian habitats or associated species, including special status aquatic species.

Livestock Grazing Management Impacts

While this alternative has the potential to temporarily remove or reduce livestock grazing within stream, riparian, and lakeshore areas, it would not result in substantial benefits to perennial stream/aquatic/riparian habitats because most of these areas are already excluded from livestock grazing under current management (Tables 2-2, 3-39). The effects of temporarily removing cattle grazing from the some of the remaining stream/aquatic/riparian areas in the planning area would be similar to those described for Alternative B. However, fewer acres would potentially be impacted for a shorter period of time. Overall, the potential benefits of reducing grazing use on fish/aquatic/riparian habitats within lakes and reservoirs would be similar, but not as extensive, as those described for Alternative B.

Summary

Overall, the types of effects associated with Category C wilderness characteristics management on fish/aquatic species and their habitat, including special status species, would be similar to those described for Alternative B, but would occur on fewer total acres of habitat. The effects to fish/aquatic habitat associated with Category B and A unit management would be similar to those described for Alternative A. The effects of livestock grazing management on fish/aquatic species and their habitat, including special status species, would be similar to those described for Alternative B, but occur on fewer total acres. The effects of OHV and travel management on fish/aquatic species and their habitat, including special status species, would be similar to the No Action Alternative.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Since the 2 units that would be managed as Category C under this alternative are small (less than 2% of the planning area) and contain no perennial fish/aquatic/riparian habitat, Alternative D would generally have the same effects on fish and other aquatic species, including special status aquatic species, as those described for Alternative A. Fish/aquatic/riparian habitat restoration or enhancement could occur in Category B units but would be more difficult or expensive to implement if BMPs (see Appendix 7) are applied. Fish/aquatic/riparian habitat conditions would be maintained or improved in Category A units and the remainder of the planning area similar to Alternative A.

OHV and Travel Management Impacts

Under this alternative, all (100%) perennial stream/aquatic habitat on public lands in the planning area would fall in the OHV Limited or Closed (portion of Buck Creek and Foskett Dace habitat) area designations. All critical/occupied habitat for Warner suckers would also fall within the OHV Limited area designation. In addition, should the BLM identify specific roads in the future that are causing negative effects to stream/riparian areas, the route would be removed or relocated (BLM 2003b, pages 31-32, 44, 98-99, as maintained). For these reasons, motorized vehicle use under this alternative would have little or no potential negative effects on fish/aquatic/riparian habitats and associated species, including special status aquatic species, similar to Alternative C.

Livestock Grazing Management Impacts

The effects of livestock grazing management on fish/aquatic/riparian habitats, including special status aquatic species, would be the same as the No Action Alternative and Alternative A.

Summary

Overall, the effects of wilderness characteristics and livestock grazing management on fish/aquatic/riparian species and their habitats, including special status species, would be similar to the No Action Alternative. The effects of OHV and travel management on fish/aquatic/riparian species and their habitats, including special status species, would be similar to Alternative C.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Alternative E would have similar effects on fish/aquatic/riparian habitats and associated species, including special status aquatic species, as those described for Alternative C. While no occupied perennial fish habitat would be managed as Category C units under this alternative, habitats for other aquatic species within Category C units that are in relatively good ecological health (*e.g.* little to no erosion, native vegetation intact, lack of weed infestations, etc.) would largely remain in the same condition or improve over time in the absence of disturbance.

Under this alternative the BLM could actively manage the majority of impaired stream channels, weed infestations, juniper encroached areas, unstable riparian areas, etc., including those within Category C and B units, which would allow treated areas to return to a relatively natural condition over time. This would benefit fish/aquatic/riparian habitat conditions in these areas but could be more difficult or expensive to implement if BMPs (see Appendix 7) are applied. Across the remainder of the planning area fish/aquatic/riparian habitat conditions would be maintained or improved similar to the No Action Alternative, as evidenced by the conditions the BLM has documented through monitoring between2003-2010 (prior to the Settlement Agreement).

OHV and Livestock Grazing Management Impacts

Under this alternative, the effects of OHV and livestock grazing management on fish/aquatic/riparian habitats, and associated species, including special status aquatic species, would be the same as the No Action Alternative and Alternative A.

Summary

Overall, Alternative E would maintain or move fish/aquatic/riparian habitat conditions in the planning area towards desired conditions at a similar rate as Alternative C.

Cumulative Impacts Common to All Alternatives

Climate Change

Self-sustaining fish and other aquatic species populations generally do not occur in most lakes and reservoirs in the planning area (with the exception of some of the Warner Lakes) due to lack of perennial water and/or suitable spawning habitat. Fish exist in most reservoirs and lakes primarily due to artificial stocking of game species by ODFW during years when water conditions allow. Water availability is determined primarily by annual variations in precipitation and climate. None of the alternatives analyzed would have any measurable effects on perennial lake or reservoir water availability in the planning area or subsequent effects on fish and aquatic habitats.

If warmer climate change trends in the western United States continue, stream temperatures could increase, summer low flows could decline, and winter floods could occur more often in places where snowmelt is the main source of water (Luce and Holden 2009). Some of these changes could be subtle, others more noticeable, and they could shift distributions of fishes (Regonda *et al.* 2005; Stewart *et al.* 2005; Rieman *et al.* 2007) and other aquatic species.

Too little flow in streams could result in a reduction in aquatic/riparian habitat quantity, quality, and connectivity, and too much flow could scour or sweep aquatic organisms downstream. Changes in the timing of runoff could be important too. Increases in low flow conditions, particularly in the driest years, would reduce the volume of deep pools and aquatic habitat, but could also result in reduced velocities and water surface area which could change the delivery of food from upstream sources (Harvey *et al.* 2006). Decreases in low flows could also cause some sections of stream to dry up and become impassible to migrating fish (Reiman and McIntyre 1996).

Higher flood flows and debris flow-related flood events could have complex effects, depending on the timing and frequency. High stream flows scour reeds (sweep newly emerging fry downstream) when they occur at the right time of year (Fausch *et al.* 2001; Meyers *et al.* 2010; Montgomery *et al.* 1996). Fall-spawning fish could be more vulnerable as peak flows shift from spring to winter months in historically snowmelt dominated basins, because their eggs could still be in the gravel, or their fry inadequately prepared for high flows when they occur (Wenger *et al.* 2011a). Debris flows have a much more limited footprint in stream ecosystems, but they typically remove all aquatic organisms from a given reach of stream, requiring recolonization. The speed with which affected reaches are recolonized would depend on the proximity of unaffected populations and the presence and abundance of migratory individuals.

Aquatic biota interacts with stream temperature in many ways. Cold-blooded animals like fish have metabolisms that are regulated by the ambient temperature (Portner and Farrell 2008). Under warmer temperatures their metabolism would run faster, and they would need more energy (food) to survive. Less of the food they consume would go into growth and they could sexually mature earlier (Dunham *et al.* 2003; Portner and Farrell 2008). If winter and spring temperatures increase earlier in the year, eggs would incubate more rapidly, and young fish could emerge from the gravel earlier in the year. Changes in emergence timing and in growth could affect the development (or non-development) of migratory individuals from a given rearing population. Different fishes have different physiological adaptations to specific thermal regimes, and different species have tolerances for different temperature ranges, which is reflected in the spatial and elevation distributions of fishes (Wenger *et al.* 2011a).

The ecological consequences of these physiological responses could be the outright loss of habitat suitability in stream reaches that become too warm or increased susceptibility to displacement of cold-adapted fish by relatively warm-adapted fish in stream locations where overlap occurs. For example, cutthroat trout are often displaced from entire streams by encroaching brook trout, rainbow trout, and brown trout (Wenger *et al.* 2011a). Stream warming could shrink the extent of habitat patches for cold-water fish of conservation concern and thereby increase the isolation of populations by pushing them farther into headwater streams (Reiman *et al.* 2007; Wenger *et al.* 2011b). At the same time, decreases in low flows and increased debris flood responses in steep tributaries could shrink habitats from above, restricting some fish populations and increasing the potential for debris flow disturbances. If decreases in low flows and temperature-related growth and productivity changes also decrease the number of migratory fish from these areas, populations could become increasingly vulnerable to individual fire or flood events.

Thermal tolerances could help explain the broad patterns for species occurrences and persistence, and there are predictable patterns in species geographic ranges and longitudinal distributions within riverine networks and along thermal gradients tied to latitude and elevation (Paul and Post 2001). Stream temperatures that commonly exceed the physiological thresholds or lethal limits of salmonids would represent relatively hard limits to species occurrence and distribution. However, variations in life histories and behaviors could mitigate these hard constraints. Salmonid populations that occur near, or more frequently encounter their thermal limits, would be more likely to respond negatively to a warming climate. Chronic warming could lead to increased mortalities and shifting habitat distributions or range limits upstream to cooler water refugia (Reiman *et al.* 2007). One study confirmed that shifts in thermal habitats were occurring, but also found that effects on species could differ dramatically within the same river network (Isaak *et al.* 2010, Isaak *et al.* 2012). For this reason, thermal tolerances may be imprecise predictors of species occurrences or abundances at finer spatial scales.

For native salmonids in the western U.S. the loss of habitat from changes to stream temperature and stream flow often combine with invasions by non-native species which further restrict native salmonid species to fragments of their former range of habitats (Fausch *et al.* 2009; Stewart *et al.* 2005). Research has shown that persistence of native species in these isolated habitats is sensitive to fragment size which influences the size and genetic integrity of a population (Reiman and McIntyre 1995). Fragment size also influences the risk to native salmonids of extirpation from climate driven stochastic events such as increased wildfires and debris flows (Dillon *et al.* 2011; Dunham *et al.* 2003; Kennedy *et al.* 2009; Reiman and McIntyre 1995) and channel dewatering and drying (Jenkins and Keeley 2010). Thus, fragmentation of native salmonid habitats and populations could place many salmonid species at risk from climate change (Williams *et al.* 2009). Habitat fragment lengths are an important variable that could interact with the increased environmental variability coinciding with climate change to influence future native salmonid persistence in the western United States (Kennedy *et al.* 2009; Roberts *et al.* 2013). Short stream habitat fragments reduce the potential fish population size by restricting available habitat, thus placing populations at risk from inbreeding and genetic drift (Young *et al.* 2005). The reduction of available habitat could also decrease the amount of refugia habitat which would increase the susceptibility of a population to hazards from stochastic events such as wildfire, debris flows, or stream drying (Roberts *et al.* 2013). For example, populations of endangered Gila trout (*Oncorhynchus gilae*) occurring in fragmented stream habitats (0.4-6.1 km) have been extirpated during and after wildfires with the remaining populations at risk from stochastic events (Brown *et al.* 2001). Short stream fragments increase the risk of extirpation from stochastic events because they often lack refugia habitat found in larger stream fragments (Reiman and Clayton 1997).

The impacts described above could occur under either a warmer/drier or warmer/wetter future climate scenario, although the impacts of reduced summer low flows could be partially ameliorated by the warmer/wetter scenario, particularly with the potential for increased summer precipitation.

Reasonably Foreseeable Future Actions

Most of the RFAs listed in Table 3-1 could have additive, incremental negative cumulative effects to vegetation, soils, hydrology, and water quality at the watershed scale (see *Vegetation, Soil,* and *Watershed and Water Quality – Cumulative Effects* sections), but these would not likely have any associated additive, incremental, negative cumulative effects on fish or aquatic resources on BLM-administered lands in the planning area because appropriate BMPs (see Appendix 7) would be applied to these activities to reduce potential fish and aquatic habitat impacts.

However, future riparian and wetland habitat restoration and maintenance projects could occur on an estimated 3,100-5,500 acres annually under all alternatives (Tables 3-1 and 3-25) that would have additive, incremental cumulative benefits to fish and aquatic habitat/species because these areas also provide important fish and aquatic habitat.

Wildlife and Wildlife Habitat

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect priority wildlife, including special status wildlife species, and associated wildlife habitats in the planning area?*

Affected Environment

Wildlife habitats consist of the major plant communities and terrestrial features that are important to wildlife for parts or all of their life cycle. The BLM is responsible for the management of a wide array of habitats (food, water, and cover) used by both native and introduced wildlife species. The Oregon Department of Fish and Wildlife (ODFW) is responsible for managing animal populations not otherwise designated to Federal agencies. An effective wildlife management program must consider both animal populations and their habitats. The BLM cooperates with the ODFW in meeting its wildlife management population objectives and protecting population health. The BLM's role in wildlife management is directed toward the maintenance or improvement of habitat quality and quantity under its multiple use management mandate. Past changes to important plant communities (see *Vegetation* section), many of them caused by humans (e.g. agriculture, livestock grazing, wildfire rehabilitation, road construction and other facilities), as well as natural causes (e.g. wildfire, weed invasion, juniper encroachment) have resulted in alterations to the wildlife habitat in the planning area. The amount and distribution of habitat, including connectivity between habitat patches, influences the types of wildlife that can thrive in an area. Management to maintain or enhance intact, contiguous habitat promotes wildlife habitat quality on a landscape scale. The Priority Wildlife Connectivity Areas (PWCAs), recently published by ODFW, represent the parts of the landscape with the highest overall value for facilitating wildlife movement (ODFW 2023).

Sagebrush Steppe Habitat

There are several types of sagebrush steppe habitats in the planning area. These communities occupy over 2 million acres (63%) of the planning area. Shrub steppe communities are diverse and include lower elevation greasewood, basin big sagebrush, and silver sagebrush communities surrounding playas and lakebeds. Wyoming and mountain big sagebrush sites are located at middle to high elevations; low sagebrush is primarily in scab flats with shallow soil, while Ponderosa pine/antelope bitterbrush/mountain mahogany sites are located on the forest fringe and serve as important big game winter habitat.

Sagebrush steppe communities are important to numerous species of wildlife, including but not limited to sagebrush obligate song and upland game birds, big game mammals, pygmy rabbits, and small mammals that serve as a prey source for raptors and larger mammals.

However, juniper encroachment into shrub steppe communities is causing a shift in many areas from steppe habitat to closed juniper stands, causing the eventual loss of the shrub/grass understory components. Encroachment has occurred primarily because of changes in fire regimes, climate, and land use changes since European settlement (Miller and Rose 1995). Shrub steppe communities containing Phase I western juniper, where shrubs still dominate ecological processes, (Miller *et al*. 2005) is largely inhabited by typical sagebrush steppe fauna. Although these areas still provide habitat for sagebrush obligate birds and mammals, research has shown these areas have reduced suitability for Greater Sage-Grouse. A juniper canopy cover of as little as 3% has a negative impact on Greater Sage-Grouse nesting probability (Severson *et al*. 2016). Sage-Grouse female survival and nest success are also lower in sagebrush areas where juniper has encroached (Severson *et al*. 2017).

Wildlife species richness (total number of species) tends to be greatest in shrub steppe with Phase II juniper (shrubs and trees equally influence ecological processes; Miller *et al*. 2005) because the structural complexity of the habitat is at its highest. The higher structural complexity results from both the trees and

the understory (shrubs/grasses) remaining intact. Forage is still available for large herbivores, while trees provide a windbreak and thermal refugia from heat. Phase II juniper also provides winter habitat for birds such as American Robins (*Turdus migratorius*) and Townsend's Solitaires (*Myadestes townsendi*) because juniper berries (female cones) make up a large portion of their diet. Additionally, twice as many rodent species inhabit thinned juniper stands where food and cover for small mammals remains (Elmore 1984 as cited in Miller *et al*. 2005). Rodents, in turn, serve as prey for many raptors, snakes, and medium sized mammals.

Dense, closed canopy juniper stands (Phase III) generally result in a greatly reduced shrub and herbaceous understory, therefore no longer providing adequate wildlife forage and structure at various levels. Although it varies among sites (soils, aspect, elevation, etc.), as juniper cover increases, sagebrush cover decreases (Miller *et al*. 2000). In mountain big sagebrush communities, herbaceous cover and herbaceous species diversity also declined with increasing juniper cover (Miller *et al.* 2000). Phase III juniper is not the same as old growth (described below) and typically occurs on sites that were historically exposed to fire.

Old-growth juniper stands (low productive sites and rocky areas safe from fire); in contrast to phase III stands, provide an important wildlife habitat component. Although cone (berry) production declines in old-growth juniper stands, these stands provide habitat for cavity nesting birds. Density of cavity nesting birds is approximately 20% higher than in phase I or II juniper areas (Reinkensmeyer 2000 as cited in Miller *et al*. 2005). Examples of cavity nesting bird species that utilize old-growth juniper include American kestrel (*Falco sparverius*), Ash-Throated Flycatcher (*Myiarchus cinerascens*), Mountain Bluebird (*Sialia currucoides*), Western Bluebird (*S. Mexicana*), Mountain Chickadee (*Parus gambeli*), Juniper Titmouse (*Parus inornatus ridgwayi*), and Northern Flicker (*Colaptes auratus*). Although shrub and ground nesting birds are absent in old-growth stands, increased species richness of cavity nesters maintains a relatively high avian diversity. Bushy-tailed woodrats (*Neotoma cenerea*) and dusky-footed woodrats (*N. fuscipes*) are relatively common in old-growth juniper stands, but overall rodent diversity is lower than in a phase II area.

Since 2003, strategically placed removal and/or thinning of post-settlement juniper has occurred in shrub steppe to enhance or maintain the health of vegetation communities that are important to sustain viable sagebrush obligate wildlife species/populations. Juniper removal treatments are designed to benefit both mule deer winter range and sagebrush obligate species through careful consideration of landscape location, spatial distribution, and density of trees retained on the landscape. Juniper removal projects have most recently occurred in the South Warner Range and Clover Flat area (west of Highway 31 and south of Tucker Hill). Removal of some juniper has also occurred in the northern part of the planning area.

Wildfires have converted portions of shrub steppe to native grasslands in various stages of recovery or restoration, or invasive annual grasslands, while other areas were seeded to crested wheatgrass. Between 2003 and 2018, approximately 41,320 acres of shrub steppe have burned on BLM-administered land in the planning area.

Ponderosa Pine/Mixed Conifer Habitat

Although covering a rather small proportion of the planning area relative to sagebrush steppe, ponderosa pine and mixed conifer forests provide habitat for a different suite of wildlife species. This forest vegetation community supports species including, but not limited to black bears (*Ursus americanus*),

porcupines (*Erethizon dorsatum*), tree squirrels, and a variety of birds not found elsewhere in the planning area, such as Mountain Quail (*Oreortyx pictus*), Sooty Grouse (*Dendragapus fuliginosus*), Northern Goshawks (*Accipiter gentilis*), Flammulated Owls (*Psiloscops flammeolus*), and the BLM Sensitive White-headed Woodpecker (*Dryobates albolarvatus*; synonym of *Picoides albolarvatus)*. The conifer forest provides habitat components such as large diameter tree trunks (standing, prostrate, living, and in various states of decay) for nesting and foraging, pine and fir cones for food, lower temperatures than the surrounding sagebrush steppe, and a high canopy for songbirds that specialize in foraging at greater heights. The ponderosa pine and mixed conifer forests also provide summer habitat for mule deer and elk.

Aspen Habitat

Maser *et al.* (1984) found high numbers of wildlife species associated with the two aspen community types (aspen/grass communities and aspen/mountain big sagebrush (*Artemisia tridentata* subspp. *vaseyana*)) in southeastern Oregon's Great Basin area. In total, 84 species reproduced, and 110 species foraged within the aspen/grass communities, while 95 species reproduced, and 117 species foraged within the aspen/mountain big sagebrush communities. These numbers are very high and quite significant to wildlife species when one takes into consideration the relatively small proportion of the landscape occupied by aspen communities within southeastern Oregon's Great Basin area. However, aspen stands are not naturally regenerating and may be diminishing in size, number, and condition across the planning area.

Wildlife Species Including Special Status Species

Numerous species of wildlife occur in the planning area. The following is a discussion of important species occurrence in the planning area. Appendix H2 of the *Draft Lakeview RMP/EIS* (BLM 2001a) contains a more thorough description of priority species' life history, habitat requirements, and historical population and/or habitat status. The information in this appendix is hereby incorporated by reference in its entirety in accordance with 40 CFR § 1502.21 (in effect prior to September 14, 2020). Updates in population or habitat status for these wildlife species are also included in the following section.

There are two categories of BLM special status species: (1) federally threatened, endangered, and/or proposed for listing (candidate) under the ESA, and (2) BLM sensitive species where the species requires special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA (BLM 2008i). Table 3-48 lists special status wildlife species known or suspected to occur in the planning area.

Big Game Mammals

Rocky Mountain Elk

Based on ODFW estimates, the current population of Rocky Mountain elk (*Cervus elaphus nelsoni*) in the planning area and adjacent lands administered by the USFS hover around the management objectives set forth in *Oregon's Elk Management Plan* (ODFW 2003b) and appear to be stable to slightly increasing (ODFW, personal communication, 2018). Management objectives for the area call for 3,000 elk in the South Central Zone (Silver Lake, Interstate Unit, including the Sprague and Klamath Falls units outside the zone administered by the planning area); 500 elk in the Warner Unit; 1,600 elk in the High Desert

Table 3-48. Special Status Wildlife Species

Birds	Habitat	Status
Bald Eagle (*Haliaeetus leucocephalus*)	Associated with large bodies of water, forested areas near the ocean, along rivers, and at estuaries, lakes, and reservoirs.	SEN
Bobolink (*Dolichonyx oryzivorus*)	Edges of cropland/pastures; lake/pond shorelines.	SEN
Greater Sage-Grouse (*Centrocercus urophasianus*)	Sagebrush obligates, found east of the Cascades. They require large expanses of sagebrush with healthy native understories of forbs.	SEN
Lewis's Woodpecker (*Melanerpes lewis*)	Ponderosa Pine, Cottonwood riparian or Oak habitats with an open canopy, brushy understory, dead and down material, available perches, and abundant insects.	SEN
Tricolored Blackbird (*Agelaius tricolor*)	Cattails or tule marshes.	SEN
Upland Sandpiper (*Bartramia longicauda*) *	Grassland interspersed with ponderosa pine; wet montane meadow.	SEN
White-headed Woodpecker (*Picoides albolarvatus*)	Mixed conifer forests (<40 % canopy cover) dominated by old growth Ponderosa Pine and open habitats where standing snags and scattered tall trees remain.	SEN
Yellow-billed Cuckoo (*Coccyzus americanus*) *	Dense riparian/willows/cottonwoods.	FT
American White Pelican (*Pelecanus erythrorhynchos*)	Lakes and freshwater marshes.	SEN
Bufflehead (*Bucephala albeola*)	Ponds, lakes, impoundments, or bays along slow-moving rivers.	SEN
Franklin's Gull (*Leucophaeus pipixcan*)	Open water.	SEN
Horned Grebe (*Podiceps auritus*)	Open water.	SEN
Red-necked Grebe (*Podiceps grisegena*)	Shallow freshwater lakes, bays of larger lakes, and marshes.	SEN
Snowy Egret (*Egretta thula*)	Meadows, marshes, streams, ponds.	SEN
Trumpeter Swan (Cygnus buccinator)	Open water.	SEN
Tule Goose (*Anser albifrons elgasi*)	Lakes and freshwater marshes/fields.	SEN
Western Snowy Plover (*Charadrius nivosus*) (inland population)	Alkali flats.	SEN
Yellow Rail (*Coturnicops noveboracensis*)	Dense sedge marshes.	SEN
Mammals		
Bighorn Sheep (*Ovis Canadensis*)	Cliff-shrub; boulders and rock outcrops.	SEN
Fringed Myotis (*Myotis thysanodes*)	Trees, snags, buildings, caves, cliffs, and bridges.	SEN
Gray Wolf (*Canis lupus*)	Woodlands, forests, grasslands, and deserts.	FE
Kit Fox (*Vulpes macrotis*) *	Desert scrub and grassland communities.	SEN
Pallid Bat (*Antrozous pallidus*)	Arid regions/rocky outcroppings.	SEN
Pygmy Rabbit (*Brachylagus idahoensis*)	Sagebrush with deep friable soils.	SEN
Townsend's Big-eared Bat (*Corynorhinus townsendii*)	Lava fields, rocky cliffs, and abandoned structures.	SEN
Spotted Bat (*Euderma maculatum*)	Cliff habitat.	SEN
White-tailed Jackrabbit (*Lepus townsendii*)	Native grasslands.	SEN
Amphibians and Reptiles[3]		
Insects		
Monarch Butterfly (*Danaus plexippus*)	Milkweed (*Asclepias* spp.) host plant for eggs and larvae.	SEN
Morrison's Bumblebee (*Bombus morrisoni*)	Open dry scrub with *Asclepias, Astragalus, Ericameria, Chrysothamnus spp.*	SEN
Sullivan's Sulphur (*Colias Christina sullivani*)	Meadows, sagebrush flats, conifer forest openings.	SEN
Western Bumblebee (*Bombus occidentalis*) *	Areas with appropriate flowering plants.	SEN
Yuma Skipper (*Ochlodes yuma*) *	Reed beds in and around freshwater marshes, streams, ponds, seeps, springs.	SEN

[1] In an agreement between the BLM and the Oregon Biodiversity Information Center (ORBIC), ORBIC maintains a database on Oregon's rare, threatened, and endangered plants, animals, and ecosystems. Inclusion of any given taxon on these lists is contingent on specific criteria: the most important factors are the total number of known, extant populations in Oregon and worldwide and the degree to which they are potentially or actively threatened with destruction. Other criteria include the number of known populations considered securely protected, size of various populations, and the ability of the taxon to persist at a known site. Amendment of these lists occur every other year as inventory/monitoring provides new information (ORBIC 2016).

[2] Data for all of the special status species in the planning area is located on the Interagency Special Status /Sensitive Species Program (ISSSSP) website (https://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/).

[3] Amphibians and reptiles are discussed in the *Fish and Aquatic Wildlife* section and Table 3-46.

*Suspected, but not confirmed in the planning area.

Zone (Beatys Butte, Wagontire, and Juniper units, including the Owyhee, Whitehorse, Steens Mountain, and Malheur units that fall outside lands administered by the planning area); and 1,600 elk in the Paulina/East Fort Rock Unit. Approximately 600,000 acres of designated elk winter range occurs in the planning area on BLM administered land (ODFW 2009; Map WLF-1). Winter range includes areas generally occupied from December through April.

Mule Deer

Mule deer (*Odocoileus hemionus*) range is divided into summer, winter, and transitional seasonal ranges, and in the planning area, this can be anywhere from 4,200 feet at Summer Lake to over 7,900 feet at Beaty Butte. There are approximately two million BLM-administered acres of ODFW designated general mule deer habitat and about one million BLM-administered acres of critical deer winter range in the planning area (Map WLF-1).

The ODFW's *Mule Deer Plan* (ODFW 2003a, 2016) set population management objectives for the deer units within the planning area as follows: Fort Rock: 11,200; Silver Lake: 10,300; Interstate: 14,800; Warner: 5,500; Wagontire: 2,500; Beaty Butte: 2,800; Juniper Unit: 2,300. All units are below population management objectives. Lake County wide, population is about 60% of the management objective (ODFW, personal communication, 2018). The Warner Unit was one of five chosen by ODFW as a focus area in the *Oregon Mule Deer Initiative Plan* (ODFW 2015). Potential limiting factors for mule deer in the Warner Unit and across its range are habitat degradation, predation, disturbance and harassment, illegal activities, and disease (ODFW 2011). Monitoring and management objectives were set to address each of the potential limiting factors for mule deer in the Warner Range. Juniper removal and invasive weed control in the South Warner Range was BLM's primary contribution to meeting objectives in the ODFW Plan.

Pronghorn

Pronghorn (*Antilocapra americana*) habitat consists primarily of shrub-steppe vegetative types. There are approximately 2 million BLM-administered acres of pronghorn habitat in the planning area. The planning area contains winter range, as well as summer and yearlong habitats (Map WLF-2). Pronghorn are known to travel between California and Oregon, and there may be important migration corridors spanning the border.

Bighorn Sheep

Bighorn sheep (*Ovis canadensis*), a BLM sensitive species, occupy sagebrush-grassland habitat, which is characterized as year-long and totals about 650,000 BLM administered acres in the planning area (ODFW 2014) (Map WLF-2). There are approximately 780 bighorn sheep currently occupying the planning area, split among 12 herd ranges. Trend varies among the herds, but appears mostly stable (John Muir, ODFW, personal communication, November 7, 2018). Lake County contains historically occupied bighorn sheep habitat; populations on BLM-administered lands have been re-established from ODFW transplants from Hart Mountain National Antelope Refuge, the Columbia River Gorge, Deschutes River, and John Day River herds over the past several years. Bighorn sheep populations are managed by the ODFW in accordance with *Bighorn Sheep and Rocky Mountain Goat Management Plan* (ODFW 2003a). The BLM currently cooperates with the ODFW in meeting its bighorn sheep management objectives and

protects population health through restricting domestic sheep and goat grazing on BLM-administered lands within 9 miles of occupied bighorn sheep habitat (BLM 2003b, page 45, as maintained).

Carnivores

Gray Wolf

Gray wolves (*Canis lupus*) are Federally listed as an endangered species in this part of the species' range. After a recent delisting in January of 2021, federal protections were reinstated in February 2022. Wolves have been observed in the planning area and have been established in the Silver Lake area since 2015, resulting in the designation of the Silver Lake Area of Known Wolf Activity (AKWA) by the ODFW. AKWA boundaries are revised at least annually by ODFW to reflect the most current documented wolf activity. The ODFW manages wolf populations in accordance with their *Wolf Management Plan* (ODFW 2010).

Kit Fox

Kit fox (*Vulpes macrotis*) is a state-threatened and BLM sensitive species and is only suspected to occur in portions of the planning area. Very little is known about kit foxes within the planning area, but the small population, if present, is likely more a result of competition with coyotes (Vesely 2015) and being on the extreme northern edge of the species range than it is from current management.

Kit foxes share many of the same potential threats with other wildlife, including habitat loss from energy development, juniper encroachment, climate change, invasive weeds, and wildfire. OHV use has also been identified as a potential threat to kit foxes, if not restricted to existing routes. It is unknown whether the OHV Open areas in the Summer Lake Basin and on the east side of the Warner Valley have had any negative impact on the kit fox because elusive, rare species are difficult to monitor, and it is unknown whether kit foxes are even present in those areas.

There are no known conflicts between current management and kit foxes or their potential habitat. In addition, the existing management direction for Greater Sage-Grouse habitat (including BMPs, RDFs, mitigation measures; Appendix 7) could have indirect, but beneficial effects for kit fox habitat (Vesely 2015). For these reasons, kit fox will not be addressed further in this analysis.

Other Carnivores

Several other species of carnivores occur within the planning area. Coyote (*Canis latrans*), bobcat (*Lynx rufus*), and cougar/mountain lion (*Puma concolor*) occur throughout the planning area. Black bears have been observed along the forest fringe. The ODFW manages cougar and bear populations in accordance with their species-specific management plans (ODFW 2012, 2017).

Small Mammals

Pygmy Rabbits

Pygmy rabbits (*Brachylagus idahoensis*), a BLM sensitive species, occur in dense stands of big sagebrush in deep friable soils; although the rabbit's distribution and abundance are not fully known for the entire planning area, surveys have been completed on portions of the planning area since 2002 and have

documented presence in suitable habitats. Pygmy rabbit habitat was modeled as "suitable" or "primary" by Smith *et al*. (2019) (Map WLF-4). This species distribution model was based on high quality occurrence records which incorporated soil, topographic, vegetation, fire, and climatic variables. Suitable habitat was calculated using a thresholding method that determined likelihood of presence only, whereas primary habitat was calculated using a value that equalized test sensitivity and specificity for classifying a "higher or more suitable" habitat. Based on this model there are an estimated 689,220 acres of primary and 890,700 acres of suitable habitat in the planning area.

Bats

Numerous bat surveys, both acoustic and physical capture, have been conducted within the planning area. From 2003 to 2010, the Oregon Bat Grid was active in the planning area. In 2016, ODFW initiated Bat Grid 2.0, which contributes to the North American Bat Monitoring Program (NABat) (USDA-FS 2015). Fifteen bat species occur in the planning area, including the pallid bat (*Antrozous pallidous*), Townsend's big-eared bat (*Corynorhinus townsendii*), big brown bat (*Eptesicus fuscus*), spotted bat (*Euderma maculatum*), silver-haired bat (*Lasionycteris noctivagans*), hoary bat (*Lasiurus cinereus*), California myotis (*Myotis californicus*), western small-footed myotis (*M. ciliolabrum*), long-eared myotis (*M. evotis*), little brown bat (*M. lucifugus*), fringed myotis (*M. thysanodes*), long-legged myotis (*M. volans*), canyon bat (*Parastrellus hesperus*), Yuma myotis *(M. yumanensis*), and the Mexican free-tailed bat (*Tadarida brasiliensis*).

The fringed myotis, pallid, Townsend's, and spotted bats are BLM sensitive species. Limited bat habitat surveys have been conducted, mostly in north Lake County. Bats will use a wide variety of habitat types and vary in their preference of roost site types (caves, abandoned mines, trees, old buildings, cliffs). Some bats are thought to be migratory (hoary bat), and some are resident (Townsend's), preferring to find a suitable site in the area to hibernate. Most of the caves (lava tubes) used by bats are located in the northern portion of the planning area. In addition to several well-known larger caves, like Derrick Cave, there are likely numerous smaller hibernacula (see *Glossary*) and/or roost sites in the lava fields, not yet discovered.

White-nose syndrome (WNS), caused by a cold-loving fungus called *Pseudogymnoascus destructans* (*Pd*), is a highly transmissible disease that has devastated bat populations in the eastern United States since its discovery in New York in 2007. WNS has spread westward, with Washington State documenting the first WNS positive bat in 2016, and California documenting presence of *Pd* in 2019. With the threat of WNS to Oregon bats, simultaneous disease surveillance has been conducted with BLM's hibernacula counts since 2015. Spearheaded by ODFW, BLM is a cooperating agency in WNS surveillance. To date, no bats on the planning area have tested positive for *Pd* or WNS.

All bats in the planning area are insectivorous, with mosquitos, moths, and beetles making up a large portion of their diet. A decline in worldwide insect abundance has already been documented due in part to introduced species and climate change, with butterflies/moths and beetles being the most affected (Sanchez-Bayo and Wyckhuys 2019). Healthy native plant communities are essential for providing quality foraging (prey) habitat for bats. At the onset of hibernation, bats with higher fat reserves are more likely to survive WNS. Although the spread of WNS is ultimately beyond BLM's control because it may be transmitted bat to bat, it does have the capability of managing for quality habitat to give local bat populations a better chance at resisting WNS when it spreads to Oregon. A recent study indicated WNS mortality may be reduced by 58-70% in bat populations with higher fat stores (Cheng *et al*. 2019).

Other Small Mammal Species

Limited small mammal inventories conducted by the ODFW have documented white-tailed (*Lepus callotis*) and black-tailed jackrabbits (*L. californicus*), cottontail rabbits (*Sylvilagus nuttallii*), deer mice (*Peromyscus* spp.), kangaroo mice (*Microdipodops* spp.), kangaroo rats (*Dipodomys* spp.), northern grasshopper mice (*Onychomys leucogaster*), Townsend's ground squirrels (*Urocitellus townsendii*), least chipmunks (*Tamias minimus*), and sagebrush voles (*Lemmiscus curtatus*) within the planning area. Numerous other small common mammal species inhabit the planning area (see Appendix H, BLM 2003a).

Birds

Golden Eagle

The Golden Eagle (*Aquila chrysaetos*) is a species of high public interest. The Golden Eagle is not federally listed; however, it is protected under the Migratory Bird Treaty Act (16 U.S.C.A. §§ 703-708) and the Bald and Golden Eagle Protection Act (16 U.S.C.A. §§ 668-668c). The BLM does not have a complete inventory of Golden Eagle nest sites in the planning area, but surveys of much of the potential eagle-nesting habitat (cliffs) have occurred. The Oregon Eagle Foundation (OEF) has been documenting new nest sites and monitoring the nest success of Golden Eagles throughout the planning area since 2011 and continues to do so as a collaborative effort among BLM employees and OEF volunteers. Currently the BLM is aware of 189 breeding areas (nest(s) buffered by 1 mile) partially or wholly within the planning area on BLM-administered lands. Each breeding area generally includes multiple nests because golden eagles build alternate nests in relatively close proximity to each other but choose one each year to use. In some cases, the nests themselves may not be located on BLM-administered land.

Peregrine Falcon

Originally federally listed under the ESA as an endangered species throughout its range, the Peregrine Falcon (*Falco peregrinus*) was also a state endangered species under the Oregon Endangered Species Act (Oregon Revised Statutes 1987). The Peregrine Falcon, after reaching the recovery goals set forth in the Recovery Plan (USFWS *et al.* 1982), was successfully delisted in 1999 (USFWS 1999). Although incidental observations of Peregrine Falcons have occurred along Abert Rim and Summer Lake, no nest sites have been located within the last 15 years. BLM conducted surveys in 2009, 2012, 2013, and 2015, and with broadcasted calls in 2013, but was unable to confirm presence of breeding Peregrine Falcons.

Bald Eagle

The Bald Eagle (*Haliaeetus leucocephalus*) was listed in 1978 as a federally threatened species under the ESA. The USFWS delisted the Bald Eagle on August 9, 2007 (USFWS 2007). However, the Bald Eagle remains a BLM sensitive species, and is still protected by the Migratory Bird Treaty Act (16 U.S.C.A. §§ 703-708) and the Bald and Golden Eagle Protection Act (16 U.S.C.A. §§ 668-668c).

Inventories and monitoring of nest success of nesting Bald Eagles has continued in the planning area The surveys over the years have only found six Bald Eagle nests on BLM-administered lands; however, one nest tree was destroyed in late 2011 or early 2012 (weather related). At least eight Bald Eagle nesting pairs use BLM-administered lands for foraging. Nest success and number of known breeding pairs appears to be stable in the planning area. The *Post-Delisting Monitoring Plan for Bald Eagle* (USFWS

2009a) provides specific direction for the monitoring and management of Bald Eagle nests and roost sites from 2009 to 2029.

Greater Sage-Grouse

Greater Sage-Grouse (*Centrocercus urophasianus*) is a sagebrush-obligate game bird and managed as a BLM sensitive species. There have been multiple petitions to list the species as threatened or endangered under the ESA over the years. In 2010, the USFWS determined Greater Sage-Grouse were "warranted but precluded". Higher priorities and a backlog of other species in need of listing precluded the Greater Sage-Grouse from listing under the ESA at that time. A status review in 2015 resulted in the USFWS making a "not warranted" decision based on the numerous conservation efforts initiated across agencies. In particular, the regulatory mechanisms put in place with adoption of the *Oregon Greater Sage-Grouse ARMPA* (BLM 2015b) contributed to range-wide efforts to reduce threats to the species.

The planning area falls within Greater Sage-Grouse Management Zone (MZ) V: the Western Great Basin. There are approximately 1.5 million and 1.7 million acres of Priority Habitat Management Area (PHMA) and General Habitat Management Area (GHMA) respectively within the planning area. Based on 2021 lek survey data from the Oregon Department of Fish and Wildlife (ODFW), there are currently 212 leks in the planning area. The status of these leks currently include 3 historic, 64 unoccupied, 90 pending, and 55 occupied (ODFW 2021).

Greater Sage-Grouse habitat suitability assessment is broken down into multiple scales: broad, mid, fine, and site. The BLM uses the *Habitat Assessment Framework* (HAF; Stiver *et al.* 2015) to describe the suitability of habitat at the mid, fine, and site scales. The Warner-Meinzer mid-scale (11.7 million acres) within which the majority of the planning area is located encompasses much of northwest Nevada and a portion of northeast California. The Warner-Meinzer mid-scale was determined suitable by an interdisciplinary team based on HAF indicators. To date, multi-scale reports have been prepared for the Beaty and Warner-Tucker fine scales (BLM 2018f, BLM 2018g). Summary reports describe in more detail the rationale behind suitability calls at the various scales. The Beaty Fine Scale (1.8 million acres) extends down into Nevada and includes most of the Beaty Priority Area of Conservation (PAC); the scale was found to be suitable (only assessed on the Oregon side for the first report). Within the Beaty Fine Scale, 74.1% (+/-10.4%) of the breeding habitat was suitable; 88.1% (+/-12.6%) of the upland summer/brood rearing habitat was suitable; 93.9% (+/-4.6%) of the winter habitat was suitable.

The Warner-Tucker fine scale includes the extreme northeast portion of California and the extreme northwest portion of Nevada, but only assessment of Oregon portion of the scale occurred for the first report; this scale takes in all of the Warner and Tucker Hill PACs, as well as a small southern portion of the Beaty PAC and was rated as marginal. Although seasonal use areas are mostly connected, there are some connectivity issues in the north due to past wildfires and anthropogenic features that can disrupt seasonal movements or cause mortality are present throughout the fine scale. Within the Warner-Tucker fine scale, 63.5% (+/-8.2%) of the breeding habitat was suitable; 69.3% (+/-14%) of the upland summer / brood rearing habitat was suitable; 82.5% (+/-6.3%) of the winter habitat was suitable. These reports are scheduled for update with larger sample sizes every 5 years. Fine scale reports which include the Dry Valley Jack Mountain, Picture Rock, and Brothers North Wagontire PACs have yet to be completed.

The Central Oregon mid-scale, which includes the Lakeview planning area portion of the Brothers and Paulina-12 Mile fine-scales was rated as marginal, primarily due to anthropogenic disturbance and the negative edge effects at that scale.

The 2021 spring Greater Sage-Grouse population in the planning area was estimated at 4,540 birds (95% CI: 4,428-4,652 birds), an 11% increase from 2020 (ODFW 2021). However, the 5-year average population trend in the planning area is still negative (-6.9%). Factors thought to be causing the decline varies by PAC and may include conifer encroachment, wildfire, invasive plants, drought, isolation and small size, fence collisions, research, and translocations. Completed causal factor analyses (CFA) for each PAC provides more in-depth descriptions of potential causes for the decline in population.

Yellow-Billed Cuckoo

Although the planning area is within the range of the Western Yellow-Billed Cuckoo (*Coccyzus americanus*), a federally threatened species, there have been no confirmed sightings or nesting attempts within the planning area, nor is there designated critical habitat for this species in Oregon. For this reason, this species will not be addressed further in this analysis.

Migratory Birds

In the planning area, numerous migratory birds are present either as residents, or during spring and fall migration. Migratory birds are protected under the Migratory Bird Treaty Act. About 228 bird species on the MBTA list (*see* 50 CFR Part 10, Subpart B, §10.13) occur in the planning area at least part of the year (see Appendix H, BLM 2003a). Some species only travel through during migration and other are either year-long, summer, or winter residents.

Reptiles

Limited reptile surveys have been conducted in the planning area. However, northern sagebrush lizard (*Sceloporus graciosus*), western fence lizard (*S. occidentalis*), desert horned lizard (*Phrynosoma platyrhinos*), pygmy short-horned lizard (*P. douglassi*), western rattlesnake (*Crotalus viridis*), garter snake (*Thamnophis elegans*), western yellowbelly racer (*Coluber constrictor*), and gopher snake (*Pituophis melanoleucus*) appear to be common in appropriate habitat types. Side-blotched lizard (*Uta stansburiana*), long-nosed leopard lizard (*Gambelia wislizenii*), western skink (*Eumeces skiltonianus*), and striped whipsnake (*Masticophis taeniatus*) are known to occur in the planning area, but limited data is available on distribution and abundance of these species.

Bumblebees and Other Pollinators

Limited invertebrate surveys, primarily for native bees, have been conducted in the planning area. Despite the few number of surveys, numerous species of native bees were identified by the Xerces Society upon submission of voucher specimens, including the BLM Sensitive Morrison's bumblebee (*Bombus morrosoni*). At this time, the status of the western bumblebee (*Bombus occidentalis*) in the planning area is suspected, but unconfirmed. Bee survey efforts in the planning area is currently increasing, with participation in the Northwest Bumblebee Atlas and Oregon Bee Project.

The status and abundance of Monarchs (*Danaus plexippus*), Yuma skippers (*Ochlodes yuma*), and Sullivan's sulphurs (*Colias Christina sullivani*) in the planning area are also unknown. The full extent of potential monarch breeding habitat (patches of milkweed; *Asclepias* spp.) within the planning area is also currently unknown.

Wildlife forage availability represents one component of habitat quality: food availability for grazing and browsing wildlife. Table 5-3 (Appendix 5) includes existing wildlife forage levels for each allotment in the planning area. The BLM has allocated a total of 15,788 animal unit months (AUMs) of forage to mule deer (*Odocoileus hemionus*) and pronghorn (*Antilocapra americana*), 3,101 to elk (*Cervus elaphus*), 2,535 to bighorn sheep (*Ovis canadensis*), and 1,425 to other wildlife (birds and small mammals).

Environmental Effects

Analysis Assumptions

- Wildlife, including special status species, depend upon healthy, native vegetation communities for forage, cover from predators, and safe nesting/birthing sites. Healthy, properly functioning vegetation communities would also contribute to clean water sources required by all wildlife. Although still subject to cyclic and/or stochastic events, prey populations (small mammals, insects, etc.) utilized by many predator species (raptors, bats, carnivores) would continue to be supported by healthy vegetation communities.
- Wildlife habitat needs vary widely by wildlife species. It is generally true that healthy and sustainable wildlife populations can be supported where there is a diverse mix of native plant communities to provide structure, forage, cover, and other habitat requirements. Managing to promote a diverse mix of plant communities is an important component of managing for an appropriate complement of fish, and wildlife, and invertebrate species, including pollinators, as opposed to a single species management.
- Potential direct effects to wildlife species, including special status species, can be described in terms of mortality or displacement of individuals due to an activity or project infrastructure, either temporarily or permanently.
- Disturbance to a species or its habitat can affect species' use of an area.
- Direct effects to wildlife habitat could include permanent or temporary conversion to an altered vegetation community or unvegetated state, which does not provide the necessary components required by a species for survival and reproduction. Direct effects to wildlife habitat indirectly affect individuals and wildlife populations through modification of hiding/nesting/birthing cover, forage quality and/or quantity, water availability, or other habitat components that support a healthy prey base, which could result in increased wildlife mortality rates and/or reduced reproductive success, both of which negatively affect wildlife populations.
- Big game and other wildlife compete for available forage on lands grazed by livestock and/or wild horses. Existing wildlife forage allocations were established in the *Lakeview RMP/ROD* (BLM 2003b) after coordination with the Oregon Department of Fish and Wildlife, to assist in meeting their wildlife population goals for this region. Wildlife forage allocation adjustments are not addressed in this plan amendment. While potential forage conflicts may be identified during future rangeland health assessments, wildlife forage allocations would only be adjusted through a future activity level plan, such as an allotment management plan, wildlife habitat plan, or a grazing permit renewal analysis.
- Meeting rangeland health standards within Greater Sage-Grouse habitat means this bird's needs are being adequately met in that area. It does not mean, however, that treatments to maintain or enhance habitat would not be beneficial.

- Number of documented pygmy rabbit burrows is an index of relative abundance of pygmy rabbit and presence of pygmy rabbit habitat.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts - All Wildlife

The BLM would not be able to implement or authorize new discretionary, ground-disturbing management actions (*e.g.* land exchanges or sales, ROWs, salable or leasable mineral development) within wilderness characteristics units if it would be deemed by the BLM to diminish the size or cause an entire inventory unit to no longer meet the criteria for wilderness characteristics. This would benefit most wildlife, including special status species, and their associated habitats, by limiting direct disturbance and activities that could impair or fragment habitat and wildlife movement, and help maintain large intact areas of habitat across wilderness characteristic units. However, many of these types of management activities are also discouraged or precluded from occurring within overlapping Greater Sage-grouse or other special status species habitat under existing management direction (see Appendix 7; *see* also Appendices N3 and O of BLM 2003a, 2003b, as maintained, 2015b, as maintained).

The current land tenure management would retain about 81.2% of the public lands within the planning area in land tenure zone 1. This would benefit all wildlife species because it would help keep large areas of habitat intact, which would maintain or increase wildlife habitat connectivity over the long-term. Large contiguous areas of sagebrush steppe would continue to give the BLM the ability to effectively manage wildlife habitat quality on a landscape scale.

Continued vegetation management (*e.g.* juniper reduction, noxious weed/invasive species control, seeding, etc.) would maintain, enhance, or restore desirable vegetation communities and would benefit associated wildlife species. The BLM would continue to implement such actions in wilderness characteristics units as long as it deems they would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. Although some inventory units are in good overall ecological condition (State A; Table 3-12) and provide quality habitat for sagebrush steppe wildlife species, adjacent areas or inclusions of States C, D, and Juniper C and D would continue to threaten State A areas that are a high priority for habitat protection for their value to sage-steppe associated wildlife (Tables 3-13 to 3-15). Areas of Juniper C (co-dominance of sagebrush and juniper) that are not being managed specifically for Greater Sage-Grouse habitat would provide some increased wildlife species diversity because of vegetation structure characteristics, but their continued existence as a Juniper C state would not persist over the long-term without active management (*e.g.* juniper reduction) to prevent those areas from succeeding into later seral stages (phase III) and losing vegetation diversity in the understory (Miller *et al*. 2005).

While wildlife habitat restoration treatments involving modification of juniper cover (primarily for mule deer and Greater Sage-Grouse) would have the most potential for visual impacts, existing VRM designations would allow most winter mule deer and Greater Sage-Grouse habitat management to continue. The BLM could authorize such treatments in wilderness characteristics units if it deemed that they would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. About 383,680 acres of winter mule deer habitat would remain in VRM class IV (where large visual modifications are allowed), which would provide the most flexibility for future wildlife habitat management and restoration actions. VRM Class III (partially retain visual

characteristics) would cover about 100,229 acres of mule deer habitat; VRM Class II (largely retain visual character) would cover about 61,271 acres of mule deer habitat; VRM Class I (preserve visual character) would cover about 7,961 acres of winter mule deer range. Habitats in VRM Classes I and II that are currently providing high quality habitat for mule deer and other wildlife would be protected from most human disturbances. However, due to natural succession or natural disturbances such as wildfire, the current state of vegetation which influenced the VRM rating may not remain stable over the long-term.

Modifying proposed habitat maintenance or restoration treatments (*e.g.* juniper reduction or fuel breaks) within inventory units to ensure that they do not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics could reduce the scale and scope of some treatments. These constraints could negatively affect habitat quantity, quality, and connectivity for some wildlife species, including some special status species, over the long-term.

OHV and Travel Management Impacts – All Wildlife

OHV use can impact wildlife in numerous ways, including but not limited to, vehicle collision, crushing of nests and/or vegetation, collapsing of burrows, habitat fragmentation, increase in edge effects (which can increase predation), and noise levels which elevate stress (Ooren *et al.* 2007). However, such effects would occur primarily in a very few small portions of the planning area that experience moderate to high levels of cross-country vehicle use. Motorized vehicle use would continue to be Closed (0.3%) or Limited to Existing or Designated Routes (85.1%) across most of the planning area, which would substantially reduce or eliminate the potential for these types of effects across a large portion (85.4%) of the planning area.

While approximately 467,104 acres (14.6%) of the planning area would remain Open to OHV use (Table 3-32; Map OHV-1, Appendix 1), currently only about 30,000 acres of these Open OHV areas have been subject to concentrated motorized vehicle use and associated negative habitat impacts to date. However, the potential for increased demand for OHV opportunities could increase concentrated impacts to wildlife habitats on up to an estimated 93,420 acres within Open OHV area designations over the long-term.

The area of highest impact to habitats from motorized vehicle use would continue to occur within the confines of BLM's existing route network. Approximately 5,529 miles of existing open BLM routes would continue to permanently impact about 8,024 acres of wildlife habitat in the planning area (Tables 3-33 and 3-34). An estimated 15-20 miles of new roads could disturb an estimated 22-26 additional acres of habitats over the long-term under this alternative.

Livestock Grazing Management Impacts – All Wildlife

Under this alternative, up to 8.1% of the planning area would continue to be ungrazed for various reasons (Tables 3-35 and A5-3, Appendix 5) and wildlife habitats in these areas would not be subject to livestock impacts. Wildlife populations depend on diversity or heterogeneity in plant communities to remain viable. Livestock grazing primarily affects wildlife through habitat alteration; directly by altering plant community composition, structure, and productivity or indirectly by altering abiotic processes and invasibility of sagebrush communities. Grazing would have varying effects on wildlife, depending on frequency, duration, timing, site-specific conditions, and individual species needs. Livestock use would continue to have the most negative impacts on vegetation and associated wildlife habitats, associated with heavy grazing and trampling around water sources and trails along fences on about 42,000 acres within the planning area (Table 3-17). Livestock impacts on wildlife and wildlife habitats across most of the rest

of the planning area would be minimized, due to implementation of appropriate BMPs and RDFs (see Appendix 7) during the permitting process.

The current process the BLM follows to address rangeland health issues due to livestock grazing includes a full suite of available management tools (i.e. changing grazing systems, changing season of use, providing better livestock distribution through the use of water and other range improvements, exclosures, and both temporary or permanent reductions in forage allocation) that have been proven effective in improving rangeland conditions (BLM and FWS 1998b, BLM 2005h, 2006j, 2006k, 2006l, 2009j, 2010j, 2010k, 2014o, 2016q) and making significant progress towards meeting rangeland health standards, including wildlife standard 5. For this reason, continuing current livestock management would adequately accommodate most wildlife habitat needs in the planning area.

The BLM assumes for analytical purposes that an estimated 5,000 to 15,000 acres, and up to 1,000 AUMs of forage, could be voluntarily relinquished over the long-term under this alternative. It is highly likely that these AUMs would be allocated to another qualified permittee. For this reason, there would not likely be any change in wildlife habitat quality or wildlife forage availability across the planning area under this alternative.

Wilderness Characteristics, OHV, and Livestock Grazing Management Impacts - Specific Species

Big Game

A total of 725,390 acres of winter mule deer habitat would continue to have OHV use Limited to Existing or Designated routes under this alternative with 128,525 of those acres in the Cabin Lake/Silver Lake area also seasonally closed from December 1 to March 31. These seasonal road closures would continue to reduce harassment and other negative impacts, such as stress from noise to mule deer and other big game in this area during the winter. The Open OHV area designation in the Sand Dunes WSA could negatively impact a small portion of winter mule deer range and a minor mule deer migration corridor (documented use by 1 deer in 1 year and not a concentration of paths) in the northeast corner of the WSA; the 1 deer, however, theoretically represents 150 deer by study design (Coe *et al*. 2015). The best winter range and most heavily used corridors are outside of the WSA and would not be impacted.

Gray Wolf

The potential impacts to gray wolves from current management activities are outlined in the *Programmatic Biological Assessment* (BLM 2018i; see also USFWS 2018c; prepared when the species was listed as Federally Endangered) remain accurate. Potential effects to wolves could include area avoidance, temporary displacement, shifts in spatial use caused by human disturbance, and/or changes in big game movement patterns, which were caused by projects, and livestock depredation. The *Biological Assessment* determined that projects or activities conducted in the planning area under current management "May Affect but are Not Likely to Adversely Affect" gray wolves as long as project design criteria (PDC) are implemented. Though the gray wolf was recently de-listed, the PDCs were carried forward as BMPs and are listed in Appendix 7. For this reason, the potential impacts to gray wolves from management activities under the No Action Alternative would continue to be mitigated to the extent possible by following the appropriate PDC.

Pygmy Rabbits

As a sagebrush obligate species, pygmy rabbits would generally incur positive impacts from vegetation, weed, fuel, and habitat restoration treatments conducted in sagebrush steppe communities under current management on an estimated 689,200 acres of primary habitat (Smith *et al*. 2019).

Existing Open OHV areas overlap with about 4,500 acres of primary pygmy rabbit habitat and 137,000 acres of suitable habitat (Smith *et al*. 2019) between Burma Rim and Saunders Rim. In this area, OHV use would negatively impact pygmy rabbits by collapsing burrow systems, crushing vegetation, and elevating noise related stress levels.

Bats

Current management would continue to provide habitat for the four sensitive species of bats (Table 3-48) in the planning area. Approximately 77% of the BLM-administered lands in the planning area (ORC data; using states A, A-C, B, Dual C, and non-habitat, which was only called non-habitat for Greater Sage-Grouse but is habitat for bats) is considered "healthy" bat habitat. Management under the No Action Alternative would maintain that condition.

Water developments attract insects (a prey source) and, therefore, provide additional foraging sites in an otherwise arid environment. The water developments also possibly allow for greater distribution of roosting sites (and maternity colonies) across the landscape because less distance to water is an important factor when considering energy expenditure and evaporative water loss, especially in reproductive females.

Although current management would do little to prevent the spread of White Nose Syndrome (WNS), it would promote healthy rangelands which would continue to provide an abundant food source for bats, which is important in helping bats build up a fat reserve prior to winter to improve their chances of surviving if they do become infected (Cheng *et al*. 2019).

All four special status species of bats have been documented as susceptible to collision and/or barotrauma fatalities at wind developments outside the planning area (B.C. Ministry of Environment 2016) and are possibly at risk. Resulting population level impacts are of increasing concern, especially for hoary bats (*Lasiurus cinereus*) (Hein and Hale 2019). Although not a special status species, hoary bats are particularly at risk from wind energy development and are exhibiting population declines in Oregon (Rodhouse *et al*. 2019). Though there is a low probability of wind development in the planning area, there could be potentially serious population impacts to numerous bat species should development occur in bat habitat. Under this alternative, the BLM would not authorize new ROWs, including those for wind development, if it deemed it would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics.

Greater Sage-Grouse

Greater Sage-Grouse and its habitat would continue to benefit from implementing management actions that conform to the existing management goals, objectives, and decisions adopted in the *Oregon Greater Sage-Grouse Approved RMPA* (BLM 2015a). These include but are not limited to the application of: lek buffers, seasonal and daily timing restrictions, exclusion and avoidance areas, and RDFs and BMPs.

Such actions would continue to reduce habitat disturbance, stress, and mortality of Greater Sage-Grouse (BLM 2015b).

OHV area designations in PHMA and GHMA (Limited to Existing or Designated Routes) would adequately reduce potential harassment impacts to Greater Sage-Grouse. The BLM would be able to continue to use these routes for monitoring and habitat management access, which would enable it to complete habitat restoration projects beneficial to the species.

Under this alternative, BLM would be able to implement most vegetation, fuel, and habitat treatments to maintain or improve Sage-Grouse seasonal habitats, so as to attain the habitat objectives outlined in the *Oregon Greater Sage-Grouse Approved RMPA* (Table 2-2 of BLM 2015a). However, proposed Sage-Grouse habitat protection/restoration treatments in wilderness characteristics units could need to be modified to ensure that they would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. This could potentially reduce the number of acres restored or reduce the effectiveness of the treatment measures utilized, which could negatively impact Sage-Grouse habitat over time.

Most of the public lands in the planning area were placed into land tenure zone 1 specifically to retain and protect the best remaining Greater Sage-Grouse habitat under BLM administration. Exclusion areas currently cover over 480,000 acres for major ROWs, over 1 million acres for solar/wind ROWs and over 480,000 acres for minor ROWs. In addition, the BLM would not authorize new ROWs within wilderness characteristics units (that may overlap sage-grouse habitat) if it deemed they would diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. Collectively, this management would continue to benefit the species by reducing potential habitat fragmentation, avian predator perch locations, and collision risk associated with these types of developments.

Migratory Birds (including Eagles)

The BLM's current management has supported successful reproduction of eagles and a diversity of other migratory birds on the planning area and would continue to do so throughout the long-term, barring unforeseen circumstances. However, individual species' populations would continue to fluctuate in number following range-wide population trends affected by natural cycles in prey availability and climate patterns. Migratory bird abundance has declined by about 30% continent-wide since 1970 (Rosenberg *et al*. 2019). Over half of arid land bird species are in decline and habitat generalist species have dropped by almost 25%. Some of the bird groups exhibiting the greatest decline are sparrows, wood warblers, blackbirds, and larks. Raptors and waterfowl, however, have increased by 200% and over 50% respectively (Rosenberg *et al*. 2019). Limited sagebrush-steppe songbird surveys have been conducted in the planning area. However, current habitat management for Greater Sage-Grouse (*e.g.* juniper treatment) has resulted in increases in sagebrush obligate songbird density and nesting pairs (Holmes *et al*. 2017); the same management has also contributed to an observed decline in other species, like the Gray Flycatcher (*Empidonax wrightii*). Habitat requirements are so varied among migratory bird species that management for diverse habitat types in appropriate places is extremely important.

Migratory birds, including eagles, are known to collide with wind turbines (Thaxter *et al*. 2017). Potential impacts to waterfowl and wading birds from solar fields could include stranding and increased predation or starvation due to the "lake effect" of solar panel fields, collision with infrastructure, burns from solar flux (Multiagency Avian-Solar Collaborative Working Group 2016). Negative impacts to

migratory birds could be substantial if wind/solar development occurs in migratory bird habitat. The BLM would only authorize solar/wind development in wilderness characteristics units if the renewable resource is present and it deemed that such development would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. Continuing this management would reduce the potential for negative effects to migratory birds, in those areas that actually provide important migratory bird habitat.

Reptiles

Information regarding impacts of land management on reptiles is limited. Current management is believed to continue to provide quality reptile habitat. Eight reptile species present in the planning area are likely to benefit from sage grouse conservation efforts based on overlap of distribution and similarity in land cover associations; these include pygmy short-horned lizard, sagebrush lizard, western fence lizard, western rattlesnake, garter snake, side-blotched lizard, gopher snake, and racer (Pilliod *et al*. 2020). Although impacts to reptiles from specific actions such as grazing and conifer removal would have mixed results depending on the species, in general, Great Basin reptiles show a preference for intact sagebrush with low amounts of invasive annual grasses and conifers and avoid monocultures of crested wheatgrass (Pilliod *et al.* 2020).

Bumblebees and Other Pollinators

Widespread threats to bumblebees include habitat loss and fragmentation, diseases and parasites that spill over from domesticated honeybee (*Apis melifera*) hives, climate change affecting blooming times of native forbs, and pesticides (Schweitzer *et al*. 2012). Bumblebees are ground nesters, typically utilizing abandoned rodent burrows; therefore, cross-country motorized vehicle use does have the potential to destroy nests but has been reduced under current management by being restricted to designated or existing roads across a substantial portion of the planning area. Open OHV areas that currently receive concentrated, heavy OHV use cover about 30,000 acres of the planning area. This could increase to an estimated 93,420 acres over time. These areas would have the highest potential to negatively impact bee nests and habitat; however, it is unknown to what extent bee populations in these heavily used Open OHV areas are actually being impacted.

Under current vegetation, grazing, and fuels management the potential negative impacts to bees and other pollinators would be minimal. These species would incur net positive impacts because the native forage plants that they rely on would be maintained or increase over time.

Summary

Overall, existing management protections from human developments and disturbance would continue to benefit most wildlife species and their habitats within the 106 identified wilderness characteristics units, by preventing most future large-scale ground-disturbing activities on approximately 1,654,103 acres. Limiting these types of disturbances and activities would help keep large areas of habitat intact. This would maintain wildlife habitat and connectivity, for most species, over the long-term. Wildlife habitats that are in relatively good ecological health (native vegetation is intact, lack of weed infestations, etc.) would largely remain in the same condition in the absence of future large-scale natural disturbance (i.e. wildfire) and habitats in poor condition, could still be treated with approved vegetation and fuel methods. However, treatments would have to include mitigation measures to ensure that they do not diminish the

size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics, which could result in smaller and/or less-effective treatments over both the short and long-term (see *Vegetation* and *Fire and Fuels* sections) and negatively impact habitat and connectivity for some species.

There would not likely be any change in wildlife habitat quality, connectivity, or wildlife forage availability across the planning area, due to existing grazing management or OHV management, under this alternative.

Impacts of Alternative A

Wilderness Characteristics Management Impacts – All Wildlife

This alternative would have the fewest restrictions to surface disturbing activities and the highest potential to impact vegetation and habitat quality and connectivity out of all the alternatives. This could impair or fragment habitat for some species, by increasing direct disturbance and altering vegetation over the long-term. Wildlife habitats that are in relatively good ecological health (native vegetation is intact, lack of weed infestations, etc.) would largely remain in the same condition in the absence of future large-scale natural disturbance (*i.e*. wildfire) or man-made disturbances. Habitats in poor condition, could be treated with approved vegetation and fuel methods and the BLM would have fewer restrictions in implementing habitat maintenance and restoration projects than under the No Action Alternative. The increased flexibility could facilitate more efficacious treatments, which could maintain or increase habitat quality and connectivity for some species, including special status species, within the planning area at a greater rate compared to the No Action Alternative and the other action alternatives.

OHV, Travel Management, and Livestock Grazing Management Impacts – All Wildlife

The potential effects of OHV, travel management, and livestock grazing management on all wildlife and its habitats would be similar to those described for the No Action Alternative, except there would be no limits on road work or new range improvements which could increase disturbance to wildlife associated with these activities.

Wilderness Characteristics, OHV, and Livestock Grazing Management Impacts - Specific Species

Impacts to specific species would be similar to the No Action Alternative except potential impacts due to ground disturbing activities as well as, vegetation, fuels, and wildlife habitat treatments would be greater. Increased disturbance and activity would negatively impact wildlife in the short-term and could negatively impact habitat and connectivity for some species in the long term by altering vegetation and causing fragmentation. However, increasing wildlife habitat treatments would more effectively improve poor or degrading habitat, and could improve conditions for some species.

Impacts of Alternative B

Wilderness Characteristics Management Impacts – All Wildlife

This alternative would reduce the potential for infrastructure related mortality, habitat fragmentation, and wildlife disturbances to the greatest extent of all the alternatives. Positive effects would occur for most wildlife species, including special status species, due to less potential for habitat disturbances within Category C units and new Section 202 WSAs that could impair or fragment wildlife habitat and

connectivity. Table 3-49 summarizes the existing overlap of lands managed specifically to protect wilderness characteristics with important wildlife habitats in the planning area.

Table 3-49. Overlap of Important Wildlife Habitats with Lands with Wilderness Characteristics

Habitat	No Action Alternative	Alternative				
		A	B	C	D	E
	106 units	Category C units	Category C units/New Section 202 WSAs	Category C units	Category C units	Category C units
Bighorn Sheep	392,207	0	392,207	142,590	3,181	54,199
Elk (winter)	307,679	0	307,679	83,980	0	105,394
Mule Deer (winter)	553,915	0	553,915	115,319	57	203,482
Pronghorn	1,090,298	0	1,090,298	195,816	2,383	231,569
PAC	561,366	0	561,366	106,392	4,677	194,024
PHMA (Total)	573,854	0	573,854	106,392	4,677	202,719
PHMA (SFA)		0	402,390	106,306	4,677	176,560
GHMA	788,113	0	788,113	0	160	135,199
Total leks (not including historical; 2021)	132	0	132	42	0	45
- Occupied leks	36	0	36	8	0	4
- Pending leks	51	0	51	23	0	22
- Unoccupied leks	45	0	45	11	0	19
Documented pygmy rabbit burrows	320	0	320	11	0	116
ODFW COAs	688,483	0	688,483	193,005	1,194	333,012

Areas where the vegetation is currently in good ecological condition would likely remain in that condition in the absence of natural disturbance (*i.e.* wildfire; see *Vegetation* section). However, when a natural disturbance occurs, areas with low resilience could require active management (*i.e.* reseeding) to assist in habitat restoration.

The greatest potential negative impact to wildlife and wildlife habitat, including special status species, would be caused by the decline in native vegetation vigor, age class diversity, and species diversity in portions of the planning area currently under threat of invasive annual grass and/or juniper encroachment. Maintenance, restoration, and enhancement of wildlife habitat through vegetation treatments, non-native invasive vegetation control, and wildfire management would become more difficult within many Category C units and WSAs (up to 2.1 million acres) over the long-term (see *Vegetation* and *Fire and Fuels* sections). This, coupled with constraints on treatment methods, could impact the scale and scope of habitat restoration treatments resulting in lower quality habitat for some species, including special status species, within some Category C units and new Section 202 WSAs over the long-term.

Designating all inventory units as land tenure zone 1 (retention) would have a small positive impact to wildlife/habitat manageability, as it would only increase the total area in zone 1 by about 7% over the No Action Alternative (total of about 88.2% of the planning area). Managing Category C units as VRM class II and new Section 202 WSAs as VRM class I would be beneficial to wildlife habitat by keeping human disturbances to a minimum, provided the area has a high resistance to invasive annual grasses and resilience to wildfire. However, active management would likely be required in some areas at some point during to maintain good ecological conditions (Tables 3-13 to 3-15) and retain quality wildlife habitat over the long-term.

OHV and Travel Management Impacts – All Wildlife

Public motorized vehicle use would be eliminated within about 66.9% of the planning area (all Category C units and WSAs) (and Limited to Existing or Designated Routes on about 25.2% of the planning area (Map OHV-2, Appendix 1), which would collectively reduce potential cross-country motorized vehicle disturbance to habitats or harassment of wildlife species across a large portion (92.1%) of the planning area. Over the long-term, vegetation and associated wildlife habitats could recover on many closed routes (up to 1,668 miles; 2,115 acres) and on an estimated 10,000 acres that were previously open and subject to concentrated OHV use. While the BLM would retain administrative access on closed routes, many of these routes would revegetate or otherwise become impassable over time which could hamper BLM's ability to easily access large areas to monitor wildlife habitat/populations or implement vegetation/habitat restoration treatments over time (see *Vegetation* and *Fire and Fuels* sections). There would also be negative impacts associated with reduced ability to access areas for wildlife infrastructure maintenance (*e.g.* guzzlers, wildlife escape ramps, fence marking/removal, etc.). In particular, there are 13 wildlife guzzlers located within existing WSAs and 62 guzzlers within Category C units and new Section 202 WSAs, all which would be more difficult to access and maintain over time. Loss of functioning guzzlers would decrease wildlife water availability and decrease wildlife habitat quality in the surrounding arid landscapes over the long-term. In addition, an estimated 15-20 miles of new roads could disturb an estimated 22-26 additional acres of habitats over the long-term under this alternative.

Livestock Grazing Management Impacts – All Wildlife

Under this alternative, the impacts of removing livestock grazing on wildlife habitat would be greater and occur on more acres than the No Action Alternative or the other alternatives. Approximately 8.1% of the planning area would be ungrazed initially (Tables 3-35 and A5-3, Appendix 5). An additional 58,681 acres of vacant allotments and pastures within ACECs and WSAs would also be designated as unavailable to livestock, and additional significant acreage could become unavailable to livestock as grazing permits are relinquished or suspended over the long-term. Wildlife habitats in these areas would not be subject to livestock impacts. Livestock grazing primarily affects wildlife through habitat alteration; directly by altering plant community composition, structure, and productivity or indirectly by altering abiotic processes and invasibility of sagebrush communities. The type and scale of impact would vary with site potential, ecological condition, climate variables, as well as the timing and intensity of grazing.

Eliminating livestock grazing throughout an entire pasture or allotment where only portions do not meet Rangeland Health Standards due to livestock grazing, could improve wildlife habitat and/or increase the availability of forage and cover (on up to an estimated 126,614 acres) for some species of wildlife. Removal of grazing would not necessarily facilitate habitat recovery at a faster rate, in the absence of other restorative activities. Courtois *et al.* (2004) found that vegetation recovery rates between ungrazed and moderately grazed areas in the northern Great Basin can be similar and long-term rest of areas that have already shifted to undesirable conditions is unlikely to reverse those shifts (Davies *et al*. 2014). However, full recovery of perennial grasses, soil nutrient levels, water infiltration rates, and biocrusts may require multiple decades of rest and restoration, which can reverse the desertification caused by drought and overgrazing (Allington and Valone 2010, Allington and Valone 2011, Germino *et al*. 2022, Morris *et al*. 2011, Valone *et al*. 2002).

Livestock grazing can be used as a tool to maintain desired wildlife habitat conditions for some wildlife species (BLM 1990d, 1990e, 1990h, 2016q, 2020h, 2021a, 2021b, In prep a) and the loss of grazing would take away one tool for maintaining or enhancing habitats. Grazing permit relinquishment on anywhere from 0 to over two million acres (Table 2-2) would eliminate a habitat management tool, reducing BLM's ability to manipulate vegetation and fine fuels through grazing in portions of the planning area.

Concentrated livestock use could be reduced or eliminated on an estimated 10,000-20,500 acres around water developments and fences, reducing direct disturbance to wildlife and fragmentation of wildlife habitats, and allowing an opportunity for vegetation and wildlife habitats in these areas to recover over the long-term.

Wilderness Characteristics, OHV and Travel, and Livestock Grazing Management Impacts - Specific Species

Big Game

Wind/solar right-of-way restrictions under Alternative B within Category C and new Section 202 WSAs, would provide the greatest amount of mule deer and elk winter range habitat protected from potential future habitat fragmentation associated with large solar energy developments of all the alternative analyzed. However, active management for big game species would be constrained on approximately 553,900 acres of mule deer winter range, 430,000 acres of elk winter range, and 586,000 acres of bighorn sheep range (Table 3-49). Implementation of Secretarial Order 3362 would be more difficult under this alternative. In addition to mule deer winter range, over 1,900 miles of documented mule deer migration routes (ODFW GIS layer; Map WLF-1, Appendix 1) would potentially be impacted because management activities designed to improve and/or restore habitat in these areas would be more difficult to accomplish. In addition to 88,152 acres of seasonal road closures in mule deer winter range, an estimated 465,760 acres of winter mule deer habitat would be closed to OHV use year-round, which would substantially reduce the potential for vehicle harassment of mule deer (and other big game and wildlife) in these areas.

Almost 500,000 acres of winter mule deer habitat would change from a VRM Class III or IV, to a Class I or II management objectives which would generally preserve the existing natural character of the habitat. However, this change in management could impede future big game habitat restoration or enhancement treatments by limiting some juniper removal actions. Compared to the No Action Alternative and Alternative A, it would be more difficult to implement effective big game habitat improvement projects as the amount of juniper cutting needed to improve big game habitat in many areas would likely exceed the level of visual change allowed by VRM Class I and II objectives. For this reason, big game habitat quality in portions of the planning area could degrade over time. However, removal or reduction of livestock grazing would increase forage available for big game.

Gray Wolves

Gray wolves are considered adaptable and a habitat generalist. Reducing or removing livestock via permit relinquishments or from allotments or pastures not meeting rangeland health standards would reduce the potential for wolf-livestock interactions and depredations in the planning area and could reduce the need for lethal control of wolves in the future. Reductions in wolf livestock interactions could range from slight to moderate. However, to date, only one livestock depredation investigation in the planning

area has been confirmed as a wolf kill. Therefore, the potential effects of livestock management actions on wolves under this alternative would be largely similar to the No Action Alternative.

Increasing OHV area closures and major and wind/solar ROW exclusion areas would reduce potential disturbances to wolves year-round. Reduced management disturbances specifically in the Duncan Creek wilderness characteristic unit (OR-015-208) could benefit wolves in the current, overlapping AKWA.

Pygmy Rabbits

There are 320 documented pygmy rabbit burrows and an estimated 384,670 acres of primary habitat (Smith *et al.* 2019) within inventory units, indicating some units provide the necessary sagebrush density and other habitat components to support pygmy rabbit populations (Map WLF-4, Appendix 1).

OHV area closures would positively benefit pygmy rabbits in the area between Burma Rim and Saunders Rim where OHV use is currently open but would have no measurable direct impact on pygmy rabbits elsewhere in the planning area because the remaining Open OHV areas would be largely outside of known pygmy rabbit habitat (areas with documented burrows).

Bats

Though there is a low probability of wind energy development in the planning area, increasing wind energy ROW exclusion areas would be beneficial to bats because of the reduction of a potential threat (wind turbines). The reduced effectiveness of vegetation treatments within inventory units could have potential negative indirect impacts to bats primarily through a change in prey type and/or abundance as a result of vegetation community changes over time. These negative effects would be greater than the No Action Alternative and Alternative A.

Greater Sage-Grouse

Under this alternative, up to 574,000 acres of PHMA, 788,000 acres of GHMA, and 31 occupied leks could potentially be negatively impacted by a loss of management access and both fewer and less effective habitat restoration treatments over the long-term (Table 3-49) (see *Vegetation* and *Fire and Fuels* sections).

However, there would also be beneficial effects associated with reductions in sage-grouse habitats potentially subject to future ground/habitat disturbance under this alternative. The increase in major and wind/solar ROW exclusion areas would be a positive benefit for Greater Sage-Grouse. Major transmission lines are a documented form of mortality for Greater Sage-Grouse and can fragment seasonal use areas. Compared to the No Action Alternative and Alternative A, an estimated 1.3 million acres would be elevated from major ROW avoidance to exclusion areas within sage-grouse PHMA/GHMA. Over 950,000 acres would change from avoidance to exclusion areas for wind/solar ROWs in sage-grouse PHMA/GHMA. These management changes would collectively reduce the potential for further habitat fragmentation and tall structure impacts. However, the potential for future wind, solar, and leasable mineral development and associated impacts in the planning area would remain low.

Removal or reductions of livestock grazing under this alternative would not necessarily benefit sage-grouse or its habitat. There is a lack of evidence that current levels of grazing use on public lands under

existing (rangeland health) standards are broadly harmful to sage-grouse populations or that further reductions or elimination of grazing would provide benefits to sage-grouse (Runge *et al*. 2018). Smith *et al*. (2018) conducted a 10-year experimental study of the removal of grazing from sage-grouse habitat and found no significant effects on sage-grouse nesting success when compared to low to moderate levels of rotational grazing. In addition, reductions in livestock grazing on public lands could also result in unintended (indirect) sage-grouse habitat loss and fragmentation on private lands within the planning area. Runge *et al.* (2018) modeled 10%, 50%, and 100% reductions in livestock grazing on public lands throughout the west and estimated an increase in the conversion of mesic native sage-grouse habitat on private lands to croplands ranging from 3.06% (10% reduction) to 38.14% (100% reduction) by 2050.

Migratory Birds (including Eagles)

Under this alternative, a potential beneficial impact could result from route closures if they revegetate with native vegetation and provide slightly more habitat (up to 2,410 acres or 0.008% of the planning area), either in the form of nesting shrubs for passerine birds or cover for raptor prey. However, populations of migratory birds could eventually be indirectly impacted by continued degradation of some poor-quality habitat areas which would negatively affect prey/forage abundance and/or quality due to fewer effective vegetation restoration treatments being completed across the planning area. During times of inadequate forage, bird reproductive rates drop. A sustained period of poor-quality habitat affecting prey/forage species would ultimately be reflected by a decline in the number and or distribution of migratory birds, including eagles and other raptors in portions of the planning area. These effects could be offset by an increase in forage from the removal or reduction of grazing.

Reptiles

Beneficial impacts from OHV closures would result in the planning area as roads revegetate (up to 2,410 acres; 0.008%), direct mortality of reptiles by OHV use would be reduced, and collection of native wild reptiles for the pet trade would be made more difficult due to reduced public access.

However, reptile populations could also be negatively impacted by continued degradation of poor-quality habitats due to fewer effective vegetation restoration treatments being completed across large portions of the planning area.

Removal or reductions in grazing could benefit sagebrush lizards and side-blotched lizards and negatively impact pygmy short-horned lizards according to a literature review by Pilliod *et al.* (2020). The exact mechanism behind positive or negative impact to the various lizard species studied was undetermined, but was likely associated with changes in vegetation composition, density, and/or structure associated with livestock grazing and differences in the individual microhabitat requirements or preferences of the different lizard species.

Bumblebees and Other Pollinators

Under this alternative, reduced ability to implement vegetation treatments would result in the decline of sagebrush steppe habitat integrity. Loss of native plants to invasive plants would reduce the species richness of flowering forbs as pollen and nectar sources. Changes in soil characteristics, erosion, and decline in proper functioning uplands would negatively affect underground bumblebee nesting sites.

Conversely, a potential beneficial impact from additional OHV closures could result as roads revegetate and provide slightly more nectar and host plants (up to 2,410 acres; 0.008%) in the planning area. However, populations could also be negatively impacted by continued degradation of some poor-quality habitats due to fewer effective vegetation restoration treatments being completed across large portions of the planning area.

Summary

Overall, the positive benefits of increased protections to high-quality, intact wildlife habitats from the prevention of future human developments and disturbance would be highest of all the alternatives. This alternative would also have the highest potential for livestock grazing reductions which could make more forage available for wildlife use across the planning area compared to any of the other alternatives. However, these benefits would be offset by fewer acres of, and less effective habitat management restoration treatments within Category C units, new Section 202 WSAs, as well as, existing WSAs. For these reasons, Alternative B would limit BLM's ability to conduct wildlife/habitat restoration efforts more than the alternatives analyzed.

Impacts of Alternative C

Wilderness Characteristics Management Impacts - All Wildlife

Under this alternative, most new habitat disturbances from human developments would be prohibited in Category C units. The acres managed as ROW exclusion areas, NSO (leasable minerals), or salable mineral closure would be more than under the No Action Alternative. In addition, BMPs (see Appendix 7) would be used to mitigate for potential effects associated with many activities in Category B units. This management direction would eliminate or minimize most adverse impacts to wildlife and wildlife habitats in both Category B and C units.

In the absence of disturbance, management of Category C units would help maintain areas in good ecological condition (Table 3-15) along with their associated wildlife habitats. However, many of these areas are threatened by expansion of juniper and/or invasive grasses and potential natural disturbances over time and could need active management to maintain or restore wildlife habitats in the future.

Wildlife habitats within Category B units that are in an STM State C (sagebrush with an understory dominated by invasive annual grasses), STM State D (invasive annual grassland), and STM Dual/Juniper State C (phase II juniper encroachment) could be more difficult to restore or prevent from further declining in condition if BMPs for wilderness characteristics (see Appendix 7) are applied that reduce the effectiveness of vegetation treatments.

The ability to actively conduct habitat management within Category A units, and the positive benefits to wildlife habitats and wildlife species, including special status species, from these activities would be similar to those described for Alternative A.

OHV and Travel Management Impacts – All Wildlife

Motorized vehicle use would be eliminated from about 0.35% of the planning area and would be Limited to Existing or Designated Routes on about 99.7% of the planning area. These designations would

collectively eliminate cross-country motorized vehicle use from the entire planning area and substantially reduce potential motorized vehicle disturbances to all wildlife habitats and species, including special status species. In addition, approximately 30,000 acres of former concentrated motorized vehicle use areas could revegetate and provide additional wildlife habitats over the long-term.

Keeping all existing routes in the planning area open to motorized vehicle use and constructing an estimated 15-20 miles of new roads would disturb an estimated 8,024 acres of habitats over the long-term under this alternative. However, these routes would allow the BLM to continue have adequate access to monitor wildlife populations and habitat, as well as treat areas to maintain, enhance, or restore wildlife habitats. Wildlife guzzler maintenance would also be feasible, similar to the No Action Alternative.

Livestock Grazing Management Impacts – All Wildlife

Under this alternative, as with the No Action Alternative, up to 8.1% of the planning area would continue to be ungrazed for various reasons (Tables 3-35 and A5-3, Appendix 5) and wildlife habitats in these areas would not be subject to livestock impacts. Livestock use would continue to have negative impacts on vegetation and associated wildlife habitats, due to heavy grazing and trampling around water sources and trails along fences on about 42,000 acres within the planning area (Table 3-17).

The types of potential impacts to wildlife and associated habitats, including most special status species, which could result from grazing reductions due to permit relinquishments under this alternative would be similar to those described under Alternative B, but would occur on fewer acres and only within WSAs. The potential impacts to wildlife/habitat, including special status species, which could occur from Rangeland Health management actions under this alternative would also be similar to those described for Alternative B, but would occur on fewer acres and for a shorter period of time.

Wilderness Characteristics, OHV, and Livestock Grazing Management Impacts - Specific Species

Big Game

Seasonally closed areas (128,525 acres) in mule deer winter range would continue to reduce winter harassment of mule deer and other big game similar to the No Action Alternative. More mule deer winter range (115,000 acres), miles of mule deer migration corridors (323), elk winter range (84,000 acres), and bighorn sheep range (143,000 acres) could be impacted over time compared to the No Action Alternative and Alternative A, due to limitations on vegetation/habitat treatment methods and needing to meet VRM Class II objectives within Category C units (Tables 3-3, 3-25 and 3-49). However, this alternative would impact management of substantially less acreage of big game habitat and miles of migration corridors than Alternative B.

Gray Wolves

Although AKWAs may shift, develop, or disappear on an annual basis, the current AKWA would not overlap any Category C units. Under this alternative, impacts would be similar to the No Action Alternative, but with slightly less potential for disturbance during wolf dispersal.

Pygmy Rabbits

Under Alternative C, impacts to pygmy rabbits and/or habitat from reduced vegetation treatment effectiveness would be slightly more than the No Action Alternative or Alternative A because very little

known, occupied habitat overlaps with Category C units. Only 11 documented burrows are located within Category C units (Table 3-49), but approximately 84,870 acres, primarily within 8 units (Long Lake, Lone Grave Butte, Buckaroo Pass, Bald Mountain, Hawk Mountain Northeast, Rincon Southwest Addition, Basque Hills Southeast Addition, and Elk Mountain) are modeled as primary habitat (Smith *et al*. 2019). Compared to Alternative B, less primary habitat would potentially be negatively affected by reduced treatment effectiveness.

The impacts of limiting OHV use throughout the planning on pygmy rabbits would be similar to Alternative B because the public would be prevented from driving motorized vehicles cross-country within most of the planning area.

Bats

Compared to the No Action Alternative and Alternative A, maintenance of quality foraging habitat that ensures bats acquire adequate fat stores before hibernation to survive potential WNS infection would possibly be more difficult within Category C units (about 420,300 acres). Maintenance or restoration of prey habitat could have reduced effectiveness within Category C units, but not as much as Alternative B due to adequate administrative access and road maintenance.

Greater Sage-Grouse

Under this alternative, sagebrush/sage-grouse habitat restoration treatments would be more restrictive and potentially less effective than the No Action Alternative or Alternative A within Category C units (Table 3-44). Compared to Alternative B, fewer acres of PHMA (106,000) and occupied leks (7) within Category C units would potentially be negatively impacted by decreased habitat restoration treatment effectiveness (Table 3-25). Overall treatment effectiveness would be greater than the No Action and Alternative B, but less than Alternative A.

An additional estimated 349,000 and 245,000 acres of sage-grouse PHMA/GHMA would be elevated from avoidance to exclusion for major and wind/solar ROWs respectively compared to the No Action Alternative/Alternative A. This would provide more protection for sage-grouse than the No Action Alternative/Alternative A, but less than Alternative B. However, the potential for future wind, solar, and leasable mineral development and associated impacts in the planning area would remain low.

Other Wildlife and Special Status Species

Compared to the No Action Alternative, habitat restoration treatments would possibly be more effective because no settlement agreement constraints would be in place. Impacts to other wildlife, including migratory birds, reptiles, pollinators, and special status species habitats within Category C units under this alternative would be less than those described under Alternative B because substantially fewer acres would be subject to wilderness characteristics management and treatment effectiveness would be greater than in Alternative B, but less than Alternative A.

Summary

Overall, the benefits to wildlife/habitat from increased protections from human developments and disturbance would be offset by the negative impacts of the limitations on active habitat restoration management within Category C units. Alternative C would negatively affect wildlife/habitat restoration

efforts more than the No Action Alternative and Alternative A, but to a lesser degree than Alternative B. However, limiting OHV use to existing/designated routes would eliminate public cross-country motorized vehicle use from most (99.7%) of the planning area and substantially reduce motorized vehicle noise/harassment impacts to individual wildlife. In addition, areas of former concentrated motorized vehicle use could revegetate and provide additional wildlife habitats over the long-term. This alternative could also result in some livestock grazing reductions which could make more forage available for wildlife use across the planning area compared to the No Action Alternative and Alternative A.

Impacts of Alternative D

Wilderness Characteristics Management Impacts – All Wildlife

Under this alternative, most new habitat disturbances from human developments would be prohibited in the two Category C units. The acres managed as ROW exclusion areas, NSO (leasable minerals), or salable mineral closure would be slightly more than under the No Action Alternative. In addition, BMPs and RDFs (see Appendix 7) would be used to mitigate for potential effects associated with many activities in Category B units. This management direction would eliminate or minimize adverse impacts to wildlife and wildlife habitat, including special status species, in both Category B and C units.

The two Category C units are currently in good ecological condition (STM State A). Management of these Category C units would help maintain this condition and the associated wildlife habitat. Unforeseen natural disturbances over time could necessitate active management to maintain or restore quality wildlife habitat in these areas in the future.

There are an estimated 167,000 acres of Category B units in an STM State C (sagebrush with an understory dominated by invasive annual grasses), 87,350 acres in STM State D (invasive annual grassland) and 45,690 acres in STM Dual/Juniper State C (phase II juniper encroachment). Wildlife habitat in these Category B units could be more difficult to restore or prevent from further decline in condition if BMPs for wilderness characteristics (see Appendix 7) are applied that reduce the effectiveness of vegetation treatments.

The ability to actively conduct habitat management within Category A units, and the positive benefits to wildlife habitats and wildlife species, including special status species, from these activities would be similar to those described for Alternative A.

OHV and Travel Management Impacts – All Wildlife

Under this alternative, motorized vehicle use would be eliminated from about 0.4% of the planning area and Limited to Existing or Designated Routes on about 97.4% of the planning area. These designations would collectively eliminate cross-country motorized vehicle use from most (97.8%) of the planning area and would result in less potential motorized vehicle harassment to all wildlife species/habitats compared to the No Action Alternative and Alternative A. However, approximately 30,000-70,500 acres of wildlife habitats in the remaining Open OHV area designations could be negatively impacted by concentrated motorized vehicle use over the long-term.

Keeping all existing routes in the planning area open to motorized vehicle use and constructing an estimated 15-20 miles of new roads could also disturb an estimated 8,024 acres of habitats over the long-

term under this alternative. However, these routes would allow the BLM to continue have adequate access to monitor wildlife populations and habitat, treat areas to maintain, enhance, or restore wildlife habitats, and maintain wildlife guzzlers, similar to the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts – All Wildlife

The potential impacts to wildlife/habitat, including special status species, associated with livestock grazing management under this alternative, including Rangeland Health management adjustments and grazing permit relinquishments, would be similar to those described under the No Action Alternative. However, making grazing management changes in response to Rangeland Health issues that are not due to livestock grazing would likely improve wildlife habitat conditions.

Wilderness Characteristics, OHV and Travel, and Livestock Grazing Management Impacts - Specific Species

Big Game

Big game habitat management would be slightly more difficult compared to the No Action Alternative and Alternative A, due to limitations on vegetation/habitat treatment methods and needing to meet VRM Class II objectives within the two Category C units, but only by a relatively insignificant amount (57 acres of mule deer winter habitat, 3,200 acres of bighorn sheep habitat, and 0 acres of elk habitat).

Seasonally closed areas (128,525 acres) in mule deer winter range would continue to reduce winter harassment of mule deer and other big game similar to the No Action Alternative. The potential impacts of continued OHV use in the Sand Dunes WSA on mule deer winter range and migration corridors would be the same as described for the No Action Alternative.

Compared to Alternatives B and C respectively, this alternative would affect management of substantially fewer big game habitat acres (Table 3-49).

Greater Sage-Grouse

Impacts to Greater Sage-Grouse habitat would be largely similar to the No Action Alternative. Under this alternative, Category C units would overlap very few acres of PHMA and there are no leks that could potentially be negatively impacted by less effective treatments (Table 3-49).

Other Wildlife and Special Status Species

The potential impacts to migratory birds (including eagles), bats, gray wolves, pygmy rabbits, reptiles, bumblebees, other pollinators, and other special status species would be similar to those described under the No Action Alternative and Alternative A, as wilderness characteristics management would only be emphasized on about 4,671 acres (less than 2% of the planning area), substantially fewer acres than Alternative B, C, or E.

Summary

Overall, the effects of this alternative on wildlife and wildlife habitat within the 2 small Category C units would be similar to those described for the No Action Alternative and Alternative A, as there would be

very little change in management in these areas. Shifting more of the planning area from open OHV area designations to limited designations would reduce both ground/habitat disturbances and negative noise/harassment effects to individual wildlife from motorized vehicles compared to the No Action Alternative and Alternative A. Impacts to wildlife/habitat associated with livestock grazing management would be similar to those described under the No Action Alternative.

Impacts of Alternative E

Wilderness Characteristics Management Impacts – All Wildlife

Under this alternative, an estimated 8,227 acres of wildlife habitats would continue to be disturbed/ negatively impacted by on-going land use authorizations, mining, facilities, and recreation sites (Tables 3-6, 3-9, 3-31, and 3-51). However, most new habitat disturbances from human developments would be prohibited in Category C units. The acres managed as ROW exclusion areas, NSO (leasable minerals), or salable mineral closure would be more than under the No Action Alternative. In addition, BMPs and RDFs (see Appendix 7) would be used to mitigate for potential effects associated with many activities in Category B units. This management direction would eliminate or minimize adverse impacts to wildlife and wildlife habitat, including special status species, in both Category B and C units.

In the absence of disturbance, management of Category C units would help maintain areas that are in good ecological condition (Tables 3-15 and 3-44) along with their associated wildlife habitats. However, many of these areas are threatened by expansion of western juniper and/or invasive grasses and unforeseen natural disturbances over time could necessitate active management to maintain or restore wildlife habitats in these areas in the future.

Wildlife habitats in Category B units that are in an STM State C (sagebrush with an understory dominated by invasive annual grasses), STM State D (invasive annual grassland) and STM Dual/Juniper State C (phase II juniper encroachment) could be more difficult to restore or prevent from further decline in condition if BMPs for wilderness characteristics (see Appendix 7) are applied that reduce the effectiveness of vegetation treatments.

The ability to actively conduct habitat management within Category A units, and the positive benefits to wildlife habitats and wildlife species, including special status species, from these activities would be similar to those described for Alternative A.

OHV and Travel Management Impacts – All Wildlife

Under this alternative, motorized vehicle use would be eliminated from about 0.35% of the planning area and Limited to Existing or Designated routes on about 85.1% of the planning area. These designations would collectively eliminate cross-country motorized vehicle use from most (85.5%) of the planning area and would result in slightly less potential motorized vehicle harassment to all wildlife species/habitats compared to the No Action Alternative and Alternative A. In addition, an estimated 30,000-93,320 acres of habitats in the remaining OHV Open area designations could be negatively impacted by concentrated motorized vehicle use over the long-term similar to the No Action Alternative and Alternative A. For these reasons, the effects of cross-country OHV use on wildlife habitat and species, including special status species, would be similar to the No Action Alternative and Alternative A.

Keeping existing routes in the planning area open to motorized vehicle use and constructing an estimated 15-20 miles of new roads could also disturb an estimated 8,024 acres of habitats over the long-term under this alternative. However, these routes would allow the BLM to continue have adequate access to monitor wildlife populations and habitat, treat areas to maintain, enhance, or restore wildlife habitats, and maintain wildlife guzzlers, similar to the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts – All Wildlife

Impacts to wildlife and associated habitats, including special status species, from livestock grazing management under this alternative, including Rangeland Health management and grazing permit relinquishments would be the same as those described under the No Action Alternative.

Wilderness Characteristics, OHV and Travel, and Livestock Grazing Management Impacts - Specific Species

Big Game

Under this alternative, approximately 319,000 acres of mule deer winter range would be designated as ROW exclusion areas, most of which is currently designated as an avoidance area. An estimated 112,500 of those acres would also be in elk winter range and specifically in the Elk Mountain, Benjamin Lake, East Butte, and Saddle Butte South wilderness characteristics units. An increase in both major and wind/solar ROW exclusion designations in winter range would reduce the potential for habitat fragmentation and impacts to migration corridors.

However, this alternative would have more mule deer winter range (203,482 acres), miles of mule deer migration corridors (303), elk winter range (105,394 acres), and bighorn sheep range (54,199 acres) that could be negatively impacted over time compared to the No Action Alternative and Alternative A, due to limitations on vegetation/habitat treatment methods and restoration actions needing to meet VRM Class II objectives within Category C units (Table 3-49).

Seasonally closed areas (128,525 acres) in mule deer winter range would continue to reduce winter harassment of deer similar to the No Action Alternative. The potential impacts of continued OHV use in the Sand Dunes WSA on mule deer winter range and migration corridors would be the same as described for the No Action Alternative.

Gray Wolves

Although AKWAs may shift, develop, and disappear on an annual basis, the current AKWA does not overlap any Category C units. Under this alternative, impacts would be similar to the No Action Alternative, but with slightly less potential for disturbance during wolf dispersal.

Pygmy Rabbits

Under Alternative E, Category C units include 116 documented burrows and about 172,200 acres of primary habitat (Smith *et al*. 2019). Therefore, more pygmy rabbit habitat would be negatively impacted by reduced effectiveness or feasibility of habitat restoration treatments than under Alternatives C and D,

but less than under Alternative B. Impacts of OHV use on pygmy rabbits would be similar to the No Action Alternative.

Bats

Compared to the No Action Alternative and Alternative A, maintenance of quality foraging habitat that ensures bats acquire adequate fat stores before hibernation to survive potential WNS infection would possibly be more difficult within Category C units (about 373,400 acres). The nature of potential impacts would be similar, but slightly less than those described under Alternative C.

Greater Sage-Grouse

Although less than Alternative B, compared to Alternatives C and D, this alternative would have the greatest amount of Category C units over-lapping PHMA (200,000 acres) and leks (44) that could be negatively impacted over time due to less effective vegetation/habitat treatments or decline in habitat condition following large-scale natural disturbance (Tables 3-15 and 3-44).

In contrast, changes in ROW management would benefit sage-grouse by reducing the risk of future habitat fragmentation and mortality. Compared to the No Action Alternative and Alternative A, approximately 327,590 additional acres would be elevated from a major ROW avoidance area to a ROW exclusion area. Approximately 161,356 acres of GHMA/PHMA would be elevated from wind and solar ROW avoidance areas to exclusion areas. This would provide more protection for sage-grouse habitat from potential future major or wind/solar ROW development than the No Action Alternative, and Alternatives A and C, but less than Alternative B (Table 3-49).

Other Wildlife and Special Status Species

The potential impacts to migratory birds (including eagles), reptiles, bumblebees, other pollinators, and other special status species would be similar to those described under No Action and Alternative A. The potential negative impacts to habitat in Category C units that would result from less effective vegetation treatments would be less than Alternatives B and C, but more than in Alternative D.

Summary

Overall, the benefits to wildlife/habitat from increased protections from human developments and disturbances would be similar to those described for Alternative C and would be offset by the negative impacts of the limitations on active habitat restoration management within Category C units. Alternative E could negatively affect wildlife/habitat restoration efforts more than the No Action Alternative or Alternative A, but to a lesser degree than Alternatives B or C. Shifting more of the planning area from open OHV area designations to limited designations would reduce both ground/habitat disturbances and negative noise/harassment effects to individual wildlife from motorized vehicles compared to the No Action Alternative and Alternative A. The effects of livestock grazing management on wildlife and wildlife habitat would be similar to the No Action Alternative.

Cumulative Impacts Common to All Alternatives

Climate Change

The potential impacts of climate change on wildlife are complex, numerous, and highly variable (could be either positive or negative), depending upon the species. Potential changes in vegetation communities associated with climate change could impact the quality and quantity of wildlife habitat. As discussed in the *Vegetation* section, warmer temperatures with early season precipitation could lead to an increase in invasive annual grasses and more frequent and/or larger wildland fires, whereas warmer/wetter summers could cause an increase in the rate of juniper encroachment into sagebrush steppe habitats. The quantity and quality of wildlife habitats could be decreased in the planning area under either scenario due to a loss of structural complexity and native plant diversity if annual grasses or juniper dominate the plant community. In addition, the risk of wildlife habitat loss from future large-scale wildland fires would increase.

Impacts to wildlife from climate change could also include phenological mismatches, physiological and behavioral changes which could affect patterns of space use, survival, and reproductive success. Climate change could be a compounding threat or stressor to wildlife on top of disease, competition with exotic species, competition for forage, anthropogenic disturbance, and loss or fragmentation of habitat through direct conversion or infrastructure.

Some wildlife species would attempt to adapt to a changing climate through elevational migration, shifting their range latitudinally, migrating earlier or later according to environmental cues, or changing their daily routine (National Fish, Wildlife, and Plants Climate Adaptation Network 2021). Still other species could be further restricted if already inhabiting a high elevation or rare ecological niche or if their mobility and dispersal capabilities are low. Socolar *et al*. (2017) reports that some birds have been documented breeding earlier in California, nesting about a week earlier than they did a century ago. Novel interactions could potentially develop between plant communities and wildlife species as spatial and temporal shifts in species ranges, animal activity, and phenology occur over time.

Reptiles could spend more time sheltered and less time foraging and mating to avoid critical maximum temperatures, thus reducing population persistence, as documented in some regions (Sinervo *et al*. 2010). Detrimental physiological consequences of climate change could also occur and include a reduction in average body size which could impact survival and reproductive success. Gender ratios could become skewed in some lizards (Valenzuela *et al*. 2019) or the western pond turtle (Ernst and Lovich 2009) because gender determination is temperature dependent in some reptiles, with warmer eggs resulting in female young and cooler eggs resulting in male young.

In the 12-month finding for the petition to list the Greater Sage-Grouse, the FWS (2010) identified wildfire, invasive plants, and climate change as contributing to listing Factor A (the present or threatened destruction, modification or curtailment of habitat or range) (see ESA Section 4; 16 U.S.C. §1533) in their "warranted but precluded" determination. Models evaluating four different climate scenarios (current, hot with dry summers, warm with slightly wetter summers, and hot with much wetter summers) in southeastern Oregon all projected a decline in Sage-Grouse habitat in the first several decades due to projected periodic increases in xeric shrub steppe, increased wildfire and prevalence of invasive grasses, and juniper encroachment (Creutzburg *et al*. 2015). Sage-Grouse are considered an indicator species for other sagebrush obligate species, such as pygmy rabbits (Rowland *et al*. 2006). For this reason, other

birds or mammals that are sagebrush obligates or near obligates could also be negatively impacted by future climate change.

Continental waterbird migration routes could degrade as hydroperiods are reduced and Important Bird Areas, such as Lake Abert, increase in salinity. Bird community composition of Lake Abert could change, favoring species such as Black-necked Stilt, Sandhill Crane, and Long-billed Curlew, while negatively impacting suitability for American Avocet, Western Grebe, Clark's Grebe, Forster's Tern, Black Tern, Killdeer, Wilson's Snipe, Wilson's Phalarope, Sora, and American Coot (Haig *et al.* 2019). The crucial link to bird composition, diversity, and abundance at Lake Abert is the presence of the birds' primary food source, the alkali fly (*Ephydra hians*), which has a small tolerance in the range of salinity. As water levels drop, salinity increases, greatly affecting the abundance of food and thus birds. Other large lakes and wetland systems in the planning area, such as Summer Lake and the Warner Lakes/wetlands system (from Crump Lake north to Bluejoint Lake) that are important bird habitats could also be impacted by future climate change. Even a small amount of wetland habitat loss or food resource loss could cause disproportionate population declines for aquatic bird species because riparian/wetland habitats are already a very small percentage of the arid west landscape.

Bats could be impacted by climate change in numerous ways. Changing temperatures could affect prey (insect) availability, torpor/hibernation duration, frequency and timing, and susceptibility to extreme weather events. As water availability declines in the west, the reproductive success of bats in the arid west is expected to decline (Adams and Hayes 2008) because evaporative water loss is high in lactating females (Neuweiler 2000). Successful reproduction of insectivorous bats declined by 32-51% with greater than average temperatures and less than average precipitation when tracked over 13 years (Adams 2010). Even non-reproductive insectivorous bats need a reliable source of water; little brown bats generally die within 12 to 24 hours of water deprivation (Neuweiler 2000). Adams and Hayes (2008) state that the survival and continued occupancy of current habitats by bat populations is questionable under drier conditions.

Pollinators could decline as climate warms in the western United States. Plant-pollinator interactions are extremely complicated however, and physiological changes to plants (*e.g.* chemical changes affecting attractiveness to pollinators, nutrition of nectar and pollen, etc.) or to insects (*e.g.* body size reduction, timing/reduced duration, and distance of foraging due to maximum thermal thresholds) could change the plant-insect community dynamics in ways not yet completely known (Scaven and Rafferty 2013). Soroye *et al*. (2020) found bumblebee species richness (number of species) declined with a warming climate. Forister *et al.* (2021) documented a 1.6% annual decline in butterflies over the last four decades, with individual species showing slightly downward to severe reductions. Climate change was identified as a listing factor in the 12-month finding for the petition to list the Monarch Butterfly (FWS 2020) under the ESA; the determination was "warranted but precluded." While a climate scenario with wetter summers could have a positive effect on butterflies due to a positive effect on nectar and host plants, the western U.S. has actually been drier in recent years (Forister *et al*. 2021).

All alternatives would retain a large degree of management flexibility capable of responding to, reducing, or helping mitigate the potential negative effects of climate change on wildlife habitats and populations within the planning area. Management actions that effectively control wildland fires, control invasive species, and restore native plant communities and wildlife habitats, would promote resistance and resilience of sagebrush steppe and other native wildlife habitats to climate change, as well as provide suitable refugia and movement corridors for wildlife. The highest degree of wildlife habitat management

flexibility would be provided (in descending order) by Alternative A, D, No Action, E, C, and B respectively. Alternative B would provide the lowest level of management flexibility to be able to respond to, reduce, or help mitigate the potential negative effects of climate change on wildlife habitats and populations on the highest number of acres (up to 2.1 million) of all of the alternatives. However, Alternative B would also provide the highest level of protection from potential disturbances or activities that could impair or fragment habitat for some species. The highest degree of habitat disturbance or alteration would be provided by (in descending order) Alternative A, D, No Action, E, C, and B respectively.

Habitat Disturbance

Under all alternatives, an estimated 8,227 acres of wildlife habitats would continue to be disturbed/ negatively impacted by past or on-going land use authorizations, mining, facilities, and recreation sites (Tables 3-6, 3-9, 3-31, and 3-51), most of which are located outside of wilderness characteristics units.

Locatable Minerals

The potential additive, incremental negative effects of future locatable mineral exploration and development on wildlife habitats within the planning area, including habitats within wilderness characteristics units, would be similar under all alternatives. Locatable mining is equally likely to occur under all alternatives and would cause ground disturbance and remove existing habitat(s) on a given mine site. Mine operators would be required to prepare a reclamation plan and, in many instances a plan of operations, to incorporate measures that would prevent unnecessary and undue degradation of the public lands (43 CFR § 3809). The BLM would be required to prepare a separate NEPA analysis and approve the reclamation plan and/or plan of operations for locatable mineral development. Impacted areas would be reclaimed either concurrently or at the conclusion of mining activities. During reclamation, vegetation and habitat would be re-established at a given mine site, but the type and quality of wildlife habitat would not necessarily be the same as what existed prior to mining. These requirements would not eliminate or completely mitigate all potential negative effects of future locatable mining development but would minimize negative impacts to wildlife and wildlife habitat, including special status species, to the extent possible under the General Mining Law of 1872 (as amended) and the 43 CFR § 3809 regulations.

Cumulative Impacts of No Action Alternative

Under the No Action Alternative, new land use authorizations, mining, facilities, recreation sites, and range improvements could potentially disturb an estimated 1,944-2,289 additional acres of wildlife habitat (on top of the existing 8,227 acres associated with these activities) over the long-term (Tables 3-6, 3-9, 3-31, and 3-51). Most of these effects would occur elsewhere in the planning area outside of wilderness characteristics units. Though there is limited potential for wind, solar, or leasable mineral development in the planning area, solar fields have the potential to fragment big game habitat and migration corridors. Habitat fragmentation could isolate elk or mule deer populations in portions of their range, reducing genetic variability over time, and/or make individual dispersion riskier (Heffelfinger *et al.* 2006).

Vegetation/habitat restoration treatments could cause short-term loss or change in vegetation/habitat on an estimated 907,600-1,371,100 acres throughout the planning area (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. These effects would decrease as the treated areas recover to native or desired vegetation/habitat (see *Soil and Vegetation* -

Cumulative Effects sections) over time. Overall, wildlife habitats would benefit from these treatments over the long-term.

New fuel breaks could be created on up to an estimated 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25) over the long-term. While this action would reduce total vegetation, particularly woody vegetation, it would alter habitat characteristics, but not completely eliminate wildlife habitats within the fuel breaks. Since fuel breaks can reduce the size of future wildfires in the surrounding area, these effects would be offset by helping keep the total wildlife habitats burned by wildfire from growing larger throughout the planning area over the long-term. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that an additional 200,400-389,000 acres of habitat (on top of the estimated 400,758 acres that have burned since 1980) within the planning area could burn over the long-term. This would result in large areas of bare ground of limited value to wildlife. However, these negative effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Soil, Vegetation,* and *Fire and Fuels - Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of wildlife habitat could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17) (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative A

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 2,170-2,310 additional acres of wildlife habitat throughout the planning area over the long-term (on top of the existing 8,277 acres; Tables 3-6, 3-9, 3-31, and 3-51).

Vegetation/habitat restoration, wildland fire, and fuels management could cause similar additive, incremental cumulative effects on wildlife habitat within the planning area as the No Action Alternative (Table 3-25) (see *Soil, Vegetation,* and *Fire and Fuels - Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of wildlife habitat could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17), similar to those described for the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative B

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 1,862-1,961 additional acres of wildlife habitats throughout the planning area over the long-term (on top of the existing 8,277 acres of disturbance associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51). These disturbances would occur elsewhere in the planning area outside of Category C units, new Section 202 WSAs, and existing WSAs where less restrictive management would apply.

Vegetation/habitat restoration treatments could cause short-term loss of vegetation/wildlife habitat on an estimated 497,000-672,500 acres across the planning area (Table 3-25). Many of these areas would

undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. These effects would decrease as the treated areas recover to native or desired vegetation/habitat over the long-term (see *Soil- Cumulative Effects* and *Vegetation - Cumulative Effects* sections) and would occur on fewer acres than the No Action Alternative.

The potential negative effects to wildlife habitat from creating new fuel breaks could occur on up to an estimated 52,500 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25) over the long-term. However, fuel breaks would largely be precluded in all Category C units and WSAs under this alternative. While this action would reduce total vegetation, particularly woody vegetation, it would alter habitat characteristics, but not completely eliminate wildlife habitats within the fuel breaks. Fewer fuel breaks, coupled with fewer effective fuel reduction treatments, would likely result in greater wildfire risk, higher intensity wildfires, and more total wildlife habitats burned within untreated areas lacking fuel breaks, particularly Category C units and WSAs, over the long-term. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that an additional 380,400-500,000 acres of habitats (on top of the estimated 400,758 acres that have burned since 1980) within the planning area could burn due to increased fuel loading over the long-term. This would result in larger areas of bare ground of little value to wildlife compared to the No Action Alternative. However, these negative effects would decline over the long-term due to natural revegetation and emergency rehabilitation (estimated 100,000-180,000 acres of seeding/planting) actions (Table 3-25) (see *Soil, Vegetation,* and *Fire and Fuels - Cumulative Effects* sections).

An additional 444 to 868 acres of wildlife habitats could be disturbed by livestock concentration or trailing use associated with new range improvements over the long-term (on top an estimated 21,500-32,000 acres of concentrated use; Table 3-17) (see *Livestock Grazing – Cumulative Effects* section) resulting in slightly less cumulative impacts to wildlife habitat compared to the No Action Alternative.

Cumulative Impacts of Alternative C

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 1,961-2,206 additional acres of wildlife habitats over the long-term (on top of the existing 8,227 acres associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51) outside of Category C units.

Vegetation/habitat restoration treatments could cause short-term loss of vegetation/habitat on an estimated 935,600-1,202,100 acres throughout the planning area (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. These effects would decrease as the treated areas recover to native or desired vegetation/habitat over the long-term (see *Soil* and *Vegetation - Cumulative Effects* section).

New fuel breaks could be created on up to an estimated 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25) over the long-term, including within Category C unit setbacks. While this action would reduce total vegetation, particularly woody vegetation, it would alter habitat characteristics, but not completely eliminate wildlife habitats within the fuel breaks. These negative effects would be offset by helping keep the total acres burned by future wildfires and the related negative impacts to wildlife habitat from growing larger throughout the planning area over the long-term. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that an

additional 300,000-389,000 acres of habitat (on top of the estimated 400,758 acres that have burned since 1980) within the planning area could burn over the long-term. This would result in large areas of bare ground of little value to wildlife. However, these negative effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Soil, Vegetation,* and *Fire and Fuels - Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of wildlife habitat could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17), similar to those described for the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative D

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 2,065-2,310 additional acres of wildlife habitats over the long-term (on top of the existing 8,227 acres associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51) outside of Category C units.

Vegetation/habitat restoration treatments could cause a similar level of short-term loss of vegetation/habitats as the No Action Alternative (907,600-1,371,100 acres; Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. These negative effects would decrease as the areas recover to native or desired vegetation/wildlife habitats over the long term (see *Soil* and *Vegetation - Cumulative Effects* sections).

New fuel breaks could be created on up to an estimated 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25) over the long-term, including within Category C unit setbacks. While this action would reduce total vegetation, particularly woody vegetation, it would alter habitat characteristics, but not completely eliminate wildlife habitats within the fuel breaks. These negative effects would be offset by helping keep the total acres burned by future wildfires and the related negative impacts to wildlife habitat from growing larger throughout the planning area over the long-term. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that an additional 300,000-389,000 acres of habitats (on top of the estimated 400,758 acres that have burned since 1980) within the planning area could burn over the long-term. This would result in large areas of bare ground of little value to wildlife. However, these negative effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Soil, Vegetation,* and *Fire and Fuels - Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of ground cover could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (on top of the existing 42,000 acres of concentrated use; Table 3-17), similar to those described for the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Cumulative Impacts of Alternative E

Under this alternative, new land use authorizations, mining, facilities, and recreation sites could potentially disturb an estimated 1,965-2,210 additional acres of wildlife habitats over the long-term (on

top of the existing 8,227 acres associated with these activities; Tables 3-6, 3-9, 3-31, and 3-51) outside of Category C units.

Vegetation/habitat restoration treatments could cause short-term loss of vegetation/habitat on approximately 935,600-1,202,100 acres throughout the planning area (Table 3-25). Many of these areas would undergo multiple treatments over several years (*e.g*. juniper thinning followed by weed treatment or seeding), so these estimates may double-count the total treated acres on the ground. These negative effects would decrease as the treated areas recover to native or desired vegetation/wildlife habitats over the long term (see *Soil* and *Vegetation - Cumulative Effects* sections).

The potential negative effects to wildlife habitats from creating new fuel breaks could occur on up to 95,230 acres (on top of the 5,350 acres of existing fuel breaks; Table 3-25) over the long-term, including within Category C unit setbacks. While this action would reduce total vegetation, particularly woody vegetation, it would alter habitat characteristics, but not completely eliminate wildlife habitats within the fuel breaks. These negative effects would be offset by helping keep the total acres burned by future wildfires and the related negative impacts to wildlife habitats from growing larger throughout the planning area over the long-term. Though the specific location, timing, and severity of future wildfires are not reasonably predictable, the BLM estimates that an additional 300,000-389,000 acres of habitat (on top of the estimated 400,758 acres that have burned since 1980) within the planning area could burn over the long-term. This would result in large areas of bare ground of little value to wildlife. However, these negative effects would decline over time due to natural revegetation and emergency rehabilitation (estimated 86,000-160,000 acres of seeding/planting) actions (Table 3-25) (see *Soil, Vegetation,* and *Fire and Fuels - Cumulative Effects* sections).

An additional estimated 1,244 to 2,141 acres of wildlife habitat could be disturbed by livestock concentration or trailing associated with new range improvements constructed over the long-term (Table 3-17) resulting in similar impacts to the No Action Alternative (see *Livestock Grazing – Cumulative Effects* section).

Recreation

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect recreation uses and opportunities in the planning area?*

Affected Environment

Three major highways and numerous county roads traverse the planning area, providing access to numerous roads and trails on BLM-administered lands (see *Off-Highway Vehicle Use and Travel Management* section). This transportation network collectively provides recreational access to public lands in the planning area and includes two designated National Backcountry Byways, one designated National Scenic Byway, and one National Scenic Bikeway (Table 3-50; Map R-1, Appendix 1). Given the available means of access, dispersed recreation opportunities exist throughout the entire planning area. Although limited in number, there are also opportunities for developed recreation throughout the planning area (Table 3-51).

Table 3-50. Oregon Outback National Scenic Byway Interpretive Sites

Interpretive Site	Location
Goose Lake State Park	West of New Pine Creek
Lake County Chamber of Commerce	Lakeview
Chandler Rest Area	Crooked Creek Valley
Valley Falls Store	Valley Falls
Paisley Community Center	Paisley
Summer Lake Rest Area	Summer Lake
Summer Lake Restaurant	Summer Lake
Christmas Valley Road	Junction with County Road 5-14F
Silver Lake Ranger District Office	Silver Lake
Fort Rock Road	Junction with County Road 5-10
Highway 97 Junction	Southeast of Junction with Highway 97

Source: BLM recreation GIS data.

Table 3-51. Designated Recreation Sites

Name	Location	Description
Abert Watchable Wildlife Site	Along U.S. Highway 395 overlooking Abert Lake	Parking area, wildlife viewing and interpretive area
Black Hills	South of Christmas Valley	Interpretive site
Buck Creek Watchable Wildlife Site	West of Silver Lake	Parking area, short hiking trail, wildlife viewing and environmental education area
Crack-in-the-Ground	North of Christmas Valley	Developed parking and hiking access and geological interpretative area
Derrick Cave	North of Fort Rock	Parking and access trail
Doherty Hang Glider Launch Site	Along State Highway 140, east of Adel	Access road and launch pad for hang gliders
Duncan Reservoir Campground	South of State Highway 31, southeast of Silver Lake	Developed campground and boat launch adjacent to Duncan Reservoir
Green Mountain Campground	North of Christmas Valley	Developed campground and scenic overlook
Highway Well Rest Area	Along U.S. Highway 395, north of Abert Lake	Developed rest area, shaded picnic structures, and interpretive site
Sand Dunes and Lost Forest Campgrounds	Sand Dunes, northeast of Christmas Valley	Undeveloped campgrounds, interpretive sites, and dune access
Sunstone Public Collection Area and Campground	Northwest of Plush	Developed use area with shaded picnic structures, campsites, and interpretive kiosks
Warner Wetlands	Northeast of Plush	Day use area with shaded picnic structures, hiking and canoe trails, interpretive kiosks, and wildlife viewing blinds

Source: BLM recreation GIS data.

Adjacent areas of interest managed by other agencies include the Hart Mountain and Sheldon National Antelope Refuges, Steens Mountain Cooperative Management and Protection Area (Burns District), and the Deschutes, Fremont-Winema, and Modoc National Forests.

Current Recreation Uses

The majority of visitors to the planning area are from Oregon, but an increasing number are from out-of-state and abroad. The major recreation activities in the planning area include general sightseeing, driving

for pleasure, scenery and wildlife viewing, hiking and backpacking, photography, hunting, fishing, camping, picnicking, hang gliding, rock hounding, caving, OHV riding, and cycling the newly designated Oregon Outback Scenic Bikeway. The heaviest recreation use occurs over Memorial Day, Fourth of July, and Labor Day holiday weekends, as well as during fall hunting seasons. There are currently no fee use areas in the planning area. Commercial recreational use varies, but an average of 10 special recreation permits are issued each year (*see Special Recreation Permits* section).

Most recreational use in the planning area is concentrated in three areas: North Lake County Special Recreation Management Area (SRMA), the Warner Wetlands ACEC/SRMA, and the Sunstone Public Collection Area (Map R-1, Appendix 1).

Recreation Management Areas

Approximately 26% of the planning area (822,333 acres) has been designated as 2 Special Recreation Management Areas (SRMAs). These SRMAs are described in more detail in the *Lakeview RMP/ROD* (BLM 2003b, pages 84-85) and the *Warner Wetlands Recreation Area Management Plan* (BLM 1990i).

The boundary of the Warner Wetlands SRMA (52,033 acres) is the same as the Warner Wetlands ACEC (Map R-1, Appendix 1). The current recreation management emphasis of the SRMA is to provide for activities and facilities which complement the wildlife, vegetation, and cultural resource management objectives of the ACEC. Recreation opportunities in the area include bird watching/sight-seeing, fishing, canoeing, hiking, camping, waterfowl hunting, and OHV use on designated routes. Facilities in the SRMA consist of Hart Bar Interpretive Site, a portion of the Lakeview-to-Steens National Back Country Byway, and a designated canoe trail in the channels between Campbell, Turpin, and Stone Corral Lakes.

The North Lake SRMA is a 770,300-acre area north of Summer Lake and west of Highway 395 (Map R-1, Appendix 1). Recreation sites in the SRMA include the Black Hills, Duncan Reservoir Campground, Buck Creek Watchable Wildlife Site, West Fork Silver Creek, Green Mountain Camp, Crack-in-the-Ground, Derrick Cave, Fossil Lake, Christmas Valley Sand Dunes, and the Lost Forest (Table 3-51). All of these sites are located on or near the Christmas Valley National Back Country Byway and are within or adjacent to 4 WSAs and 1 RNA.

The main attraction of the area, the Christmas Valley Sand Dunes, is the largest inland shifting sand dune system in the Pacific Northwest. These dunes are open to OHV use and motorized cross-country travel and are one of the most popular OHV destinations in the Pacific Northwest. The Christmas Valley Sand Dunes are the most visited recreation area in the Lakeview Field Office. The areas adjacent to the Sand Dunes are also a popular destination for motorized OHV travel on designated primitive routes and roads, allowing users to connect to hundreds of miles of nearby primitive public roads open to OHV use.

Other Attractions

Other attractions and concentrated recreational use areas in the planning area include the following:

- A short stretch of the Chewaucan River to the west of the town of Paisley flows through intermingled public lands (BLM and USFS) and contains several dispersed, but undesignated day-use (fishing and swimming access) and camping areas.

- West Fork Silver Creek and the ZX Detention Reservoir southwest of Silver Lake contain several dispersed day-use (fishing and swimming access) and camping areas.
- Fishing opportunities are scattered throughout the planning area in lakes, reservoirs, and streams. The ODFW stocks rainbow trout in the following waters: Mud Lake, Spaulding, Lucky, Sunstone, Priday, Duncan, Sherlock, Sid Luce, and Big Rock Reservoirs. During high water years, it is possible to catch crappie, largemouth bass, and bullhead in some of the Warner Lakes (Flagstaff, Campbell, and Turpin).
- Hunting for big game (pronghorn, bighorn sheep, mule deer, and elk), as well as for waterfowl, upland game birds, and small game such as rabbits and coyotes, occurs throughout the planning area, mainly during fall and early winter. Waterfowl hunting is limited to many of the same lakes and reservoirs that provide fishing opportunities.
- The Oregon Desert Trail and the Oregon Backcountry Discovery Route, conceptualized and promoted by citizen groups (https://onda.org/regions/oregon-desert-trail and https://ridebdr.com/ORBDR), demonstrate an increasing recreational demand for primitive, mechanical, and motorized recreation activities throughout the planning area.

Recreation Opportunity Spectrum

The Recreation Opportunity Spectrum (ROS) is a methodology that recognizes different people desire different recreation experiences, and the resource base has a varying potential for providing recreational opportunities. Through the ROS, BLM has characterized the demand for various types of recreation settings and activities, as well as the capability of the resource base to provide such experiences along an opportunity spectrum or continuum. This spectrum contains six classes, each defined in terms of a combination of activities, settings, and experiences which provide specific opportunities including: *Primitive, Semi-Primitive Non-Motorized, Semi-Primitive Motorized, Roaded Natural, Rural,* and *Modern Urban* (see *Glossary* in Appendix 8 for definitions). Four ROS classes occur in the planning area. The majority of the planning area is currently managed for *Semi-Primitive Motorized* (2,825,005 acres/88%) experiences with remaining lands managed for *Roaded Natural* (145,293 acres/4.5%), *Rural* (119,707 acres/3.7%), and *Semi-Primitive Non-Motorized* (118,472 acres/3.7%) opportunities and experiences (Map R-2, Appendix 1).

Environmental Effects

Analysis Assumptions

- The demand for all types of recreational uses, including primitive non-motorized experiences, and motorized/OHV uses, is expected to increase across the planning area over the long-term.
- Many forms of non-motorized recreation (hiking, camping, hunting, fishing, and sight-seeing) are associated with or dependent upon OHV/motorized vehicle use to access the public lands. Reducing motorized vehicle access would also affect non-motorized recreational uses and opportunities.

Impacts of No Action Alternative and Alternative A

Wilderness Characteristics, and OHV and Travel Management Impacts

Recreation opportunities across the planning area would remain largely unchanged under these two alternatives. Current levels of recreation activities, opportunities, and experiences would remain relatively constant or increase slightly over the long-term. Recreation opportunities across the planning area would continue to be managed in accordance with current Recreation Opportunity Spectrum (ROS) where semi-primitive motorized recreation settings, opportunities, and experiences would continue to be emphasized across the majority (88%) of the planning area (Map R-2, Appendix 1).

Special recreation permits (SRPs) would continue to be issued where appropriate and provide opportunities for commercial or group recreational activities such as hunting/guiding, natural history tours, wilderness therapy schools, poker rides (OHV, equestrian, running), and other recreational activities.

The 12 existing, developed/designated recreation sites would continue to be managed for their individual recreational purpose (Table 3-51) under these two alternatives. However, under the No Action Alternative, the BLM would only allow new designated/developed recreation sites within wilderness characteristics units if it deemed they would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. In contrast, Alternative A would be the least constrained in designating or developing new recreation sites of all of the alternatives. New developed/designated recreation sites under Alternative A would further contribute to the diversity of recreation opportunities available across the planning area over the long-term.

Future road maintenance and potential new road construction actions would maintain or minimally enhance public access for recreational activities in portions of the planning area and would benefit those seeking motorized recreational opportunities. For additional discussion of potential impacts to recreation opportunities refer to the *Lands with Wilderness Characteristics*, *Wilderness Study Area,* and *Off-Highway Vehicle Use and Travel Management* sections.

Livestock Grazing Management Impacts

Some user conflicts could continue to occur as some recreational users find their experience negatively impacted by the presence of livestock and/or range improvements and other facilities across the planning area. However, other recreational users could find these to be a routine part of their recreational experience.

Summary

Overall, these alternatives would continue to provide a diversity of recreational uses and facilities to meet current and expected increasing recreational demand, while protecting other resources in the planning area. Potential social conflicts between motorized and non-motorized recreational users would continue to be addressed primarily through the management of existing OHV area designations or would be addressed during future travel management plan (see also *Off-Highway Vehicle Use and Travel Management* section and Appendix 9).

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Under Alternative B, recreation management within all Category C units and new Section 202 WSAs would undergo a major shift in the type of recreation opportunities available and promoted. The majority of these units (77 whole units and portions of 2; approximately 1,381,142 acres), would be managed as Category C units. The remainder (34 whole units and portions of 2; approximately 273,705 acres), would be managed as Section 202 WSAs. As a result, approximately 67% of the planning area (2.14 million acres) would provide *Primitive Non-Motorized* recreation settings, activities, and experiences. There would be substantially less *Semi-Primitive Motorized* (904,918 acres; 28.3%) and slightly less *Rural* (83,324 acres; 2.3%) or *Roaded Natural* (74,129 acres; 2.3%) recreation settings, activities, and experiences across the planning area compared to the No Action Alternative and Alternative A.

Alternative B would result in a substantial increase in recreational opportunities that are dependent on large, undeveloped, natural appearing areas with a high degree of solitude and/or opportunities for primitive and unconfined recreation (such as hiking, backpacking, caving, etc.). Users seeking this type of recreation opportunity would benefit. There could also be a loss of big game hunting opportunities that occur over the long-term due to loss of motorized access and a decline in big game habitat quality in some Category C units and new Section 202 WSAs (Table 3-49; see also *Vegetation* and *Wildlife* sections). Motorized OHV recreation opportunities would be substantially reduced as all public motorized use would be closed within all about 2.1 million acres within the planning area (see *OHV and Travel Management Impacts* section below).

A reduced number of SRPs would likely be processed annually compared to the No Action Alternative and Alternative A, because of the more restrictive non-impairment standard within the new Section 202 WSAs. SRPs in new Section 202 WSAs would only be allowed if they are both temporary and non-surface disturbing and, if they are new discretionary uses, if they would not establish a new use that would impair wilderness suitability. SRPs in Category C units would be allowed if they are compatible with protecting wilderness characteristics and would not be explicitly prohibited by management direction. However, more SRPs would be focused on permitting and providing primitive non-motorized recreational pursuits within Category C units, Section 202 WSAs, as well as existing WSAs (about 2.1 million acres). For additional discussion of potential impacts to non-motorized, primitive recreation opportunities, refer to the *Lands with Wilderness Characteristics* and *Wilderness Study Areas* sections.

The 12 existing developed/designated recreation sites would continue to be managed for their original recreational purpose (Table 3-51) and would contribute to the diversity of recreation opportunities available across the planning area similar to the No Action Alternative and Alternative A. Compared to the No Action Alternative far less area would be available for new designated/developed recreation opportunities over the long-term.

OHV and Travel Management Impacts

Under Alternative B, all Category C units, new Section 202 WSAs, and existing WSAs would be closed to public motorized vehicle (i.e. OHV) use (Table 3-3 and Map OHV-2, Appendix 10). Closing these areas to OHV use would also result in the closure of all existing internal primitive routes (approximately 1,452 miles).

Recreational OHV use in the planning area is rising (see *Off-Highway Vehicle Use and Travel Management – Affected Environment* section). Much of the recreational use in the planning area depends on OHV travel/access to open BLM-administered routes to connect between the dispersed recreation opportunities available in the planning area. For many recreational users, motorized travel is the preferred method of recreation and sight-seeing. Some users rely upon OHV travel due to health and mobility reasons.

While primitive recreation opportunities would increase under this alternative, closing areas and internal routes to motorized vehicle use would prevent many users from being able to access areas that offer solitude or primitive recreation experiences like dispersed camping areas, traditionally stocked lakes for fishing, and hunting areas. Closing a significant portion of the primitive routes to motorized use would prevent these users from being able to access these recreational opportunities that have been historically available via motorized access for their entire generation.

This alternative would also close the Christmas Valley Sand Dunes to all motorized vehicle use. This closure would have a substantial negative impact on recreational OHV opportunities as it would close an important OHV use area (about 10,484 acres) to OHV use. While there would be less total motorized vehicle use associated with dispersed recreation opportunities (camping, hunting, sight-seeing, etc.) by users attempting to access large blocks of OHV Closed BLM-administered lands, it is not certain how much of a decline in total recreational cross-country OHV use would occur within the planning area or whether the existing level of use would simply shift and concentrate within the remaining OHV Open areas. However, the BLM estimates that there would be up to a 20% reduction in recreational motorized vehicle use on remaining open routes, cross-country OHV use levels would be reduced by up to 60%, and the remaining OHV use would be concentrated on fewer Open areas/acres. For additional discussion of potential impacts to motorized recreation opportunities, refer to the *Off-Highway Vehicle Use and Travel Management* section.

Compared to the No Action Alternative and Alternative A, this alternative would have substantial negative impacts on users seeking recreational opportunities dependent on motorized use to access public lands for both motorized and non-motorized recreational activities. Closing all Category C units and new Section 202 WSAs to motorized travel would have the most substantial negative impact to recreational OHV use compared to all other alternatives.

Livestock Grazing Management Impacts

Compared to the No Action Alternative and Alternative A, there would be some improvements to some recreational opportunities and experiences under Alternative B in areas where grazing is reduced or removed. In particular, recreational users in Category C units, new Section 202 WSAs, existing WSAs, and ACECs could experience less impacts from livestock grazing over the long-term. The more areas where substantial reductions in grazing occur, the more potential positive benefits some recreational users would experience. These benefits could include a net reduction in the presence of water developments and fences across the planning over the long-term. These changes in recreational opportunities and experiences would be relatively minor in scale. Current levels of recreation activities, opportunities, and experiences would likely remain relatively constant or increase slightly over the long-term

Summary

Overall, this alternative would provide more primitive, non-motorized recreational opportunities, and fewer motorized recreational opportunities, as well as more protection to other resources across large portions the planning area compared to the No Action Alternative and Alternative A. Because of the substantial changes in recreation and OHV management emphasis, this alternative could potentially cause increased social conflicts between motorized and non-motorized recreational users when compared to the No Action Alternative and Alternative A.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Overall, Alternative C would shift toward providing more *Semi-Primitive Non-Motorized* recreation settings, activities, and experiences in Category C units and WSAs (520,961 acres; 16.3%) compared to the No Action Alternative or Alternative A, but fewer of these opportunities compared to Alternative B. Users seeking this type of recreation opportunity would benefit. Approximately 2,420,506 acres (75.6%) of *Semi-Primitive Motorized,* 119,642 acres (3.7%) of *Rural,* and 145,190 acres (4.6%) of *Road Natural* settings, activities, and experiences would be provided.

A similar number of SRPs would likely be processed annually, but more would be focused on permitting and providing primitive non-motorized recreational pursuits within Category C units compared to the No Action Alternative.

The 12 existing developed/designated recreation sites would continue to be managed for their original recreational purpose (Table 3-51) and would contribute to the diversity of recreation opportunities available across the planning area similar to the No Action Alternative and Alternative A. Compared to the No Action Alternative far less area would be available for new designated/developed recreation opportunities over the long-term.

For additional discussion of potential impacts to non-motorized recreation opportunities, refer to the *Lands with Wilderness Characteristics* and *Wilderness Study Areas* sections.

OHV and Travel Management Impacts

Compared to the No Action Alternative and Alternative A, Alternative C would have negative impacts on users seeking recreational opportunities dependent on motorized use to access public lands for both primitive and motorized recreational activities. Impacts to recreation opportunities under Alternative C within Category C units would be similar to those described for units under Alternative B. However, Alternative C would allow motorized use to continue on all interior routes in all Category C units and WSAs. Motorized access and associated fishing and waterfowl hunting opportunities to most existing stocked reservoirs and lakes throughout the planning area would be retained, as all existing open routes would remain open. Road maintenance and potential new road construction actions would maintain or minimally enhance access for recreational activities in portions of the planning area. However, this alternative would not provide any opportunities for motorized off-road recreation experiences. In particular, off-road motorized recreation would no longer be available in the Sand Dunes WSA.

For additional discussion of potential impacts to motorized recreation opportunities, refer to the *Off-Highway Vehicle Use and Travel Management* section.

Livestock Grazing Management Impacts

Under Alternative C, the potential impacts to recreational opportunities and experiences due to livestock grazing management activities would be similar in nature to those described for Alternative B. However, these effects would occur in fewer areas/acres than Alternative B.

Summary

Because of the OHV Limited area management emphasis and associated changes in recreational opportunities, this alternative could cause increased social conflicts between motorized and non-motorized recreational users compared to the No Action Alternative and Alternative A, but not as much as Alternative B.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Impacts to non-motorized recreation opportunities under Alternative D would be similar to the No-Action Alternative and Alternative A. However, management of the two Category C units (4,671 acres) would result in a very slight shift toward more *Semi-Primitive Non-Motorized* recreation settings, activities, and experiences (118,376 acres; 3.7%) compared to the No Action Alternative and Alternative A. Approximately 2,823,091 acres (88.2%) of *Semi-Primitive Motorized,* 119,642 acres (3.7%) of *Rural,* and 145,190 acres (4.6%) of *Road Natural* settings, activities, and experiences would be provided.

A similar number of SRPs would likely be processed annually for similar recreational purposes as described for the No Action Alternative and Alternative A.

The 12 existing developed/designated recreation sites would continue to be managed for their original recreational purpose (Table 3-51) and would contribute to the diversity of recreation opportunities available across the planning area similar to the No Action Alternative and Alternative A. Compared to the Alternative A about the same amount of area would be available for new designated/ developed recreation opportunities over the long-term. Additional developed/designated recreation sites would enhance the diversity of recreation opportunities available within the planning area similar to Alternative A.

For additional discussion of potential impacts to non-motorized recreation opportunities, refer to the *Lands with Wilderness Characteristics* and *Wilderness Study Areas* sections.

OHV and Travel Management Impacts

Alternative D would have slightly more negative impacts on users seeking recreational opportunities dependent on motorized use to access public lands for motorized recreational activities compared to the No Action Alternative and Alternative A. Motorized access for fishing and waterfowl hunting opportunities at most stocked reservoirs or lakes within Category A and B units would be retained, as unit boundary roads would remain open and continue to provide access to these waterbodies (there are no substantial reservoirs/lakes within the two small Category C units under this alternative). Road

maintenance and potential new road construction actions would maintain or minimally enhance access for recreational activities in portions of the planning area.

This alternative would provide fewer opportunities for motorized off-road recreation experiences because of the changes to more OHV Limited areas and fewer OHV Open areas. However, the Sand Dunes WSA and other appropriate Open OHV areas would provide opportunities for existing and anticipated increased demand for off-road motorized recreational use. For additional discussion of potential impacts to motorized recreation opportunities, refer to the *Off-Highway Vehicle Use and Travel Management* section.

Livestock Grazing Management Impacts

The potential effects of livestock grazing management on recreation opportunities and experiences under this alternative would be the same as the No Action Alternative and Alternative A.

Summary

Under this alternative, there would be little change in the potential for social conflict between motorized and non-motorized recreational users compared to the No Action Alternative or Alternative A.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Impacts to recreation under Alternative E would be similar to Alternative C within the 26 Category C units (372,218 acres). This would result in a moderate shift in recreation opportunities compared to the No Action Alternative and Alternative A. About 14.8% of the planning area would be managed for *Semi-Primitive Non-Motorized* recreation settings, activities, and experiences (472,565 acres) in Category C units and WSAs. Approximately 2,468,902 acres (77.2%) of *Semi-Primitive Motorized,* 119,642 acres (3.7%) of *Rural,* and 145,190 acres (4.6%) of *Road Natural* settings, activities, and experiences would be provided.

Overall, public seeking recreational opportunities dependent on large, undeveloped, natural appearing areas with a high degree of solitude and/or primitive and unconfined recreation would experience moderate beneficial impacts.

A similar number of SRPs would likely be processed annually, but more would be focused on permitting and providing primitive non-motorized recreational pursuits within Category C units compared to the No Action Alternative.

The 12 existing developed/designated recreation sites would continue to be managed for their original recreational purpose (Table 3-51) and would contribute to the diversity of recreation opportunities available across the planning area similar to the No Action Alternative and Alternative A. Compared to the No Action Alternative less area would be available for new designated/developed recreation opportunities over the long-term.

For additional discussion of potential impacts to recreation opportunities, refer to the *Lands with Wilderness Characteristics* and *Wilderness Study Areas* sections.

OHV and Travel Management Impacts

Under this alternative, those public seeking recreational opportunities dependent on motorized use and access would experience moderate negative impacts. The Sand Dunes WSA would remain open to OHV use under this alternative and would continue to provide a motorized off-road experience similar to the No Action Alternative and Alternative A. Road maintenance and potential new road construction actions would maintain or minimally enhance access for recreational activities in portions of the planning area.

For additional discussion of potential impacts to recreation opportunities, refer to the *Off-Highway Vehicle Use and Travel Management* section.

Livestock Grazing Management Impacts

The potential effects of livestock grazing management on recreation opportunities and experiences under this alternative would be the same as the No Action Alternative and Alternative A.

Summary

Because of the changes in recreation and OHV management, this alternative could potentially cause increased social conflicts between motorized and non-motorized recreational users compared to the No Action Alternative and Alternative A.

Cumulative Impacts Common to All Alternatives

Climate Change

Warmer temperatures could result in an increase in recreational visits to BLM-administered lands in the planning area during the "shoulder seasons" previously limited by colder temperatures. More use could occur earlier in the spring and later in the fall due to more outdoor recreation destinations becoming accessible for longer portions of the year. Since the BLM-administered lands in the planning area occur primarily within an arid climate, there could also be reduction in outdoor recreation during mid-summer when temperatures exceed comfortable thermal conditions. In addition, as the availability and abundance of fish and wildlife species change in response to climate, participation in hunting, fishing, and wildlife viewing recreation activities could shift accordingly (Brice *et al*. 2020).

Reasonably Foreseeable Future Actions

Many of the RFAs listed in Table 3-1 (new land use authorizations, mining, facilities, fencing, and water developments) could have additive, incremental negative effects on recreational opportunities within portions of the planning area. Those users seeking more primitive, natural recreation experiences would be negatively impacted by these types of activities over the long-term. Vegetation and wildland fire management activities could have short-term negative disturbance effects on recreational opportunities, but these would be reduced over time as vegetation recovers.

Wild Horses

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect wild horses and BLM's ability to effectively manage wild horses in the planning area?*

Affected Environment

There are two designated wild horse herd management areas (HMAs) in the planning area: Paisley Desert and the Beaty Butte (Map HMA-1, Appendix 1). A total of 22 wilderness characteristics units overlaps with these 2 HMAs. The monitoring data gathered over many years supports the established appropriate management levels (AMLs) for each HMA (Table 3-52). Both HMAs are in relatively good habitat condition and currently support both wild horse herds in a thriving ecological balance with other resources. In most years, adequate water and forage are available to support both herds. The most dependable water sources in the Beaty Butte HMA are associated with springs located primarily on private land. Two solar wells were drilled in the Paisley HMA to improve water availability and horse distribution.

Table 3-52. Wild Horse Herd Management Areas

Name	Acres	AML	Forage Allocation (AUMs)[1]
Paisley Desert	303,526	60–150	1,800
Beaty Butte	438,773	100–250	3,000
TOTAL	742,299		4,800

[1]Animal unit months are based on 12 months forage need for the top number of horses in the AML range for each HMA. 150 horses in the Paisley HMA and 250 horses in the Beaty Butte HMA.
Source: BLM wild horse management files; BLM 2003b.

Table 3-53 shows annual census numbers for each herd management area since 1971. The Paisley Desert and Beaty Butte herds have been gathered numerous times since 1971. Table 3-53 also shows the number of horses removed from each herd management area by gathers since 1977.

The University of Minnesota conducted a study of fertility control on the Beaty Butte herd in the late 1980s. Dominant studs in the HMA were gelded and released back to the HMA. In 2002, 13 mares and 7 studs were introduced back into the Beaty Butte herd, with the returned mares inoculated with an immune-contraceptive vaccine called PZP (porcine zona pellucida), in an attempt to slow down reproductive rates. The contraceptive was expected to remain effective for one to two years (BLM 2000d). In the fall and winter of 2009, mares from both herds were treated with PZP and returned to the HMAs. Research on PZPs effectiveness in managing horse population numbers is ongoing.

Environmental Effects

Analysis Assumptions

- A national priority process would continue to drive the scheduling for future wild horse gathers. Factors affecting gather priorities would include determinations of excess horses and over-population, wild horse and range condition, annual appropriations, litigation and court orders, emergency situations (disease, weather, and fire), availability of contractors, the market for adoption, and long-term holding availability for unadoptable excess horses. One principal factor affecting gather priorities is the fact that short- and long-term holding facilities are at or near

Table 3-53. Wild Horse Census and Gather Data

Year	Paisley Desert HMA[1]		Beaty Butte HMA[2]	
	Horses Counted	Horses Removed	Horses Counted	Horses Removed
1971	81		190	
1972	121		271	
1973	177		365	
1974	219		482	
1975	288		611	
1976	307		762	
1977	368[3]	235	879	776[4]
1978	137		273[3]	
1979	179		305	
1980	215		419	
1981	244[3]	183	441[3]	272
1982	70		249	
1983	119		291	
1984	147		382[3]	260
1985	176		167	
1986	286[3]	238	233	
1987	56[5]		250	
1988	40		260[3]	186
1989	70		150	
1990	99		154	
1991	139		250	
1992	203[3]	105	312[3]	162
1993	77		77	
1994	143		118	
1995	172[1 3]	82	142[1]	
1996	103		191	
1997	144		283	
1998	142		393	
1999	172		474[3]	283
2000	411	351	193	
2001	60		436	307
2002	168		263	
2003	173[3]	101	311	
2004	72		416[3]	320
2005	123		138	
2005	139		349	
2007	174		434[3]	260
2008	200		362	
2009	310[3]	250	485[3]	379
2010	122		386	
2011	146		530	
2012	300[3]	210	705	
2013	128		846	
2014	154		1253	
2015	439		1348[3]	1092
2016	526		193	
2017	631		231	
2018	757		277	
2019	878		251	
2020	1050	708	301	

Source: BLM Wild Horse Management Files

Notes: Summary is for horses inside the HMA; from 1971 to 1999 inventory was yearly by fixed-wing aircraft; after 1999, inventory was every three years with a helicopter. In some years horse numbers are estimated based on an average of 20% increase per year. Most years, horses were inventoried by flying over the herd area; however, during some years, horse numbers are estimated based on an average 20% increase per year. Variability in inventory numbers is from horses moving in and out of the HMA, the adjacent Sheldon and Hart Mountain Wildlife Refuges, and the BLM Burns District.
[1]Year horses were gathered.
[2]Partial inventories.
[3]Year horses were introduced.
[4] Removed 1977-78.
Mortality: 12 horses strayed outside the HMA and died from dehydration in an area with no natural water sources.

- capacity, which significantly reduces the total number of excess wild horses that can be removed from HMAs annually.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Under this alternative wild horse management actions (monitoring, maintaining existing horse facilities, placing temporary traps, conducting gathers, etc.) within the 22 wilderness characteristics units that overlap the 2 HMAs could continue because they would have no effect on size or cause an entire BLM inventory unit to no longer possess wilderness characteristics. However, the BLM could only authorize the construction of new permanent horse management facilities (water developments, fences, corrals, etc.) that it deems would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics (see *Facilities* section).

OHV and Travel Management Impacts

Under this alternative, OHV use within the majority of the 2 HMAs (approximately 591,740 acres) would remain limited to existing or designated routes. While there would be large areas within the interior of these limited area polygons in both HMAs that would not be subject to public cross-country motorized vehicle use, approximately 97,246 acres would remain open to this use. Motorized vehicle use could cause harassment impacts to wild horses, particularly within OHV open areas. However, these existing OHV area designations would provide opportunities for the public to be able to view wild horses on the landscape.

Being able to use motorized vehicles and aircraft for monitoring and horse gathers (including placement of temporary traps) would allow the BLM to effectively monitor horse populations and range conditions, as well as effectively gather and remove excess wild horses from the HMAs.

Livestock Grazing Management Impacts

The effects of continuing existing livestock grazing management on wild horses would be similar to those described for Preferred Alternative D in the *Lakeview Proposed RMP/Final EIS* (BLM 2003a, pages 4-84 to 4-88). That analysis is hereby incorporated by reference in its entirety in accordance with the provisions of 40 CFR § 1500.4(j) and 1502.21 (in effect prior to September 14, 2020).

Existing grazing systems and associated range improvements designed to improve ecological/vegetation conditions would maintain or potentially increase forage production and provide a more stable environment for wild horses. When livestock use is balanced with forage production, horses have adequate forage during the summer and prior to winter. Livestock grazing would continue to be managed

primarily under rest/rotation systems in both HMAs. Based on previous studies, rest/rotation grazing results in significantly better vegetation conditions than all other grazing systems. Ecological improvement would benefit wild horses due to herbaceous vegetation increases. Most vegetation improvements would occur on rangelands in mid-seral conditions.

Forage needs for wild horses would continue to be met under current livestock management. Adequate forage would help maintain the health of the herds and assist in maintaining population viability. As a result, viable horse herds would typically be maintained in balance with available forage and other resources over the long-term. However, if horse numbers increase above AML with no corresponding reduction in livestock numbers, key areas could be over-grazed and forage production and availability would decrease. This impact would be compounded during periods of drought and could result in decreased health or even mortality of wild horses.

Summary

Overall, the BLM would be able to continue most wild horse management actions and would continue to meet AML and other wild horse management objectives within wilderness characteristics units in both HMAs.

Impacts of Alternative A

Wilderness Characteristics, OHV and Travel, and Livestock Grazing Management Impacts

The impacts of wilderness characteristics, OHV and travel, and livestock grazing management on wild horse management under Alternative A would be similar to those described for the No Action Alternative except that new wild horse water developments, fences, or other facilities within both HMAs would be easier to implement because there would be no constraints for wilderness characteristics (see *Facilities* section).

Impacts of Alternative B

Wilderness Characteristics Management Impacts

A total of 14 Category C units, 8 new Section 202 WSAs and six existing WSAs overlap the two wild horse HMAs in the planning area. Wild horse management would continue under this alternative but impacts to vegetation management and communities associated with this alternative (see *Vegetation* and *Fire and Fuels* sections) could negatively impact forage availability for wild horses across portions of the 2 HMAs. This impact could be offset to a minor degree by additional forage being made available as a result of reductions in livestock grazing from permit relinquishments or rangeland health management reductions within HMAs (see *Livestock Grazing Management Impacts* section below).

Existing fences define the HMA boundaries and assist in keeping wild horses within those designated boundaries. While existing HMA boundary fences could be maintained and support wild horse management this could become more difficult over time due to a decrease in motorized access (see *Off-Highway Vehicle Use and Travel Management* section). With less fence maintenance along HMA boundaries, wild horses would be able to wander outside of the HMAs and increase the potential impacts of wild horses grazing on rangelands and wildlife habitats outside of the HMAs. Gathering horses that

stray outside the HMA boundaries would also increase BLM's management costs, as BLM is required to remove wild horses from these undesignated areas.

While new wild horse management projects (water developments, fences, etc.) could be implemented within Category C units and new Section 202 WSAs that overlap HMAs, they would have to be designed and constructed in a manner that meets VRM Class I or II objectives (and the non-impairment standard within new Section 202 WSAs), which would make implementing such projects more difficult and/or costly (see *Facilities* section).

OHV and Travel Management Impacts

Under this alternative, all Category C units and WSAs would be closed to OHV/motorized vehicle use, including those areas that overlap the 2 HMAs. As a result, the majority of the interior of both HMAs (approximately 564,721 acres) would no longer be subject to public motorized vehicle use. In addition, vehicle use on about 118,379 acres within the 2 HMAs would remain limited to existing or designated routes. Very few (about 5,895) acres within one HMA would remain open to motorized vehicle use. These changes in OHV management would eliminate or substantially reduce the potential for negative harassment impacts to wild horses from motorized vehicles compared to the No Action Alternative and Alternative A. However, it would also substantially reduce the opportunities for public viewing of wild horses on the landscape.

While the BLM and its contractors would still be able to utilize these closed interior routes for horse management activities initially, over time the BLM's ability to conduct ground-based horse monitoring and gather operations would be negatively affected as interior routes revegetate due to lack of use and maintenance. This would make horse gathering operations more difficult as the BLM would be limited to setting up traps on the edge of Category C units/WSAs or outside of the HMAs. The BLM to would have to herd horses further distances which would increase the amount of stress put on the animals and potentially increase the risk of injury or mortality during aerial gather operations.

Livestock Grazing Management Impacts

Should grazing closures or permit relinquishments occur within HMAs, additional forage could become available for wild horses. However, there would be no change in permanent wild horse forage allocations (AUMs) as a result of such actions.

Range improvement maintenance would be reduced because permittees would no longer maintain many existing range improvements (including springs/troughs, waterholes, reservoirs, pipelines, and fences) within the interior of closed pastures/allotments. The responsibility to maintain wild horse developments would shift solely to the BLM. This would increase the budget needed to manage horses within the HMAs. Based on the current trend in budget and staffing levels, the BLM would likely not be able to successfully maintain all of these existing developments. This could result in a reduction in water availability for wild horses over the long-term.

Water is the primary resource affecting wild horse distribution and is a limiting factor within both HMAs. Water developments can be used to improve wild horse distribution. However, developments that employ some type of mechanical device, such as a windmill or electric pump, could fail and cause horses to go without, or to search elsewhere for water. Therefore, maintaining developed water sources is crucial to supporting healthy wild horse populations and keeping those populations in ecological balance with their

habitat. Motorized access for maintenance of water developments could be substantially reduced within the HMAs over time under this alternative. If water developments within the interior of Category C units (or WSAs) cannot be maintained due to a decrease in access, there would be fewer clean water sources for wild horses over the long-term. When water becomes limited, horses paw at the water source in an effort to get deeper holes for drinking. This would negatively affect the health of wild horse herds by concentrating populations in closer proximity to remaining water sources, as well as contributing to health issues related to drinking water out of muddy puddles. These pawing actions would also contribute to the degradation of spring sources and associated riparian areas by increasing the loss of riparian soils, increasing sediments, and decreasing riparian vegetation that protects water sources.

All of these factors would collectively reduce the total number of existing/new projects and the functionality of many existing projects that are needed to support the health and habitat of wild horses. This, in turn, would negatively affect the BLM's ability to effectively manage horses within the 2 HMAs.

Summary

The financial and logistical impacts of managing wild horses, as well as the negative impacts to the health of wild horses and the quality of their range, would be greater under Alternative B than all other alternatives. In addition, it would be more difficult for the BLM to manage wild horses to meet AML and other wild horse management objectives within both HMAs.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Wild horse management actions could continue to occur in Category A and B units that overlap HMAs in a similar manner as described for Alternative A. Existing wild horse management developments (fences, water developments, etc.) within HMAs overlapping Category C units could be maintained and support wild horse management. New projects (water developments, fences, etc.) needed for wild horse management could be implemented on the majority of the 2 HMAs similar to Alternative A. However, about 14% of the Beaty Butte HMA and 34% of the Paisley Desert HMA fall within Category C units and future proposed horse management projects would be subject to meeting VRM Class II objectives (see *Facilities* section).

OHV and Travel Management Impacts

Under this alternative, OHV/motorized vehicle use throughout the entire planning area, including the 2 HMAs (approximately 688,998 acres) would be limited to existing or designated routes. No areas within the HMAs would be open to motorized vehicle use. As a result, there would be large areas within the interior of limited area polygons in both HMAs that would not be subject to public cross-country motorized vehicle use. While vehicles could still travel on open routes in the HMAs, this change in OHV management would substantially reduce the potential for negative harassment impacts to wild horses from motorized vehicles compared to the No Action Alternative and Alternative A. However, it would also slightly reduce the opportunities for public viewing of wild horses on the landscape.

Being able to use motorized vehicles and aircraft for monitoring and horse gathers would allow the BLM to effectively monitor horse populations and range conditions, and effectively gather and remove excess wild horses from the HMAs in a similar manner as the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts

Should grazing closures or permit relinquishments occur within HMAs, additional forage could become temporarily available for wild horse use. However, there would be no change is permanent wild horse forage levels (AUMs) as a result of such actions, and these benefits would go away if livestock grazing resumes at a later date.

Range improvement maintenance would be reduced because permittees would no longer maintain many existing range improvements (including springs/troughs, waterholes, reservoirs, pipelines, and fences) within the interior of closed pastures/allotments. The responsibility to maintain wild horse developments would shift solely to the BLM. This would increase the budget needed to manage horses within the HMAs. Based on the current trend in budget and staffing levels, the BLM would likely not be able to successfully maintain all of these existing developments. This could result in a temporary reduction in water availability for wild horses.

Summary

Overall, this alternative would result in less harassment and more benefits to wild horses than the No Action Alternative or Alternative A, but slightly more harassment and less benefits than Alternative B.

While this alternative could make it more difficult to manage the horse populations effectively at AML compared to the No Action Alternative or Alternative A, the BLM should be able to meet most wild horse management objectives within both HMAs.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Wild horse management actions could continue to occur in Category A and B units that overlap HMAs in a similar manner as described for Alternative A. About 3,409 acres of the Category C units in this alternative are technically located within the Beaty Butte HMA, but are located south of Highway 140 and are fenced in such a way that they are inaccessible to wild horses.

OHV and Travel Management Impacts

Under this alternative, most OHV/motorized vehicle use in the 2 HMAs (approximately 682,001 acres) would be limited to existing or designated routes. Only about 6,994 acres within the HMAs would be open to motorized vehicle use. As a result, there would be large areas within the interior of limited area polygons in both HMAs that would not be subject to public cross-country motorized vehicle use. While vehicles could still travel on open routes and cross-country within a very small portion of one HMA, this change in OHV management would substantially reduce the potential for negative harassment impacts to wild horses from motorized vehicles compared to the No Action Alternative and Alternative A. However, it would also slightly reduce the opportunities for public viewing of wild horses on the landscape similar to Alternative C.

Being able to use motorized vehicles and aircraft for monitoring and horse gathers would allow the BLM to effectively monitor horse populations and range conditions, and effectively gather and remove excess wild horses from the HMAs in a similar manner as the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts

The potential effects of livestock grazing management on wild horses under this alternative would be the same as the No Action Alternative and Alternative A.

Summary

Overall, this alternative would result in less potential OHV harassment of wild horses than the No Action Alternative or Alternative A, but slightly more than Alternatives B or C. The potential effects of livestock grazing management on wild horses would be the same as the No Action Alternative and Alternative A.

The impacts of this alternative on BLM's ability to effectively manage wild horses would be most similar to Alternative A. Overall, this alternative would allow the BLM to manage wild horses to meet AML and other wild horse management objectives within both HMAs.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Wild horse management actions could continue to occur in Category A and B units that overlap HMAs in a similar manner as described for Alternative A. Existing horse management developments (fences, water developments, etc.) within HMAs overlapping Category C units could continue to be maintained and support wild horse management (see *Facilities* section). New projects (water developments, fences, etc.) needed for wild horse management could be implemented on the majority of the 2 HMAs similar to Alternative A. However, about 19% of the Beaty Butte HMA falls within Category C units and future proposed horse management projects would be subject to meeting VRM Class II objectives.

OHV and Travel Management Impacts

Under this alternative, OHV area designation specifically within the 2 HMAs would not change. For this reason, the impacts of OHV/motorized vehicle use on wild horses would be the same as the No Action Alternative and Alternative A. Opportunities for public viewing of wild horses on the landscape would also be similar to the No Action Alternative and Alternative A.

Being able to use motorized vehicles and aircraft for monitoring and horse gathers would allow the BLM to effectively monitor horse populations and range conditions, and effectively gather and remove excess wild horses from the HMAs in a similar manner as the No Action Alternative and Alternative A.

Livestock Grazing Management Impacts

The potential effects of livestock grazing management under this alternative would be the same as the No Action Alternative and Alternative A.

Summary

Overall, this alternative would result in a similar level of potential OHV harassment and livestock grazing impact on wild horses as the No Action Alternative or Alternative A.

While this alternative could make it more difficult to manage the horse populations (AML) effectively in the Beaty Butte HMA compared to the No Action Alternative or Alternative A, the BLM should be able to meet most wild horse management objectives within both HMAs.

Cumulative Impacts Common to All Alternatives

Climate Change

There is limited research available addressing the potential effects of climate change on wild horses (Brice *et al*. 2020). However, the effects of climate change on forage and water availability for wild horses would likely be similar to those described for livestock in the *Livestock Grazing* section. A reduction in available forage or water due to climate change could result in needing to conduct more frequent gathers and/or manage herd numbers more closely to the lower end of AML over the long-term.

Reasonably Foreseeable Future Actions

Future vegetation management activities and water developments have the potential to improve vegetation, forage, and water availability for wild horses, if such activities occur within HMAs. Conversely, future wildland fire has the potential to temporarily decrease forage availability if it occurs within HMAs. None of the other RFAs listed in Table 3-1 would have any additive, incremental cumulative effects on wild horses or HMAs on BLM-administered lands in the planning area beyond those direct effects described in the preceding *Environmental Effects* section.

Wilderness Study Areas

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect the suitability of WSAs within the planning area for future designation as wilderness?*

Affected Environment

Under the authority of Section 603 of the FLPMA, the BLM conducted an inventory of all public lands in Oregon for suitability as wilderness between 1977 and 1991. This inventory followed guidance published in BLM's (1978a) *Wilderness Inventory Handbook* and several subsequent policy directives (BLM 1979a, 1979b, 1979c, 1979d, 1979e). The inventory handbook defined an "inventory" as a distinct phase of the wilderness review process that "involves looking at the public lands to determine and locate the existence of areas containing wilderness resources that meet the criteria established by Congress" (see Appendix 3 for a discussion of the minimum characteristics necessary to qualify for wilderness consideration). The inventory consisted of two distinct phases: an initial inventory and an intensive inventory. Documentation of BLM findings occurred during each inventory phase and identified lands that did or did not contain wilderness characteristics (BLM 1979f, 1979g, 1979h, 1979i, 1980a, 1980b). Refer also to Appendix 2.

The BLM completed this comprehensive wilderness inventory for the entire state of Oregon in 1989 (BLM 1982c, 1989a) and forwarded its wilderness recommendations to the President in 1991 (BLM 1991a). The report included WSAs studied under Section 603 and 202 of the FLPMA. The BLM recommended a total of 245,497 acres (out of 484,953 acres) as suitable for wilderness designation. A description of the location, summary of the criteria considered in developing suitability recommendations, and number of acres recommended or not recommended for wilderness designation for each WSA is contained in Appendix J1 of the *Draft Lakeview RMP/EIS* (BLM 2001a). A complete description of each WSA is located in the *Oregon Wilderness Environmental Impact Statement* and the *Wilderness Study Report* (BLM 1989a, 1991a). These descriptions are incorporated by reference in their entirety in accordance with 40 CFR § 1502.21 (in effect prior to September 14, 2020). (*Note*: The Basque Hills and Rincon WSAs straddle the Lakeview/Burns District boundary and are managed by the Burns District. The Hawk Mountain WSA also straddles the Lakeview/Burns District boundary but is managed by the Lakeview District). Acreages listed in Table 3-54 are only those located within the planning area and are based on the most up-to-date geographic information system (GIS) boundaries and, therefore, differ from those acreages listed in previous BLM (1989a, 1991a) wilderness documents.

Table 3-54. Existing Wilderness Study Areas and Instant Study Area

Name	WSA Number	Total Acres[1]
Abert Rim WSA	1-101	25,054
Basque Hills WSA[3 6]	2-84	68,183[2]
Devil's Garden Lava Bed WSA	1-2	28,166
Diablo Mountain WSA	1-58	118,677
Fish Creek Rim WSA	1-117	19,129
Four Craters Lava Bed WSA	1-22	12,473
Guano Creek WSA	1-132	10,554
Hawk Mountain WSA[2]	1-146A	45,476
Lost Forest ISA[4]	1-24	9,044
Orejana Canyon WSA	1-78	24,143
Rincon WSA[3 6]	2-82	3,498
Sage Hen Hills WSA[6]	1-146B	7,973
Sand Dunes WSA[5]	1-24	15,511
Spaulding WSA	1-139	68,496
Sq__ Ridge Lava Bed WSA	1-3	28,673
TOTAL		**484,953**

[1] Acreage based on GIS data as of 2022.
[2] Acreage listed only include the portion of the WSA located within the Lakeview planning area. The remainder of the WSA falls within the Burns District.
[3] WSA managed by Burns District but shared with the Lakeview District.
[4] Includes 963 acres of overlap between Lost Forest ISA and Sand Dunes WSA.
[5] Does not include 963 acres of overlap between Lost Forest ISA and Sand Dunes WSA.
[6] Most existing WSAs in this table were studied under Section 603 of the FLPMA. However, the entirety of Sage Hen Hills and small portions of Basque Hills and Rincon were studied under Section 202 (BLM 1991a).

Section 603 of the FLPMA also required all secretarially identified natural or primitive areas established prior to November 1975 to become Instant Study Areas (ISAs) for purposes of wilderness study. The Lost Forest area was designated as a Research Natural Area (RNA) in 1972 and became the only ISA within the planning area. In the *Oregon Wilderness Study Report* (BLM 1991a), the BLM recommended the Lost Forest ISA as non-suitable for wilderness designation. The BLM will continue to manage the Lost Forest ISA as a WSA until such time as Congress designates it as wilderness or releases it from wilderness study (BLM 2012h).

Though the President forwarded BLM's wilderness recommendations on to Congress in 1992, Congress has not designated any wilderness areas on BLM-administered lands in the planning area. As required by the FLPMA, until such time as the Congress decides to either designate these existing WSAs as wilderness areas or release them from wilderness study, the BLM must manage them in accordance with *BLM Manual 6330 – Management of Wilderness Study Areas* (BLM 2012h) to prevent impairment of their wilderness characteristics.

Environmental Effects

Impacts Common to All Alternatives

Wilderness Characteristics Management Impacts

Since the BLM would continue to manage all discretionary activities within WSAs to avoid impairment of suitability for preservation for future designation as wilderness until such time as Congress acts to either designate them as wilderness or permanently release them from wilderness study (BLM 2012h), wilderness characteristics within WSAs would be preserved under all alternatives.

Livestock Grazing Management Impacts

Though livestock grazing within WSAs is a "legacied use" (BLM 2012h, pages 1-12, 1-18), the BLM would continue to not authorize grazing in most of the Guano Creek WSA, the western portions of the Abert Rim and Sand Dunes (Fossil Lake closure) WSAs, and most of the Diablo Mountain, Devils Garden, Four Craters Lava Bed, and Sq__ Ridge Lava Bed WSAs (approximately 29% of all WSAs) (Table 3-35; Map G-1, Appendix 1) under all alternatives. This would continue to limit grazing-related disturbances and benefit naturalness in these WSAs or portions of WSAs under all alternatives.

Impacts of No Action Alternative

OHV and Travel Management Impacts

Motorized vehicle use within the interior of WSAs would continue to be limited to a combination of existing or designated routes, with the exception of the Sand Dunes WSA (western portion would remain closed; eastern portion would remain open to cross-country travel). Existing OHV area designations for WSAs are summarized in Table 3-32.

Approximately 213 miles of existing interior routes (formerly referred to as "ways", see definition in *Appendix 8 – Glossary*) would remain open for motorized vehicle use and public access within the interior of all WSAs. While this type of use is temporary and is consistent with the current *WSA Management Manual* (BLM 2012h), the associated ground disturbance from motorized vehicles (approximately 310 acres) would continue to negatively impact naturalness and the noise from vehicle use would continue to negatively impact opportunities for solitude within the interior of some WSAs.

Impacts of Alternative A

OHV and Travel Management Impacts

The impacts of motorized vehicle use within the WSAs would be the same as those described for the No Action Alternative (Table 3-32).

Impacts of Alternative B

OHV and Travel Management Impacts

Under Alternative B, all WSAs (about 484,953 acres) would be closed to motorized vehicle use (Table 3-32). Approximately 213 miles of existing interior routes within WSAs (that existed at the time of wilderness study) would be closed. Although there would be some negative impacts (loss of public recreational access) as a result, the wilderness characteristics within WSAs would benefit from these closures. The criterion of naturalness would see the most improvement as internal routes would have vegetation gradually return to route surfaces through natural processes or active rehabilitation (approximately 310 acres).

The criteria of outstanding opportunities for solitude and unconfined primitive recreation would also improve as encounters/interactions with vehicles, people, noise, and activities associated with motorized vehicle use would cease to interfere with those seeking solitude through primitive recreation means. Route closures would benefit the unconfined feel of primitive recreation pursuits within the WSAs. The greatest example of this benefit would occur within the Sand Dunes WSA (where motorized, cross-country travel is currently allowed and moderate to high OHV use occurs from May through September). Most WSAs in the planning area receive low (on-road) motorized use the majority of the year, with moderate to high motorized use associated with hunting seasons in the fall. Therefore, route closures within WSAs would result in a moderate to high benefits (depending on the WSA and time of year) to naturalness and opportunities for solitude and primitive and unconfined recreation over the long-term.

Livestock Grazing Management Impacts

It is not possible to accurately predict the number or locations of future rangeland health violations that could occur specifically within WSAs over time under this alternative. Based on past rangeland health assessment findings, about 7% of the planning area has experienced rangeland health issues due to livestock grazing since 1998 (Table A5-4, Appendix 5). However, only about 19,931 acres (4%) of existing WSAs have experienced rangeland health violations due to livestock grazing during this timeframe. For analytical purposes, the BLM assumes 4-7% of future rangeland health violations could potentially occur in WSAs over the long-term. Removing grazing from these portions of WSAs could benefit wilderness characteristics in the following ways:

- The criterion of apparent naturalness would improve as unnatural features associated with grazing (trampled areas, trailing routes, watering locations, loading/unloading areas, etc.) revegetated by natural processes or were actively rehabilitated, or where livestock facilities (troughs, wells, water tanks, corrals, fences, salt blocks/buckets, etc.) were removed from the landscape.
- The criteria of outstanding opportunities for solitude or unconfined primitive recreation would also improve to some degree as encounters/interactions with vehicles, people, and activities associated with livestock management would decline or possibly cease in some WSAs. However,

even if this resulted in visitors having zero interactions associated with livestock grazing activities, improved solitude or primitive recreation opportunities would occur in a relatively small portion (4-7%) of the total area within WSAs.

For these reasons, the removal of livestock grazing within WSAs due to rangeland health violations under this alternative would likely result in a minimal to low benefit to wilderness characteristics within WSAs over the long-term.

Anywhere from 0 to 71% additional acres within WSAs could experience a reduction or complete removal of grazing over the long-term due to voluntary permit relinquishment (on top of the 29% that is currently ungrazed). In addition, existing livestock management facilities would no longer be maintained in WSAs where grazing is completely removed. Beneficial impacts to wilderness characteristics within WSAs (naturalness, outstanding opportunities for solitude or unconfined primitive recreation) from grazing removal due to permit relinquishment would be similar to those described for grazing removal associated with rangeland health issues under the *Impacts Common to Alternatives B and C* section above. However, wilderness characteristics could potentially improve on up to all 486,313 acres within WSAs.

Impacts of Alternative C

OHV and Travel Management Impacts

Under Alternative C, motorized vehicle use within all WSAs would be limited to routes that existed at the time the area became a WSA (1991) and, therefore, would be similar in most respects to the impacts described under the No Action Alternative and Alternative A (Table 3-32. However, motorized vehicle use within most of the Sand Dunes WSA would change from OHV Open to Limited while the western portion that overlaps the Closed portion of Fossil Lake would remain Closed (Map OHV-3, Appendix 1). This WSA would effectively be closed to all cross-country motorized travel, similar to all other WSAs. Therefore, under Alternative C, the Sand Dunes WSA would experience a benefit to wilderness characteristics that would be similar to those described for OHV Closed areas under Alternative B, including less noise and intrusions associated with motorized vehicle use and improved solitude opportunities.

However, there are approximately 6.5 miles of open routes that existed in 6 WSAs in the planning area (Devils Garden Lava Bed, Abert Rim, Sand Dunes, Fish Creek Rim, Guano Creek, and Hawk Mountain) at the time of WSA designation, that were subsequently closed by decisions in the *Lakeview RMP/ROD* (see Table 10 and Maps SMA-5, SMA-7, SMA-9, SMA-13, SMA-15, and SMA-16 of BLM 2003b, as maintained). These routes could be re-opened for public use through a separate decision resulting from a subsequent travel and transportation management plan and could result in slightly more noise and intrusions on solitude opportunities due to motorized vehicle use on these routes in these WSAs.

Livestock Grazing Management Impacts

It is not possible to accurately predict the number or locations of future rangeland health violations that could occur specifically within WSAs over time. For this reason, the potential effects of temporary removal of livestock grazing from WSAs due to rangeland health violations would likely result in a

minimal to low benefit to wilderness characteristics within WSAs over the long-term, similar to those described for Alternative B.

Beneficial impacts to wilderness characteristics within WSAs (naturalness, outstanding opportunities for solitude or unconfined primitive recreation) from grazing reductions or removal associated with permit relinquishments would be similar to the analysis pertaining to grazing reductions associated with rangeland health violations described under Alternative B. However, it not possible to accurately predict how often voluntary grazing permit or lease relinquishments would actually occur within WSAs over the long-term. In the past 20 years, a total of three permits (covering about 15,000 acres of public lands) were relinquished in the planning area and none of these occurred in WSAs. Based on past trends the BLM assumes for analytical purposes that future permit relinquishments specifically in WSAs under this alternative would potentially occur in a proportional fashion to the rest of the planning area. Based on this assumption, the BLM estimates that voluntary permit relinquishments would proportionally occur within approximately 2,280 acres (0.47%) of WSAs in future permit relinquishments under this alternative. Therefore, the removal of livestock grazing due to voluntary permit relinquishments would likely result in only a minimal improvement to wilderness values over the long-term under this alternative.

Impacts of Alternative D

OHV and Travel Management Impacts

The potential impacts of motorized vehicle use within the interior of WSAs would be the same as those described for the No Action Alternative and Alternative A (Table 3-32).

Impacts of Alternative E

OHV and Travel Management Impacts

The potential impacts of motorized vehicle use within the interior of WSAs would be the same as those described for the No Action Alternative and Alternative A (Table 3-32).

Cumulative Impacts Common to All Alternatives

Reasonably Foreseeable Future Actions

Under all alternatives, no incremental, additive cumulative effects would occur to wilderness characteristics within WSAs, as no RFAs (Table 3-1) are likely to meet the non-impairment standard and be allowed to occur within WSAs. For this reason, wilderness characteristics within WSAs would not likely be impacted by RFAs over either the short or long-term.

Wilderness Characteristics Management Impacts

Wilderness characteristics management direction would be applied only within the boundaries of specific wilderness characteristics units within BLM-administered lands in the planning area, so these actions would generally not have the potential to cumulatively impact wilderness characteristics within adjacent WSAs (those separated by a defined boundary road). However, there are a number of wilderness characteristics units that are contiguous (not separated by a defined boundary road) to existing WSAs.

Managing contiguous units to emphasize wilderness characteristics (as Category C units) would cumulatively contribute to, or benefit wilderness values, within the contiguous WSA by increasing the size of area(s) managed for similar wilderness characteristic values. However, the magnitude of this effect would vary across the range of alternatives and is described in the following section.

Cumulative Impacts – No Action Alternative

Wilderness Characteristics Management Impacts

Under this alternative, there would be a large additive, incremental benefit to wilderness characteristics across the planning area. These values would be maintained or enhanced on about 1,654,103 additional acres on top of the existing WSAs (484,953 acres) and 7 small existing wilderness characteristics units (1,187 acres). In total wilderness characteristics would be maintained or enhanced on about 2,140,243 acres (66.8% of the planning area) under this alternative.

Cumulative Impacts – Alternative A

Wilderness Characteristics Management Impacts

Under Alternative A, there would be no additive, incremental benefit to wilderness characteristics in the planning area. These values would be maintained or enhanced within existing WSAs (484,953 acres) and 7 small existing wilderness characteristics units (1,187 acres). In total wilderness characteristics would be maintained or enhanced on about 486,140 acres (15.2% of the planning area) under this alternative.

Cumulative Impacts – Alternative B

Wilderness Characteristics Management Impacts

Under this alternative, there would be a large additive, incremental benefit to wilderness characteristics across the planning area. Wilderness characteristics within the existing WSAs (484,953 acres) would be maintained or enhanced.

This alternative would include designating 34 whole units and 2 partial units as new Section 202 WSAs (273,705 acres). These new Section 202 WSAs would either be contiguous with existing WSAs or separated from them by a minor road (as described in Chapter 2 and Appendix 4). In particular, the 31 contiguous units would cumulatively benefit or add to similar wilderness values within 12 contiguous WSAs (Hawk Mountain, Rincon, Basque Hills, Guano Creek, Fish Creek Rim, Abert Rim, Diablo Mountain, Sand Dunes, Devil's Garden, Poker Jim, Round Mountain, and Sheldon Contiguous). In addition, 77 whole units and portions of 2 units (1,381,142 acres) would be managed as Category C units. In total wilderness characteristics would be maintained or enhanced on about 2,140,243 acres (66.8% of the planning area) under this alternative.

Cumulative Impacts – Alternative C

Wilderness Characteristics Management Impacts

Under Alternative C, there would be a moderate additive, incremental benefit to wilderness characteristics across the planning area. These values would be maintained or enhanced on about 411,033 additional

(Category C unit) acres on top of the existing WSAs (484,953 acres) and 7 small existing wilderness characteristics units (1,187 acres). In total wilderness characteristics would be maintained or enhanced on about 897,173 acres (28% of the planning area) under this alternative.

In addition, management of the 7 contiguous Category C units would cumulatively benefit similar wilderness values in 10 contiguous WSAs (Hawk Mountain, Rincon, Basque Hills, Guano Creek, Fish Creek Rim, Diablo Mountain, Sand Dunes, Poker Jim, Round Mountain, and Sheldon Contiguous).

Cumulative Impacts – Alternative D

Wilderness Characteristics Management Impacts

Under Alternative D, there would be a small additive, incremental benefit to wilderness characteristics in the planning area. These values would be maintained or enhanced on about 4,671 additional (Category C unit) acres on top of the existing WSAs (484,953 acres) and 7 small existing wilderness characteristics units (1,187 acres). In total wilderness characteristics would be maintained or enhanced on about 490,811 acres (15.3% of the planning area) under this alternative.

In addition, management of the 2 contiguous Category C units would cumulatively benefit similar wilderness values in 2 contiguous WSAs (Hawk Mountain and Round Mountain).

Cumulative Impacts – Alternative E

Wilderness Characteristics Management Impacts

Under Alternative E, there would be a moderate additive, incremental benefit to wilderness characteristics across the planning area. These values would be maintained or enhanced on about 372,218 additional (Category C unit) acres on top of the existing WSAs (484,953 acres) and 7 small existing wilderness characteristics units (1,187 acres). In total wilderness characteristics would be maintained or enhanced on about 858,358 acres (26.8% of the planning area) under this alternative.

In addition, management of 16 contiguous Category C units would cumulatively benefit wilderness values in 6 contiguous WSAs (Hawk Mountain, Rincon, Basques Hills, Guano Creek, Fish Creek Rim, and Abert Rim).

Areas of Critical Environmental Concern/Research Natural Areas

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect the relevant and important resource values within Areas of Critical Environmental Concern/Research Natural Areas in the planning area?*

Affected Environment

An Area of Critical Environmental Concern (ACEC) is a land use designation specified within the *Federal Land Policy and Management Act* for areas where special management is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or

other natural systems or processes, or to protect life and safety from natural hazards (*see* 43 CFR § 1601.0-5).

The Sand Dunes/Lost Forest/Fossil Lake and Devils Garden Lava Beds ACECs were designated during the management framework planning process in the early 1980s (BLM 1982a, 1982b, 1983a, 1983b). Other areas were considered for ACEC designation in the *Lakeview Grazing Management Final Environmental Impact Statement* but failed to meet the criteria (BLM 1982a). A third area (Connley Hills) was later found to meet the ACEC criteria, as well as the criteria for designation as a Research Natural Area (RNA). However, BLM recommended that the proposed Connley Hills RNA be managed as an "interim RNA" until such time as the *Management Framework Plan* for the Lakeview District was amended or updated (BLM 1985). Two plan amendments were completed in the 1990s, which designated the Warner Wetlands and Lake Abert ACECs and defined the management direction for these 2 areas (BLM 1989b, 1989c, 1996c, 1996d).

In 1992, the BLM contracted with the Oregon Natural Heritage Program (ONHP) to conduct an inventory to evaluate plant and animal community "natural heritage cells" across the planning area and to reevaluate previous ACEC nominations. Nine sites were recommended for designation for both ACEC and RNA status, because they contained at least one ONHP plant community cell (Vander Schaff 1992). RNAs are created for scientific research and management is designed to maintain those values. BLM evaluated those recommendations, along with other nominations from numerous environmental groups, Native American Tribes, Dr. Richard Miller (Oregon State University), and its own staff (BLM 1999b, 2000a).

As a part of the previous planning process, BLM designated lands within the planning area as ACECs in 2003. The *Lakeview RMP/ROD* validated four existing ACECs and designated an additional 13 ACECs (BLM 2003b). As a result, there are currently seventeen existing ACECs covering over 314,918 acres (9.8%) in the planning area (Table 3-55). The BLM considered 12 other proposals at that time but found they did not meet the relevance and importance criteria (BLM 1999b, 2000a, and 2003a). The BLM ID team examined these 17 existing ACECs again in 2011 and found they all still met the relevance and importance criteria. For this reason, none of the existing ACEC designations decisions are being re-visited in this plan amendment. Based on national and state policy in place at the time, the BLM designated these RNAs as ACECs. For this reason, the 10 RNAs listed in Table 3-55 have dual designations as ACECs.

There is a large degree of overlap between ACECs and other existing protective designations in the planning area. In particular, about 112,230 acres of ACECs (23%) overlap with WSAs (Table 2-2; see Table 9 in BLM 2003b, as maintained). ACEC/RNAs also overlap substantially with sage-grouse PHMA/GHMA habitat designations. In addition, about 165,613 acres of ACEC/RNAs overlap with about 10% of the wilderness characteristics units in the planning area.

Environmental Effects

Impacts Common to All Alternatives

Under all alternatives the effects of continuing current ACEC special management direction for land tenure, land use authorizations, energy and minerals, VRM, vegetation, weeds/invasive species, special status species, fire, and recreation (see Tables 8 and 10 in BLM 2003b, as maintained) would maintain or protect all of the relevant and important ACEC values (Table 3-55) within each existing, designated ACEC/RNA (refer to analysis contained in BLM 2003a, pages 4-88 to 4-103, that is hereby incorporated

by reference in its entirety in accordance with the provisions of 40 CFR § 1500.4(j) and 1502.21 (in effect prior to September 14, 2020).

The relevant and important ACEC values within those ACECs that overlap WSAs (see Table 9 of BLM 2003b, as maintained) would also continue to be protected by additional protective management constraints under the *Management of Wilderness Study Areas Manual* (BLM 2012h). In addition, portions of three key RNAs (approximately 12,052 acres; see Table 3-35) would no longer be subject to potential effects associated with livestock grazing use under all alternatives.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Current ACEC/RNA management (see *Appendix 3 – Existing Management Common to All Alternatives* and BLM 2003b, p. 57-70) is adequate to maintain or protect relevant and important values. However, continuing to implement Provisions 18 and 19 of the 2010 Settlement Agreement would provide additional level of protection to the various relevant and important ACEC values (Table 3-55) by preventing many potential discretionary ground disturbing activities within portions of 13 of the ACECs (Connley Hills, Fish Creek Rim, High Lakes, Juniper Mountain, Rahilly-Gravelly, Red Knoll, Sink Lakes-Guano Creek, Spanish Lakes, Table Rock, Abert Rim Addition, Lake Abert, Sand Dunes-Lost Forest, and Warner Wetlands; totaling about 165,613 acres) that overlap wilderness characteristics units.

Impacts Common to No Action Alternative and Alternative A

OHV, Travel, and Livestock Grazing Management Impacts

Continuing existing OHV Limited area designations and travel management direction would continue to prevent cross-country vehicle travel, limit access to certain areas (*e.g.* cultural/paleontological sites), reduce soil compaction and erosion, reduce disturbance to vegetation and wildlife, and protect the relevant and important ACEC values within all ACECs (BLM 2003a, p. 4-89 to 4-101) with the exception of the open portion of the Sand Dunes ACEC complex.

Continuing existing livestock grazing management would have little or no impacts on the relevant and important ACEC values, as well as provide adequate management flexibility to make adjustments to grazing, if needed to prevent future adverse effects to the relevant and important values within all ACECs (BLM 2003a, p. 4-88).

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Under this alternative, the relevant/important ACEC values within portions of 12 ACECs (about 161,048 acres) would receive some additional protection due to overlap with 23 Category C units and 7 new Section 202 WSAs. While there would be no changes in most existing land use allocation and management decisions (*e.g.* land tenure, salable minerals, OHV, etc.) in these ACECs, portions of 11 ACECs (Connley Hills, High Lakes, Juniper Mountain, Rahilly-Gravelly, Red Knoll, Sink Lakes, Spanish Lakes, Lake Abert, Fish Creek Rim, Lost Forest-Sand Dune-Fossil Lake, and Warner Wetlands) would see increased protection/benefit to the relevant/important ACEC values from changing management

Table 3-55. Existing ACEC/RNAs

Name/Designation Year	Acres	Relevant and Important Values [2]
Devil's Garden Lava Beds/1984	28,244	Natural system values: Lava tubes, cinder and spatter cones, ecological transition zone containing both forest and high desert plant communities.
Lake Abert/1996	50,128	Natural system, cultural, scenic, and wildlife values: aquatic ecology, important snowy plover and migratory bird populations and habitat, prehistoric cultural sites, National Historic Register District, and scenic quality.
Lost Forest (RNA) - Sand Dunes - Fossil Lake/1972 and 1983	35,676	Natural system and cultural values: Two ONHP Basin and Range Ecosystem cells: (1) relic ponderosa pine/big sagebrush-bitterbrush, (2) ponderosa pine-western juniper/big sagebrush/needle-and-thread grass. Interior sand dunes, prehistoric cultural and paleontological sites.
Warner Wetlands/1989	51,847	Natural system, cultural, and wildlife values: wetlands/wildlife habitat, including migratory birds and special status species, one special status plant, one ONHP cell (which ONHP did not recommend for RNA): (9) low-elevation alkaline pond with aquatic beds and marshy shore, and prehistoric cultural sites.
Abert Rim/2003	18,039	Cultural and wildlife values: Cultural sites, cultural plants, and Greater Sage-Grouse habitat.
Black Hills RNA/2003	3,048	Natural system values: Meets ONHP cells for Basin and Range Ecosystem: (4) Western juniper/big sagebrush/bluebunch wheatgrass and (11) Wyoming big sagebrush/bluebunch wheatgrass. Special status plant species.
Connley Hills RNA/2003	3,600	Natural system and cultural values: Unique plant communities that fill ONHP cells for Basin and Range Ecosystem: (4) western juniper/big sagebrush, bluebunch wheatgrass, (7) western juniper/bluebunch wheatgrass, (8) western juniper/Idaho fescue, (11) Wyoming big sagebrush/bluebunch wheatgrass. Prehistoric archaeological sites.
Fish Creek Rim RNA/2003	8,718	Cultural, wildlife, and natural system values: Fills ONHP cells in Basin and Range Ecosystems: (20) big sagebrush- bitterbrush/Idaho fescue, (26) low sagebrush/Idaho fescue scabland, (37) mountain mahogany/mountain/big sagebrush/bitterbrush, (41) snowbrush/bitter cherry shrub. Special status plant species. Greater Sage-Grouse habitat. Cultural plants and prehistoric archeological sites.
Foley Lake RNA/2003	2,228	Cultural and natural system values: High concentration of cultural sites related to resource procurement and settlement patterns. One special status plant. Meets ONHP cell for Basin and Range Ecosystem: (30) black sagebrush/bunchgrass.
Guano Creek - Sink Lakes RNA/2003	11,186	Natural system and wildlife values: Low elevation vernal pool and sagebrush/Sandberg bluegrass scabland. Fills ONHP cells for Basin and Range Ecosystem: (28) low sagebrush/Sandberg's bluegrass scabland, (53) low elevation vernal pond, (15) big sagebrush/needle-and-thread, (82) low elevation riparian. Special status plant species. Greater Sage-Grouse habitat.
Hawksie-Walksie RNA/2003	17,300	Cultural and natural system values: Fills ONHP cell for Basin and Range Ecosystem: (11) Wyoming big sagebrush/bluebunch wheatgrass, (12) big sagebrush/Idaho fescue. Prehistoric archaeological sites.
High Lakes/2003	38,952	Cultural, wildlife, and natural system values: High concentration of prehistoric rock art sites. Cultural plants. Special status plant species. Greater Sage-Grouse habitat.
Juniper Mountain RNA/2003	6,330	Natural system values: Old-growth western juniper. Meets ONHP cell for Basin and Range Ecosystem: (5) western juniper/big sagebrush/Idaho fescue. (Note: a 2003 wildfire reduced the extent of the western juniper component of the ONHP cell along with about 50% of the old-growth juniper).
Rahilly-Gravelly RNA/2003	18,678[3]	Cultural, wildlife, and natural system values: High density and variety of prehistoric and historic sites. One special status plant. Meets ONHP cell needs for Basin and Range Ecosystem: (6) western juniper/big sagebrush-bitterbrush, (21) mountain brush (mountain big sagebrush-bitterbrush-Sq__ apple), (40) bitterbrush-sagebrush/ mountain snowberry/Thurber needle grass. Greater Sage-Grouse habitat.
Red Knoll/2003	11,119	Cultural and wildlife values: High density and wide variety of cultural sites. Cultural plants. Unique plant community containing special status plant species. Greater Sage-Grouse habitat.
Spanish Lake RNA/2003	4,695	Natural system values: Diversity of salt desert scrub communities with limited distribution in planning area and Northern Great Basin. Meets ONHP cell for Basin and Range Ecosystems: (19) black greasewood- shadscale/bunchgrass/playa margin (73) playa with greasewood/Great Basin wildrye, (34) shadscale-budsage/bunchgrass/salt desert shrub.
Table Rock/2003	5,139	Cultural, natural system, and scenic values: High density of unique archeological site types. Table Rock formation is regionally significant scenic feature. Special status plant species. May qualify as a traditional cultural property.
Total	**314,918**	

Sources: BLM (2000a), Appendix I of BLM (2003a), BLM (2015b), and ONHP (1998).

[2]Non-BLM lands are excluded from these estimates whenever possible.

[3] Rahilly-Gravelly acreage estimates does not include approximately 957 acres in Nevada managed by the Surprise Field Office.

within the Category C unit and new Section 202 WSA portions to meet VRM Class I or II management objectives. For this reason, the relevant and important values in these overlapping ACECs would continue to be maintained or protected at a slightly higher level than the No Action Alternative.

OHV and Travel Management Impacts

OHV area closures would reduce or eliminate the potential for future ground disturbance and potential negative impacts to the relevant and important values in Category C units and new Section 202 WSAs overlapping portions of 12 ACECs (about 157,442 acres) compared to the No Action Alternative.

Livestock Grazing Management Impacts

Grazing reductions/removal due to permit relinquishments or rangeland health issues could potentially occur within any of the 17 ACECs under this alternative and could reduce or eliminate the potential for negative effects of grazing on the relevant and important values in some ACECs compared to the No Action Alternative.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

The relevant and important ACEC values within portions of 6 ACECs (Fish Creek Rim, High Lakes, Sink Lakes-Guano Creek, Abert Rim Addition, Lake Abert, and Sand Dunes-Lost Forest) would receive some additional protections due to overlap with 8 Category C units under this alternative. While there would be no changes in many existing land use allocation and management decisions (*e.g.* land tenure, land use authorizations, mining restrictions, etc.) in these ACECs, portions of some ACECs (High Lakes and Lake Abert) would see increased protection/benefit to the relevant/important ACEC values from changing management within the Category C unit portions to meet VRM Class II objectives. For this reason, the relevant and important values in these overlapping ACECs would continue to be maintained or protected over the long-term.

OHV and Travel Management Impacts

Limiting OHV use to existing routes within Category C units would only eliminate the potential for cross-country travel to negatively impact the relevant and important values within a portion of one additional ACEC (Sand Dunes) compared to the No Action Alternative, because motorized vehicle use in all other ACECs is already Limited to Existing or Designated routes.

Livestock Grazing Management Impacts

Livestock grazing reductions/removal due to rangeland health issues could potentially occur within any of the 17 ACECs under this alternative which could reduce or eliminate the potential for negative effects of grazing on the relevant and important values in one or more ACECs compared to the No Action Alternative. However, no changes in permit relinquishment procedures would occur specifically within ACECs under this alternative.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Under this alternative, there would be no additional protections to ACECs because there would be no overlap with Category C units and no changes in any existing land use allocation or management decisions.

OHV, Travel, and Livestock Grazing Management Impacts

Since there would be no changes in OHV, travel, or livestock grazing management specifically within any ACEC under this alternative, the effects of OHV, travel, and livestock grazing management on the relevant and important ACEC values would be the same as those described for the No Action Alternative.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

The relevant and important ACEC values within portions of 6 ACECs (Juniper Mountain, Fish Creek Rim, High Lakes, Sink Lakes-Guano Creek, Abert Rim Addition, and Lake Abert) would receive some additional protections due to overlap with 13 Category C units (Map P-6, Appendix 1). While there would be no change in existing land use allocation or management decisions (*e.g.* land tenure, land use authorizations, mining restrictions, etc.) in these overlapping ACECs, portions of four of these ACECs (High Lakes, Sink Lakes, Juniper Mountain, and Lake Abert) would see increased protection/benefit to the relevant and important ACEC values from changing management within the Category C unit portions to meet VRM Class II objectives. For this reason, the relevant and important values in these over-lapping ACECs would continue to be maintained or protected over the long-term.

OHV, Travel, and Livestock Grazing Management Impacts

Since there would be no changes in OHV, travel, or livestock grazing management specifically within any ACEC under this alternative, the effects of OHV, travel, and livestock grazing management on the relevant and important ACEC values would be the same as those described for the No Action Alternative.

Cumulative Impacts Common to All Alternatives

Key RNAs and Preliminary Injunction

If BLM continues to implement the Key RNA grazing management decisions in the 2015 *Oregon Greater Sage-grouse AMPA* (BLM 2015a), up to 12.5 miles of new fencing could be constructed to keep livestock out of the Key RNA portions of the Fish Creek Rim, Foley Lake, and Rahilly-Gravelly ACEC/RNAs (Table 3-1). The potential effects of this fencing would require additional NEPA analysis prior to implementation and would likely result in an estimated additional 7.6 acres of ground disturbance resulting from future fence construction and livestock trailing (BLM in prep. b). While the fencing would reduce the potential effects of livestock grazing on some of the relevant/important values (cultural resources and ecological processes; Table 3-55), further analysis is needed to determine the impacts of fencing on sage-grouse or its habitat at the local level. If the injunction is lifted and the 2019 *Oregon Greater Sage-grouse AMPA* (BLM 2019f) is implemented, these 3 areas (approximately 12,052 acres) would become available for livestock grazing once again and the proposed fencing and the potential

associated effects to ACEC/RNA values would not occur (see also *Livestock Grazing Cumulative Effects* section).

Reasonably Foreseeable Future Actions

Most of the lands, realty, and cadastral survey, energy and minerals, and facilities RFAs listed in Table 3-1 would likely not have any additive, incremental cumulative effects on the relevant and important values within ACECs in the planning area, because the existing special management direction would discourage or preclude these activities. Activities that are allowed would require additional mitigation to reduce potential effects to the relevant and important ACEC values. In general, vegetation, fire, and fuels management RFAs listed in Table 3-1 would benefit relevant/important plant community and wildlife habitat values.

However, since most ACECs have not been withdrawn from mineral entry, locatable mining could occur in these areas in the future. While such mineral development would require the preparation of a plan of operations and a reclamation plan designed to prevent undue and unnecessary degradation, negative impacts to the relevant and important values would likely occur.

Wild and Scenic Rivers

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect the free-flowing nature and outstanding remarkable values within the one suitable wild and scenic river in the planning area?*

Affected Environment

Between 1982 and 2001, BLM conducted several wild and scenic river (WSR) eligibility studies. The Forest Service participated on several river studies that involved both Forest Service and BLM ownerships. In these assessments, three rivers were determined to be eligible: Honey Creek, Guano Creek, and Twelvemile Creek in the planning area (FS and BLM undated, 1995b, 1996b, BLM 1999c). In 2001, the BLM further assessed the suitability of the three eligible rivers. Appendix J2 of the *Draft Lakeview RMP/EIS* (2001a) documents this in more detail. These assessments are incorporated by reference herein their entirety in accordance with 40 CFR § 1502.21 (in effect prior to September 14, 2020). As a result of these assessments, the BLM determined that Honey Creek and Guano Creek were not suitable for inclusion into the WSR system and are not considered further in this analysis.

The Twelvemile Creek corridor was recommended as suitable for designation as a WSR, based on the presence of one outstandingly remarkable value (ORV): fish habitat and populations (Warner suckers). This 6.6-mile corridor flows from northeastern California to southern Oregon to northwestern Nevada and back into southern Oregon (Map R-1, Appendix 1; see also Map SMA-22 of BLM 2003b). A formal recommendation as suitable of the 4.4-mile Oregon portion of this river was made in the *Lakeview RMP/ROD* (BLM 2003b, page 73) with a tentative classification as "recreational." The 2.2- mile portion of this corridor in northeastern California and northwestern Nevada was formally recommended as suitable with a tentative classification as "recreational" in the *Surprise RMP/ROD* (BLM 2008b, page 11). These findings represent the BLM's official recommendations to the Secretary of the Interior. This recommendation has not yet been submitted to the Congress for consideration.

Environmental Effects

Impacts Common to All Alternatives

Other Management Impacts

Under all alternatives, the ORV (Warner suckers) within approximately 4.4 miles of Twelvemile Creek (1,395 acres) in Oregon would continue to be maintained due to the on-going management as a suitable WSR corridor (BLM 2003b and Appendix 3) that is managed to meet the existing recreational river management objectives and standards (see Appendix J2 of BLM 2001a). In addition, the overlapping sage-grouse habitat designations (PHMA and GHMA; Table A2-3 of Appendix 2) and associated management direction (BLM 2015a) would also continue to prevent or limit many types of ground-disturbing activities within this corridor that would also benefit the existing ORV.

Livestock Grazing Management Impacts

The BLM removed livestock grazing from the Twelvemile Creek WSR corridor in the mid-1990s to protect Warner sucker habitat (FWS 1997, 2002). Continuing to exclude livestock would continue to prevent potential negative impacts typically associated with concentrated livestock grazing use (*e.g.* vegetation trampling, soil compaction, erosion, and sedimentation) to Twelvemile Creek, the adjacent riparian area, and the associated Warner sucker habitat under all alternatives.

Summary

This existing common management direction would continue to adequately protect the ORV of the Twelvemile Creek suitable WSR corridor under all alternatives.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

The Twelvemile Creek suitable WSR corridor overlaps the northern portions of two wilderness characteristics units (Twelvemile-Rock Creek and Twelvemile-Horse Creek; Table A2-3 of Appendix 2) which are located primarily in Nevada. Managing the Oregon portions of these units in accordance with Provisions 18 and 19 of the Settlement Agreement would provide only minimal additional protections to the ORV above the current WSR management (see *Appendix 3 – Existing Management Common to All Alternatives* and *Impacts Common to All Alternatives* section above) by potentially preventing some additional human disturbances within the Oregon portion of the suitable wild and scenic river corridor.

OHV and Travel Management Impacts

OHV use within the suitable WSR corridor would continue to be limited to one designated route under this alternative (see Map SMA-22 of BLM 2003b, as maintained), which would continue to minimize the potential for associated soil erosion and sedimentation impacts to the Twelvemile Creek system.

Impacts of Alternative A

The effects of Alternative A would be as described in the *Impacts Common to All Alternatives* section above. Though no new management would be applied to protect wilderness characteristics, the existing wild and scenic river values would still be adequately protected.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Managing the northern portions of two wilderness characteristics units (Twelvemile-Rock Creek and Twelvemile-Horse Creek; Table 3-3) within Oregon which overlap the Twelvemile Creek suitable WSR corridor as Category C units would not provide any additional level of protection to the one ORV (Warner sucker habitat and populations) beyond those protections already provided by the existing management (see *Impacts Common to All Alternatives* section above).

OHV and Travel Management Impacts

The most substantial change in management under this alternative would be closing the suitable WSR corridor to OHV use. However, since there is only one existing open route currently in this corridor and the steep walls of the canyon prevent most cross-country vehicle use, this change would have very little additional benefit to the one ORV (Warner sucker habitat and populations) when compared to the No Action Alternative.

Impacts Common to Alternatives C, D, and E

OHV and Travel Management Impacts

OHV use under these alternatives would continue to be limited to designated routes within this suitable WSR corridor. However, since there is only one existing open route in this corridor and the steep walls of the canyon prevent development of new routes, the impacts of OHV management would be the same as those described for the No Action Alternative.

Cumulative Impacts Common to All Alternatives

Most of the RFAs identified in Table 3-1 would have no additive, incremental cumulative effects on the Twelvemile Creek suitable WSR corridor as the existing WSR management direction would prevent most ground-disturbing activities from occurring. However, future vegetation treatments could still occur within the corridor provided they are shown to benefit or not negatively impact the one ORV (Warner sucker habitat and populations).

Cultural and Paleontological Resources

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect cultural and historic resources, paleontological resources, and traditional uses in the planning area?*

Affected Environment – Cultural Resources

Cultural resources are defined as a definite location of human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. The term includes archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and may include definite locations (sites or places) of traditional cultural or religious importance to specified social and/or cultural groups (BLM 2004r; see also *Glossary*, Appendix 8). Cultural resources are fragile and irreplaceable and can be damaged or destroyed by human actions. Through vandalism and natural deterioration processes, these resources are disappearing.

The planning area has not been comprehensively surveyed for the presence of cultural or historic resources. Surveys have been done on portions of the planning area and are typically completed during project (implementation) level planning activities prior to implementing or authorizing ground-disturbing activities. These represent resources for which there is "incomplete or unavailable information." According to the CEQ's NEPA regulations (40 CFR § Part 1502.22), when an agency is evaluating impacts and there is incomplete or unavailable information, the agency must make clear that such information is lacking.

If the information "cannot be obtained because the cost of obtaining it is exorbitant or the means to obtain it are not known, the agency shall include: (1) a statement that such information is incomplete or unavailable; (2) a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts….; (3) a summary of the existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant impacts… and (4) the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community…". The DOI NEPA regulations state that these costs are not just monetary, but can also include "social costs, delays, opportunity costs, and non-fulfillment or non-timely fulfillment of statutory mandates" (43 CFR § Part 46.125).

The BLM estimates the monetary cost of obtaining comprehensive survey information for cultural resources would range from $36 to $80 per acre based upon recent costs for contract survey work. Surveying the remaining 2,865,370 un-surveyed acres within the planning area would cost approximately $103,153,000 to $229,229,000 and would be exorbitant. It would take one cultural resource specialist surveying an average of 40 acres per day an estimated 71,634 survey days or 274 years (working 5 days a week) to complete such a survey. While a survey could be completed more quickly with a larger crew of specialists, it could not be completed without causing significant delay in the preparation of this plan amendment.

The scope and scale of cultural resource identification needed for land use planning is much more general and less intensive than for site-specific (project) proposals (BLM 2005, Appendix C, page 8). Even if the BLM had a comprehensive survey of the planning area, it could not publish the specific locations of these resources due to the sensitive nature of these values. Further, comprehensive cultural and historic resource information is not needed to adequately address the potential effects associated with the development of a land use plan or plan amendment because impacts would only occur to these resources as the result of implementing or authorizing ground-disturbing activities. The approval of a land use plan would not automatically result in the implementation or authorization of any ground-disturbing activities.

To date, the BLM has completed over 2,130 project-level cultural resource surveys covering over 340,000 acres of the planning area. The following section summarizes what is currently known about existing cultural and historic resources in the planning area based on published sources, professional knowledge, survey data, and other information on file in the Cultural Resource Archives located at the Lakeview District Office.

Pre-contact Period Sites

When the first people of European descent came through this part of Oregon, six Native American Tribes or groups were the primary occupants or visitors in what is now the planning area. Evidence collected from consultation with Native American Tribes and individuals, the archaeological record, and old ethnographic reports indicates that tribal groups moved about, changed territories, or vacated the land over time. Native Americans have lived in what is now the planning area for over 14,000 years. It is unclear what Tribe or Tribes held any specific portion of the planning area on a consistent basis during pre-contact periods. Today's boundaries for historic tribal groups are more a product of federal and state governments drawing lines on maps, often for political reasons during the creation of treaties, rather than a reflection of who actually used the land in times past.

Historical records and tribal consultations indicate that the Native American groups known as the Northern Paiute occupied most of the planning area at the time of contact with people of European descent. The Yahuskin Band of the Northern Paiute occupied the northern regions around Silver Lake, Christmas Valley, and Summer Lake, while the Fort Bidwell and Harney Valley Bands used the eastern and southeastern portions of the planning area. Today, the Yahuskin Paiute are a part of The Klamath Tribes, with tribal headquarters located in Chiloquin, Oregon. The Fort Bidwell band is part of the Fort Bidwell Indian Community, with tribal headquarters located in Fort Bidwell, California. The Harney Valley Paiute are part of the Burns Paiute Tribe with tribal headquarters located in Burns, Oregon.

Native people from the Warm Springs area to the north, and Klamath and Modoc from the west, also used portions of the planning area. Currently, the Warm Springs are part of the Confederated Tribes of Warm Springs with tribal headquarters located in Warm Springs, Oregon. The Klamath and Modoc are part of The Klamath Tribes with tribal headquarters located in Chiloquin, Oregon.

Archaeological or cultural site types found in the planning area range from small lithic scatters (areas of stone tool debris) of only a few flakes to large lithic workshops and quarry locations that cover many square miles. There are also permanent village locations, small temporary campsites, hunting stations, hunting blinds, game drives, plant collection sites, spiritual sites, rock art, rock cairns, rock stack features, burials, and cremation sites present in the planning area (Cultural Resource Archives).

The planning area's archaeological record is one of the richest and longest in North America in terms of site numbers and age. Evidence exists in the planning area for occupation of the area beginning some 14,300 years ago (Jenkins 2012). The planning area is part of the cultural and geographic region known as the Northern Great Basin. The length of time that Native Americans occupied the Northern Great Basin area is divided into periods of occupation known as cultural periods. Cultural periods are based primarily on perceived technological developments in types of artifacts found within archaeological sites, on radiocarbon dates of materials found in sites, and upon Native American consultation about their history. The following are the four periods of occupation for the planning area:

Pre-Clovis Period

There is evidence from Paisley Caves, a site located within the planning area, that occupation started here some 14,300 years ago (Jenkins *et al.* 2007, 2008, 2012, 2013). Evidence from Paisley Caves in the form of extinct fauna, including remains of horses, camel, and bison, indicates the occupants of the site hunted these animals (Jenkins 2007). DNA evidence of the human occupants of the site was collected from coprolites (fossilized human feces) found in the site. This DNA evidence links the occupants of the site to the Native American populations present in North America today. Sites of this period are extremely rare (Jenkins *et al.* 2013).

Clovis Period

This period dates from about 12,000 to 10,000 years ago. The Clovis Period takes its name from a projectile point form called a Clovis Point. As is the case with the Pre-Clovis Period, there is little known about the people from this period. Like the people of the previous period, Clovis people hunted now extinct fauna such as camel, bison, and mammoth. In addition, evidence indicates they hunted smaller game such as deer, antelope, and rabbits, and relied on the collection of plants and seeds. There are currently three known Clovis Period sites and several isolated finds of Clovis artifacts in the planning area (Cultural Resource Archives).

Stemmed Point Period

Until recently, this period was thought to date from about 10,000 to 7,500 years ago and was believed to mark a change in the subsistence patterns of Great Basin populations to a greater dependence upon the collection of plant foods over hunting. While hunting remained important, this new subsistence strategy provided a means to make a living within a constantly changing environment. However, more recent research indicates some stemmed point sites are earlier than Clovis, while some existed at the same time as Clovis, and some existed after Clovis. Stemmed Point Period sites and isolated finds of stemmed points have been located throughout the planning area (Cultural Resource Archives).

Desert Culture or Archaic Period

This period lasted from 7,500 years ago until contact with Europeans. During this period, the collection and processing of plants for food continued to be the major subsistence activity. However, as in all of the periods, hunting continued. One animal resource of great importance was the rabbit. Aside from a food source, rabbit hides were fashioned into blankets, and awls and bone tube beads were created from rabbit bones. Within the planning area, there are thousands of Desert Culture Period sites. Sites of this period are by far the most common sites in the planning area (Cultural Resource Archives).

Historic Resources

Many locations in the planning area have historical remains from Lake County's post-1840 history. In scattered locations, the remains of old-line shacks that served as shelters for cattlemen and sheepherders can be found. These are usually one-room board and batten structures of simple construction. Most have fallen down, remaining only as piles of weathered boards, nails, and broken glass. In the Fort Rock/Christmas Valley area, nearly all of the old homesteads, towns, and businesses from the 1900s are gone. Of the more than 30 post office locations that were once in the area, only the towns of Fort Rock, Christmas Valley, and Silver Lake remain. Other historic sites include the remains of historic roads and

trails, Civilian Conservation Corps (CCC) camps, CCC project locations, abandoned mines, mine processing locations, ranch houses, corrals, cemeteries, military plane crash sites, and abandoned logging/sawmill locations.

Historic Period Sites

There are a few cultural sites in the planning area where Native American people were still living when people of European descent first entered the area. There are also a few Contact Period sites where European items, such as trade beads have been found along with stone tools (Cultural Resource Archives).

People of European descent first entered the area in 1826 when Peter Skene Ogden of the Hudson Bay Fur Company traveled through the area (Davies 1961). In 1843, the John C. Fremont expedition representing the government of the United States passed through the Klamath Lakes area, heading east over Winter Rim and Summer Lake, then southeast along the shore of Lake Abert, continuing east passing through the Warner Valley from north to south, and then south into present day Nevada (Fremont 1849). Shortly after these explorations, persons of European descent began settling in the area, displacing the Native American populations. The settlement of the area is broken down into the following themes:

Exploration

Beginning in the 1820s, people of European descent entered the lands of the planning area to explore and to identify available resources. Trappers primarily from the Hudson Bay Company operating out of Fort Vancouver on the Columbia River probably exploited the area for animal furs. Explorers began mapping routes and trails through the area during the1840s (Minor 1979).

Transportation

This theme covers the development of transportation routes in the planning area. It includes the early trails followed by explorers, and other roads and trails, such as the Oregon Central Military Road, which required mechanical construction along their routes. Most of these routes would later become the graveled and paved roads in existence today (Minor 1979).

Military and Indian Affairs

The Oregon Treaty of 1846 between Great Britain and the United States created the Oregon Country of which the planning area is a part. Native American Tribes of the region were not party to this agreement, which claimed the lands for the United States. In subsequent years, the creation of various treaties and reservations were used to move Native Americans off the lands and on to reservations. The establishment of military posts such as Camp Warner, located in the Warner Valley area, protected settlers of European descent. Construction of roads such as the Oregon Central Military Road and the Warner Valley to Fort Bidwell Road assisted in supplying the needs of the troops at Camp Warner and other areas (Minor 1979).

Homesteading, Settlement, and Development

Beginning about 1870, people began to come to the area to homestead using reports and maps generated by early explorers as guidebooks (Allen 1987). Homesteading, established under federal laws and land disposition policies, allowed for the development of settlements. Over the years, these settlements

became towns. The towns of Lakeview, Paisley, Plush, Adel, and Fort Rock evolved as centers of trade and social life. Development brought lumber mills to produce building materials for the region. Large-scale ranches such as the Shirk Ranch in Guano Valley were established. In some areas, mining took place, but soon faded away. In areas such as Christmas Valley and Fort Rock Valley post office "towns" were established, nearly all of which are gone today, having failed to survive the harsh climate and bad economic times of the early part of the 20th century (Allen 1987). In the 1930s, the CCC established numerous camps throughout the planning area. The "Boys of the CCC," as they were known, built roads, campsites, livestock water developments, fences, and corrals throughout the planning area (Cultural Resource Archives).

Existing Special Management Designations for Cultural Resources

In response to the legal mandate to protect and manage significant cultural sites on the public lands the BLM has used three types of special designations in the planning area to highlight special management needs for cultural resources. These include National Register designations as individual sites, Districts, or Thematic Nominations, Traditional Cultural Properties, and Areas of Critical Environmental Concern. A Traditional Cultural Property can also be a National Register listed property.

National Register Sites, Thematic Nomination Districts and Traditional Cultural Properties

National Register sites are historic properties that are listed on the National Register of Historic Places. This type of listing is for a single site or property. The establishment of the National Register was a way to highlight the need for management and protection of those sites that represent the diversity of the nation's history and culture. Eligibility is determined on criteria established by the NHPA of 1966, as outlined in 36 CFR § 800 and 36 CFR § 60. Sites must be unique, provide information important to the study of history or prehistory, or be connected to important historical events or persons. Nominations for the National Register can be for a single site, a group of sites known as a District, or as individual locations under a Thematic Nomination, or as a Traditional Cultural Property.

A National Register District is a specific defined area with sites of many different kinds or ages within that area. A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development (NPS 1998, page 5). A district can easily be defined and mapped. An example would be the Lake Abert National Register District which contains many archaeological sites located along the eastern shoreline of the lake over an area of approximately 20 miles.

A Thematic Nomination can be an area of any size up to and including the United States. Within that area, sites matching a theme such as religion, transportation or battlefields of a specified period and style related to that theme can be a part of the nomination. These sites do not need to be within a contiguous area. Upon the creation of the Thematic Nomination, locations identified in the future can be added to the nomination. Designation as a National Register site or as part of a Thematic Nomination does not automatically preclude other uses in the area, even if uses are destructive to the site. Competing uses are considered on a case-by-case basis. Archaeological research and other activities, such as educational and recreational uses, may be appropriate in these areas.

There are currently six National Register sites and one National Register District in the planning area: Greaser Petroglyph site, Picture Rock Pass Petroglyph site, Shirk Ranch Complex, Military Stone Bridge Site, the Paisley Caves, Lake Abert Petroglyphs, and the Lake Abert National Register District. In

addition, the Oregon Central Military Road is also potentially eligible for listing as a National Register site but has not been nominated to date (Map SMA-1, Appendix 1; Cultural Resource Archives).

A traditional cultural property is a place that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (1) are rooted in that community's history, and (2) are important to maintaining the continuing cultural identity of the community. While not defined in any federal legislation, a traditional cultural property is a working concept developed by the National Park Service which can be used to define and place a border around a specific area of religious or cultural importance to a community or group (NPS 1998).

The identification of several potential traditional cultural properties has occurred in the planning area through consultation with Tribal governments and individuals. Potential traditional cultural properties may also be identified in the future when projects are proposed. Tribal members are often unwilling to identify specific places they are using unless identification is necessary to protect the area from destruction or other conflicting use. Currently there are no formally designated traditional cultural properties in the planning area.

Areas of Critical Environmental Concern (ACECs) with Cultural Values

An ACEC designation can be used to protect and prevent irreparable damage to important historic and cultural resources (see *ACEC* section and 43 CFR § 1601.0-5). Within the planning area, eight ACECs have been designated with important cultural values including the presence of significant cultural sites and/or presence of culturally important plants: High Lakes, Red Knoll, Table Rock, Connley Hills, Hawksie-Walksie, Fish Creek, Abert Rim Addition, and the Rahilly-Gravelly (Table 3-55; *see also* BLM 2003b, pages 57-70, 77). ACECs can also be considered for designation as traditional cultural properties.

Archaeological Research, Public Education, and Recreational Use of Cultural Resources

There has been a long record of archaeological research in the planning area beginning in 1937 with research by Luther Cressman of the University of Oregon on the Rock Art of Lake County, Oregon (Aikens 2011, Cultural Resource Archives). The completion of many archaeological field schools, research projects, master thesis projects, and doctoral dissertation projects have occurred on archaeological sites in the planning area. Archaeological research is an appropriate and permitted use of cultural resource sites found in the planning area. Research is controlled and monitored through the issuance of Federal Cultural Resource Use Permits under the Antiquities Act and ARPA and their implementation regulations.

Educational use is a goal of the BLM's Cultural Resource Program. Public educational materials, pamphlets, books, school curriculums, and interpretive site development regarding cultural resources has and will continue to be created and shared. These types of materials and sites are also part of the recreational activities of the public at large. These uses must be considered along with the wishes of the Native Americans to preserve and protect sites. In all cases, the sites involved would be subject to the requirements of Section 106 of the NHPA (as amended) and its implementing regulations at 36 CFR § 800. While many of the archaeological sites located in the planning area are not suited for recreational use, many are used for that purpose. The Paisley Caves site is frequently visited by members of the public, as is the Shirk Ranch Complex. Two military plane crash sites receive regular visitation. The public also often visits rock art sites throughout the planning area.

Tribal Interests/Concerns

During consultations with the tribes and tribal members, the Fort Bidwell Indian Community and The Klamath Tribes have made it clear they consider all archaeological sites in the planning area, including rock cairn or rock placement sites to be sacred. These tribes do not want any cultural resource of any kind to be disturbed for any reason.

Affected Environment – Paleontological Resources

Paleontological resources are defined in the Paleontological Resources Preservation Act (PRPA) as "any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, which are of paleontological interest and that provide information about the history of the earth." These animals and plants may be either extinct or extant today in the planning area or elsewhere. Paleontological resources are fragile and irreplaceable and can be damaged or destroyed by natural weathering and human actions such as mineral development, vehicle travel, livestock grazing, other ground-disturbing activities, and unauthorized collecting.

The planning area has not been comprehensively surveyed for the presence of paleontological resources. Surveys have been done on portions of the planning area and are typically completed during project (implementation) level planning activities at the same time as cultural resource surveys, prior to implementing or authorizing ground-disturbing activities. Further, comprehensive paleontological resource information is not needed to adequately address the potential effects associated with the development of a land use plan or plan amendment because impacts would only occur to these resources as the result of implementing or authorizing ground-disturbing activities. The approval of a land use plan would not automatically result in the implementation or authorization of any ground-disturbing activities.

There are several areas in the planning area known to contain important plant and animal fossil remains. The following section summarizes what is currently known about existing paleontological resources based on published sources, professional knowledge, survey data, and other resource information on file in the Lakeview District Office.

Fossil Lake

Fossil Lake is located in northern Lake County and is currently protected as part of a larger ACEC complex known as the Lost Forest RNA/Sand Dunes WSA/Fossil Lake ACEC. This ACEC was designated in part to protect fragile and rare fossils in the Fossil Lake area. Fossils in this area have been studied and collected by a number of researchers dating back to the 1870s and include a number of plants, mollusks, fishes, amphibians, birds, and mammals from the Pleistocene period (Howe and Martin 1977, Martin and Martin 2013, Martin 2017). Additional information on the paleontological resources in this area is located in BLM 2003a (pages 2-65 to 2-67) and is incorporated by reference in its entirety.

Fossils in this area are periodically covered and uncovered by naturally drifting sand dunes and are subject to weathering when exposed on the surface. The majority of the Fossil Lake area has been closed to OHV and livestock grazing use since at least 2003.

Simontacchi Camel Location

This site is located in southern Lake County and was discovered by a BLM geologist in 1997. The site has been studied by paleontologists from the South Dakota School of Mines and contains large amounts of camel and other vertebrate fauna fossils. Additional information on the paleontological resources in this area is located in BLM 2003a (page 2-67) and is incorporated by reference in its entirety.

Fossils in this area continue to be exposed and subjected to weathering due to wind and water erosion. This area is currently open to livestock grazing and OHV use.

Rattlesnake Butte Formations

The Rattlesnake Butte Formations are located in the Beaty Butte region. Fossils in this area were discovered by the U.S. Geological Survey. Fossil remains include rhinoceros, elephant, horse, camel, and a wide range of other vertebrate fauna. Additional information on the paleontological resources in this area is located in BLM 2003a (pages 2-67 to 2-68) and is incorporated by reference in its entirety.

This area is currently open to livestock grazing use, but motorized vehicle use is limited to existing routes.

Paleontological Research

As described above, there has been a long record of paleontological research, primarily at Fossil Lake and to a lesser extent other portions of the planning area. Over the years, this research has been conducted under contract or permit by a number of university field schools, or as master's thesis or doctoral dissertation projects. The BLM would continue make these and other areas available for scientific research in the future.

Environmental Effects

Analysis Assumptions

- There are unknown cultural and paleontological resources in the planning area. Many of these resources are located below the ground surface.
- Not all cultural and paleontological resources can be protected or avoided for all projects or management activities.
- The BLM would evaluate potential effects to cultural resources through the NHPA Section 106 process (with implementing regulations at 36 CFR 800) and the 2015 Protocol between the Oregon/Washington BLM and Oregon State Historic Preservation Office as part of project planning for specific undertakings with defined locations. The BLM would complete surveys for cultural resources and traditional cultural properties before implementation of any ground-disturbing management action/project and consider appropriate measures to eliminate, minimize, or mitigate potential impacts within subsequent step-down NEPA analyses.
- The BLM would consult with appropriate Native American Tribes, individuals, and the State Historic Preservation Office (SHPO) during proposed plan implementation actions and would

consider their input during the decision-making process. These actions would minimize potential impacts to cultural resources and traditional use areas during project implementation.

- As part of project planning for undertakings with defined locations, the BLM would preserve, manage, and protect paleontological resources under the provisions of the Paleontological Resources Preservation Act (PRPA).
- Increasing the ease of access to an area could potentially increase the amount of human-caused disturbance to cultural and paleontological resources.
- Decreasing the ease of access to an area could decrease the ability of Native American Tribes to engage in traditional cultural activities in those areas. The BLM would consult with Tribes regarding any changes in access to sacred sites or sites of traditional cultural significance in order to reduce potential impacts to tribal access.

Impacts Common to All Alternatives

The existing special management associated with existing ACEC/RNA, WSR, and WSA designations would continue to have a positive effect on cultural resources, paleontological resources, and traditional use areas by restricting potentially detrimental uses and reducing or eliminating surface disturbances in these areas (BLM 2003a, pages 4-108, 4-110).

Research uses of paleontological and cultural resources would continue to occur, which would expand scientific knowledge of these values, as well as expand knowledge of past use of the planning area by native people.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Following the Section 106 process and consulting with tribes and SHPO during future project-level planning would reduce the potential for negative impacts to cultural resources. Even with appropriate mitigation (*i.e.*, data recovery), some sites could be impacted and no longer available for future research work. From the viewpoint of Native Americans, some traditional use areas could be damaged or degraded by physical or visual impacts from other resource management actions (BLM 2003a, pages 4-108 to 4-111).

Under this alternative, the BLM would not implement or authorize discretionary projects or management actions that would diminish the size of a wilderness characteristics unit or cause an entire inventory unit to no longer meet the minimum wilderness characteristics criteria within approximately 1,654,103 acres in the planning area. While the BLM could modify project designs to prevent the loss of wilderness characteristics, such measures would not necessarily prevent all potential ground disturbance associated with a proposal and, therefore, there still could be potential negative impacts to cultural resources, traditional uses, or paleontological resources if present within a unit. Some sites could be impacted and no longer available for future research work and traditional use areas could be damaged or degraded by physical or visual impacts from other resource management actions.

OHV and Travel Management Impacts

OHV area designations across most of the planning area would continue to be Limited to Existing or Designated Routes (85.1%) or Closed (0.3%) (Table 3-32; Map OHV-1, Appendix 1). These designations would collectively reduce potential disturbance impacts to paleontological resources, cultural resources, and traditional use areas from motorized vehicles across about 85.4% of the planning area. However, cross-country travel would still be allowed in Open area designations (14.6% of the planning area) and could be permitted in Limited or Closed area designations for research or tribal access needs under OHV use exception #5 on a case-by-case basis. However, such authorization is discretionary and not guaranteed. This could impact scientific/research uses of paleontological or cultural resources and access to Native American traditional use areas in portions of the planning area over time.

Livestock Grazing Management Impacts

Livestock use would continue to have the greatest potential for impacts to paleontological or cultural resources located near water sources or along fences where livestock concentration and associated grazing, erosion, and trampling effects would be highest. Early spring use would have the most potential to cause detrimental impacts to cultural resources due to wet soil conditions. When the ground is wet, especially around water sources, livestock hooves sink deep into the soil causing "soil punching." This can mix and churn cultural deposits within a site, which would destroy the stratigraphy within the site and make use of dating such items as charcoal useless since it would be out of context within the site. In addition, the dispersal of artifacts from their original position is offensive to Native Americans who believe they should never be moved other than by natural processes. Dispersed livestock use or use on drier soils, which is what occurs across most of the planning area, would cause less potential impact on individual sites located near the surface. Reductions in grazing use, though rare under this alternative (see *Livestock Grazing* section), would have the potential to reduce livestock impacts on some cultural or paleontological sites located near existing water developments or existing fence lines within a few pastures or allotments over the long-term.

Summary

In terms of limiting ground disturbance and potential future impacts to paleontological resources, cultural resources, and traditional use areas, this alternative offers the second highest level of protection to the second highest number of acres (behind Alternative B) in the planning area.

Impacts of Alternative A

Wilderness Characteristics Management Impacts

Under this alternative, there could be more potential for ground disturbing management activities across the planning area compared to the No Action Alternative. This would have the potential to negatively affect more paleontological resources, cultural resource sites, or traditional use areas. While BLM would follow the Section 106 process and consult with appropriate tribes and the SHPO during project planning, there would still be potential for negative impacts to cultural resources and traditional use areas. Even with appropriate mitigation (*i.e.,* data recovery), some sites could be destroyed and no longer available for future research work or use by Native Americans. From the viewpoint of Native Americans, some traditional use areas could be damaged or degraded by physical or visual impacts from other resource management actions.

OHV and Livestock Grazing Management Impacts

The potential effects of OHV use and livestock grazing on cultural, paleontological, and traditional uses would be the same as those described for the No Action Alternative.

Summary

This alternative would have the highest potential to allow ground disturbing actions that could negatively impact paleontological resources, cultural resources, or traditional use areas of all the alternatives. However, these effects would not exceed those allowable by applicable laws and policies such as Section 106 of the National Historic Preservation Act.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Under this alternative, cultural and paleontological resources, and traditional use areas within Category C and new Section 202 WSAs, as well as existing WSAs (up to 2.1 million acres; Maps W-3 and OHV-2, Appendix 1) would not be subject to most types of ground disturbances. This would provide an additional level of protection to these resources within more areas compared to the No Action Alternative.

OHV and Travel Management Impacts

OHV area designations across most of the planning area would be Limited to Existing/Designated Routes (25.2%) or Closed (66.8%) to public motorized vehicle use (Map OHV-2, Appendix 1). These designations would collectively reduce potential disturbance impacts to paleontological resources, cultural resources, and traditional use areas from motorized vehicles across about 92% of the planning area.

Researchers or Native Americans could be authorized, on a case-by-case basis, to use motorized vehicles off-road within Closed or Limited area designations or on closed routes to access research areas or traditional use areas under OHV exception #5 on a case-by-case basis. However, such authorization is discretionary and not guaranteed. In addition, many closed routes would become impassable over the long-term (see *Off-Highway Vehicle Use and Travel Management* section). Compared to all other alternatives, Alternative B could impact scientific/research uses of paleontological and cultural resources and Native American traditional uses within larger portions of the planning area due to the decrease in motorized vehicle access over time.

Livestock Grazing Management Impacts

Reductions in grazing use, whether due to rangeland health issues or permit relinquishment, would reduce the potential for livestock impacts on paleontological resources, cultural resources, or traditional use areas located near water sources or fence lines within a few pastures or allotments by eliminating trampling, erosion, and hoof punching in wet, soft soils over the long-term which would assist in the protection of cultural material, traditional cultural property, or paleontological resources from potential dispersal or destruction, by leaving these resources *in situ*.

Summary

This alternative would further reduce the potential for ground disturbance on approximately two-thirds of the planning area (all Category C units and WSAs) and would provide the highest protection to paleontological resources, cultural resources, and traditional use areas to the most acres of all the alternatives. Impacts to paleontological resources, cultural resources, and traditional use areas across the remainder of the planning area would be similar to those described for Alternative A.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Following the Section 106 process and consulting with tribes and SHPO during future project-level planning would reduce the potential for negative impacts to cultural resources. However, even with appropriate mitigation (*i.e.*, data recovery), some sites could be destroyed and no longer available for future research work. From the viewpoint of Native Americans, some traditional use areas could be damaged or degraded by physical or visual impacts from other resource management actions.

Under Alternative C, many types of ground disturbing actions would be prohibited within Category C units (about 411,033 acres; Map W-4, Appendix 1). This would further reduce or eliminate the potential for negative effects to paleontological resources, cultural resources, and traditional use areas that may be located within these units.

None of the potential BMPs that the decision-maker could apply for wilderness characteristics (see Appendix 7) within Category B units (1,161,199 acres) during future project level planning would likely reduce potential impacts to cultural resources, paleontological resources, or traditional use areas in these units.

OHV and Travel Management Impacts

Motorized vehicle use across most of the planning area would be Limited to Existing/Designated Routes (99.7%) or Closed (0.3%) (Table 3-32; Map OHV-3, Appendix 1) under this alternative. These designations would collectively reduce potential disturbance impacts to paleontological resources, cultural resources, and traditional use areas from vehicles in the entire (100%) planning area.

Researchers or Native Americans could be authorized to use motorized vehicles off-road within Limited area designations to access research areas or traditional use areas under OHV exception #5 on a case-by-case basis. However, since such authorization is discretionary and not guaranteed, this alternative could impact scientific/research uses of paleontological or cultural resources and Native American traditional uses across the entire planning area due to the loss of cross-country motorized vehicle access.

Livestock Grazing Management Impacts

Reductions in grazing use, whether due to rangeland health issues or permit relinquishment, would reduce the potential for livestock impacts on paleontological or cultural resources located near water developments or fence lines within a few pastures or allotments by eliminating trampling, erosion, and hoof punching in wet, soft soils over the long-term.

Summary

Overall, this alternative would reduce ground disturbance and potential impacts to paleontological resources, cultural resources, and traditional use areas across less area and acres than Alternative B or the No Action Alternative, but more area and acres than Alternatives E, D, and A respectively.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Following the Section 106 process and consulting with tribes and SHPO during future project-level planning would reduce the potential for negative impacts to cultural resources. However, even with appropriate mitigation (*i.e.*, data recovery), some sites could be destroyed and no longer available for future research work. From the viewpoint of Native Americans, some traditional use areas could be damaged or degraded by physical or visual impacts from other resource management actions.

Many types of ground disturbing actions would be prohibited within two small Category C units (about 4,671 acres; Map W-5, Appendix 1) which would eliminate or reduce the potential for negative impacts to paleontological resources, cultural resources, and traditional use areas, if located within these units.

None of the BMPs that the decision-maker could apply for wilderness characteristics (see Appendix 7) within Category B units (1,066,919 acres) during future project level planning would likely reduce potential impacts to cultural resources, paleontological resources, or traditional use areas in these units.

OHV and Travel Management Impacts

Motorized vehicle use across about 97.4% of the planning area would be Limited to Existing/Designated Routes or Closed (0.4%) (Table 3-32; Map OHV-4, Appendix 1) under this alternative. These designations would collectively reduce potential disturbance impacts to paleontological resources, cultural resources, and traditional use areas from vehicles within the majority (97.8%) of the planning area.

Researchers or Native Americans could be authorized to use motorized vehicles off-road within Limited area designations to access research areas or traditional use areas under OHV exception #5 on a case-by-case basis. However, since such authorization is discretionary and not guaranteed, this alternative could impact scientific/research uses of paleontological or cultural resources and Native American traditional uses within more area than either the No Action Alternative or Alternative A due to the loss of motorized vehicle access.

Livestock Grazing Management Impacts

The potential effects of livestock grazing on paleontological resources, cultural resources, and traditional use areas would be the same as those described for the No Action Alternative and Alternative A.

Summary

Overall, this alternative would reduce ground disturbance and potential impacts to paleontological resources, cultural resources, and traditional use areas across less area and acres than Alternative B, the

No Action Alternative, Alternative C, or Alternative E respectively, but slightly more area and acres than Alternative and A.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Following the Section 106 process and consulting with tribes and SHPO during future project-level planning would reduce the potential for negative impacts to cultural resources. However, even with appropriate mitigation (*i.e.*, data recovery), some sites could be destroyed and no longer available for future research work. From the viewpoint of Native Americans, some traditional use areas could be damaged or degraded by physical or visual impacts from other resource management actions.

Under Alternative E, many types of ground disturbing actions would be prohibited within Category C units (about 372,218 acres; Map W-6, Appendix 1). This would provide additional protection to paleontological resources, cultural resources, and traditional use areas located within these units.

None of the BMPs that the decision-maker could apply for wilderness characteristics (see Appendix 7) within Category B units during future project level planning would likely reduce potential impacts to cultural resources, paleontological resources, or traditional use areas in these units.

OHV and Travel Management Impacts

Motorized vehicle use would be Limited to Existing/Designated Routes (85.1%) Closed (0.3%) (Table 3-32; Map OHV-5, Appendix 1). These designations would collectively reduce potential disturbance impacts to paleontological resources, cultural resources, and traditional use areas from vehicles within the majority (85.4%) of the planning area, but would be substantially the same as the No Action Alternative and Alternative A.

Researchers or Native Americans could be authorized to use motorized vehicles off-road within Limited area designations to access research areas or traditional use areas under OHV exception #5 on a case-by-case basis. However, since such authorization is discretionary and not guaranteed, this alternative could impact scientific/research uses of paleontological or cultural resources and Native American traditional uses within more area than either the No Action Alternative or Alternative A, but not as much as Alternatives B, C, or D, due to the loss of motorized vehicle access.

Livestock Grazing Management Impacts

The potential effects of livestock grazing on paleontological or cultural resources would be the same as those described for the No Action Alternative and Alternative A.

Summary

Overall, this alternative would reduce ground disturbance and potential impacts to paleontological resources, cultural resources, and traditional use areas across less area and acres than Alternative B, the No Action Alternative, or Alternative C, but more area and acres than Alternatives D and A respectively.

Cumulative Impacts Common to All Alternatives

Climate Change

Research on the potential impacts of climate change on cultural, historic, and paleontological resources is limited. However, increased disturbance due to climate change, such as wildfire, could potentially irreversibly damage historic sites (Brice *et al*. 2020).

Native American traditional food plants could be negatively affected by climate change through habitat alteration, and associated changes in species abundance and distribution, which could result in the erosion of traditional practice and knowledge (Warziniack *et al*. 2018).

Reasonably Foreseeable Future Actions

Most of the RFAs listed in Table 3-1 could cause additional ground disturbance (Tables 3-6, 3-9, and 3-25) and have the potential to negatively affect cultural resources, paleontological resources, or traditional uses, if present. However, these potential effects would be reduced or avoided by following the Section 106 process and consulting with appropriate tribes and the SHPO during future project-level planning (see *Analysis Assumptions* section).

The potential for future locatable mineral exploration and development would be similar under all alternatives. Locatable mining would cause ground disturbance and would have the potential to negatively affect paleontological resources, cultural resources, or traditional use areas, if present on a given mine site. However, mine operators would be required to follow the cultural protocols and requirements found in 43 CFR § 3809.9.420 and prepare a Plan of Operations that includes a reclamation plan and mitigation measures to prevent unnecessary and undue degradation of the public lands, including measures for cultural resources. Mitigation measures could include conducting a cultural resource survey, consultation with Native Americans who have an association with the project area, and development of a Historic Properties Treatment Plan.

Paleontological and cultural resources located near the surface would continue to be subject to natural deterioration due to erosion, weathering, and wildlife disturbance (trampling and burrowing) over the long-term under all alternatives. Historic resources such as wooden structures would also be subject to natural deterioration due to weathering over the long-term under all alternatives.

Social and Economic Conditions

Issue: *How would alternative strategies for wilderness characteristics management, OHV management, and livestock grazing management affect social and economic conditions in the planning area and would there be any adverse, disproportionate effects on identified environmental justice populations?*

Affected Environment

The planning area covers Harney County and Lake County. A majority of the land in both counties—about 73%--is managed by the Federal government, with the BLM managing just under 62 percent of the lands in Harney County and just over 48 percent of the lands in Lake County. Harney County is the largest county in size in Oregon, and Lake County, the third largest.

The primary economic center of Lake County is the town of Lakeview, the county seat and the location of many federal, state, and local government offices. Most basic goods and services are available in Lakeview, which provides services to the rural areas and smaller communities of the county. The area has strong ties to the city of Klamath Falls, located 95 miles west of Lakeview in Klamath County. A greater diversity of firms and most specialty services are available in Klamath Falls. The major economic center of Harney County is the Burns/Hines area. These communities are located approximately 50 miles northeast of the planning area boundary.

Several smaller communities are located in the planning area. Paisley is an incorporated community, while Adel, Christmas Valley, Summer Lake, Fort Rock, and Silver Lake are unincorporated communities in Lake County. These smaller communities generally have very limited services for residents and visitors: fuel, a campground, a motel or resort, a small store, a restaurant, and one or two churches.

Population

Although large in size, the counties are sparsely populated. Harney County's population density in 2020 was 0.7 people per square mile, the lowest level of all Oregon counties. Lake County's population density was 1.0, the third lowest of all Oregon counties. In 2021, the population of Lake County was about 8,119 and Harney County was 7,454, both slightly higher than the populations in 2010. The median household income in 2021 was $42,095 in Harney County and $50,685 in Lake County, both substantially lower than the statewide median of $70,084. In 2021, about 19% of the persons in Lake County and 12% of those in Harney County were living below the poverty level, compared to the statewide level of 12%. The unemployment rate in April 2022 was about 4.1% in Harney County and 4.7% in Lake County (seasonally adjusted), both higher than the statewide average of 3.7%. About 19% of the population age 25 or higher have a bachelor's degree or higher level of education in Lake County, compared to 15% in Harney County and 35% statewide.

Lake County has a lower proportion of Hispanic/Latino residents (9%) than the statewide level of 14%, as does Harney County (6%). The Burns Paiute Indian Reservation is located in Harney County, which contains a higher proportion of Native Americans (about 5%) than the statewide level of 1.1%; Lake County's population is about 2.6%. No reservation lands are located in Lake County, but the Klamath Tribe has reserved rights in the area (BLM 2003a). Native American residents may participate in unique cultural practices associated with reserved treaty rights. Activities may include fishing, hunting, and gathering plant materials for food or ceremonial purposes. In addition, approximately 11,000 acres (approximately 0.2% of Harney County area) of Native American purchased and owned lands are in Harney County. Primarily agricultural, these lands are taxable, like those owned by any other citizens; however, these lands fall under the administration of the Bureau of Indian Affairs (PARC Resources 2009).

Environmental Justice

Environmental Justice is the fair treatment and meaningful involvement of all potentially affected people—regardless of race, color, national origin, or income—when the federal government develops, implements, and enforces environmental laws, regulations, and policies:

- Fair treatment means that no group should bear a disproportionate share of the adverse consequences that could result from federal environmental programs or policies. Populations of particular concern are minority, low-income, and tribal communities.

- Meaningful involvement means that environmental justice populations have a voice when the federal government makes decisions that could affect their well-being.

Executive Order 12898 (*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*) requires each Federal agency to "identify and address . . . disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States."

The identification and analysis of minority and low-income populations is described in the BLM's environmental justice policy (BLM 2022e). Based on BLM definitions, Lake and Harney Counties both contain environmental justice populations, based the percentage of Native Americans in the population. Both counties also contain environmental justice populations due to their low-income status; about 38% of Lake County residents and 46% of Harney County residents are considered low-income, compared to 29 percent statewide.

Uses and Values

The public's uses and values associated with BLM-managed lands in the planning area are linked to the remoteness of most of the area from urban populations and their lack of development. About 52% of the planning area (1,655,290 acres) consists of wilderness characteristics units. An additional 15.2% (486,873 acres) comprise existing WSAs. Rural land uses predominate, such as grazing, agriculture, OHV use, hunting and fishing, and sightseeing in wide open spaces. Yet there is certainly public conflict over the activities that should be allowed on public lands, their effects, and the desired character of the landscape, as reflected by the need for this plan amendment under a settlement following a lawsuit. The conflict was also evident from the BLM's *Scoping Report* (2012a, page 23):

Two widely divergent views were presented in the public comments as to what management would be most beneficial to local communities. Wilderness proponents opined that communities near designated wilderness areas have a growing economy. Proponents of resource uses felt that the local economy is heavily dependent on such uses, and further restrictions would be devastating. OHV users requested analysis of the continuing restrictions on OHV access and the associated adverse effects on public use and local economics.

A sample of the individual comments received shows the range of values present and the associated concerns about management's effects on social and economic conditions:

- "Identifying, restoring and protecting substantial roadless areas in the lands governed by the Southeastern Oregon and Lakeview RMPs can provide crucial benefits to wildlife, cultural resources…soils…solitude……economic values, etc."

- "These ranches, most of them small family businesses, form the base of the local economy, providing jobs, tax revenue, and a safe, domestic food source."

- "OHVs of all three Classes contribute economic wealth to all communities. Especially the smaller towns such as Christmas Valley, Baker City, Halfway, Fields, Unity, Prairie City, etc."

- "Providing opportunities for quality, muscle-powered recreation on public lands can result in a significant economic boost to local and regional economies. "

- "The wildlands located within the Vale and Lakeview District Offices help to define the character of these areas and are an important component of the quality of life for local residents and future generations, providing wilderness values in proximity to burgeoning urban and suburban areas. Their protection enables the customs and culture of this community to continue."

- "Grazing on BLM land is a vital part of our operation as well as the operation of most ranches in Lake County. Without public land grazing, most ranches would no longer be viable and would ultimately have to be turned into something that was. This would invite development that would be detrimental to the area's natural beauty, resources, and wildlife."

- "ATVs are a critical management tool that saves time and money as well as improves the overall way that grazing impacts the land. It is crucial that ranchers be allowed to use them responsibly to help manage grazing, especially for monitoring and fencing. I understand that in areas that are already wilderness or in wilderness study areas, OHV use needs to be restricted. However, other areas need to remain open to responsible use by permittees."

Economy

The Lake County website lists forestry, agriculture, and tourism as the county's key industries (http://www.lakecountyor.org/business/major_employers.php). About 18% of the total private employment jobs in Lake County are in the travel and tourism-related sectors, compared to 23% in Harney County, both higher than the 16% statewide (these include establishments that also serve local residents, such as restaurants, gas stations, and bars). A study prepared for the Oregon Tourism Commission (Dean Runyan and Associates 2022; https://www.travelstats.com/impacts/oregon) estimated that travel-related spending in Lake County totaled $19 million in 2022. Of this, an estimated $2.2 million was associated with travelers staying in campgrounds. Travel-related spending in Harney County in 2022 totaled about $24 million, with $3 million attributed to travelers staying in campgrounds.

Timber plays a greater role in Lake County employment, providing about 12% of total private employment in 2022, than in Harney County (3%) or the state (just over 2%). The Collins Lakeview Sawmill, which has been in operation since 1945, produces 70 MMBF (millions of board feet of timber) annually, and the 35-acre mill production employs an average of 75 people making lumber products from wood harvested on the 97,600-acre Collins Forest sustainable yield Forest Service unit (Collinsco.com 2019, Herald and News 2017).

In 2022, about 17% of the jobs in Harney County and 14% of the jobs in Lake County were in the agricultural sector, much higher than the statewide level of 2.2%. Livestock raising and associated feed production industries are contributors to the economy of Harney County; of the $82 million market value of agricultural products sold in 2017, 63% came from livestock sales, and another 35% from sale of hay and other crops. Similarly, of the $94 million market value of Lake County agricultural products sold in

2017, 50% came from livestock sales and another 46% from sale of hay and other crops. In grazing year 2022, the BLM reported 164,125 billed AUMs of grazing in Harney County (far more than in any other Oregon county except Malheur), and 75,287 in Lake County (the third highest amount of Oregon counties).

In 2016, the mining sector provided no jobs in Harney County and about 32 jobs (less than 3% of total private employment) at the perlite mine and processing plant in Lake County. Several sunstone mines in Lake County also provide almost year-round employment for an estimated 5-10 individuals.

In 2022, both counties had a higher proportion of jobs in the government sector (local, state, and federal) than the statewide level of 11%, with Harney County at 24% and Lake County at 29%. In Lake County, the Warner Creek Correctional Facility accounts for about 100 employees and nearly $13 million in labor earnings annually. Another source of income in both counties is federal payments such as payments in lieu of taxes (PILT). The BLM shares a portion of receipts generated on public lands with state and local governments, including grazing fees through the Taylor Grazing Act. In 2019, Lake County received about $4.3 million in federal payments, of which 3.5% were payments from the BLM, and Harney County $3.6 million, with 9% from the BLM.

Environmental Effects - Socioeconomics

Analysis Assumptions

- The analysis area for the social and economic impacts consists primarily of Lake and Harney counties, although public lands visitors and stakeholders who live outside the area could also be affected.
- The social and economic analyses are based on the findings from the other resource analyses, which describe how landscape uses and opportunities valued by people would change under each alternative and are summarized in this section. Readers are encouraged to refer to the other resource sections of this Draft EIS for more detail. Those descriptions of effects do not provide enough specifics to quantify economic effects in terms of changes in jobs or income using an input-output analysis. For example, the recreation analysis does not quantify estimates of changes in use levels or types of visits for each alternative.
- While many people would support or oppose an alternative based on the way in which it addresses wilderness characteristics protection, the OHV area allocations proposed, and livestock grazing, the level of support varies, especially for Alternatives B, C and E, based on likely future outcomes for the portions of the planning area that people value the most or how their values and associated uses would be affected.
- The public and other stakeholders would continue to have diverse views regarding appropriate management of public lands in the planning area, and what values and land uses should take precedent over others, regardless of the management alternative. Social conflict over the future management of public lands would continue, as would be expected given this amendment has been prepared to fulfill a 2010 Settlement Agreement resulting from litigation.

Impacts of No Action Alternative

Wilderness Characteristics Management Impacts

Under this alternative, the BLM would not implement or authorize management actions that it deems would diminish the size or cause an entire BLM inventory unit to no longer possess wilderness characteristics. This alternative would provide a slightly lower level of protection for wilderness characteristics than Alternative B, but more protection than Alternatives C, E, and D, respectively. Public who strongly value protection of wilderness characteristics may not be satisfied with this existing level of protection and potential for degradation, despite supporting the ability to restore or maintain ecological conditions through active management. In particular, opportunities for solitude would continue to be impacted within some wilderness characteristics units that remain Open to OHV use. Some public may also not support the lack of change in existing livestock grazing or OHV management.

In addition, those who value other multiple uses of the public land may not be satisfied with this alternative because the 2010 Settlement Agreement would continue to pose a barrier to some types of future development or uses, including minerals and ROWs. These individuals would likely support this alternative's retention of existing OHV area designations/management.

While public lands would continue to be available for major and minor land use authorizations in open and avoidance areas (subject to appropriate mitigation measures to minimize impacts to other resources; Appendix 7), applications within wilderness characteristics units could only be authorized if the BLM deemed they would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristic. For this reason, some public, commercial, and other agency land use authorization needs would not be met on public lands. Due to the existing major utility corridors and lack of pending proposals for major ROW projects, this is not likely to result in negative effects on the overall County economies in the short-term, but could result in impacts to individual projects, the size or magnitude of which are not currently known.

Existing restrictions on saleable mineral development would continue to affect the BLM's ability to provide material for Federal, State, and County road maintenance activities in portions of the planning area, which could affect future transportation, recreation access, and transport of commodities. While the Counties and ODOT have developed their gravel resources over the last few years, most are located on BLM-administered lands. Future needs are currently being addressed in a separate EA (see *Cumulative Impacts* section).

Leasable Mining

The vast majority of the planning area (94%) would remain open to mineral and energy leasing, subject to some restrictions (Tables 3-3 and ES-1). However, the BLM would only authorize new leasable mineral development within wilderness characteristics units if it deemed that such development would not diminish the size or cause the entire BLM inventory unit to no longer meet the criteria for wilderness characteristics. Given that there is no existing mineral leasing occurring and little potential for mineral leasing in the future (Table 3-1), continuing existing restrictions would not likely affect future leasing opportunities or associated potential economic benefits. Leasable mining currently plays a negligible role in the overall Counties' economies.

Continuing current vegetation management would result in maintained or improved ecological and watershed health conditions across most of the planning area, including within wilderness characteristics units. These ecosystem services could be reflected in monetary terms, but the gains were not quantified for purposes of this analysis.

The BLM would continue to manage recreation uses and facilities to provide an appropriate mix of semi-primitive motorized and primitive non-motorized recreational settings and experiences so recreation would continue to support the local economy (18% of the total private employment jobs in Lake County and 23% in Harney County) through travel/tourism sector jobs which would also support establishments and opportunities used by residents.

OHV and Travel Management Impacts

The existing OHV area designations and route network (Maps OHV-1 and TM-1 to TM-4, Appendix 1) would continue to provide public and administrative motorized access to most public lands in the planning area for a variety of uses including, but not limited to recreation, mining, utility development and maintenance, livestock grazing, wildfire suppression, fuels management, and monitoring. The amount of road maintenance, upgrades, or new road development that would occur would maintain or slightly improve motorized access to most of the planning area. This level of access would continue to provide adequate support for existing and expected future trends in recreation and commodity uses of the public lands in the planning area over the long-term.

Livestock Grazing Management Impacts

Continuing current livestock grazing management on BLM-administered lands in the planning area would allow an important component of the agricultural sector (about 19% of the jobs in Harney County and 15% of the jobs in Lake County) to continue contributing to the County economies. Ranchers and other public would appreciate that all BLM-administered lands currently open to livestock grazing would remain open and the high likelihood that little or no permanent reductions in AUMs would occur under this alternative over the life of the plan. Livestock grazing would also continue to benefit invasive species control in portions of the planning area. This would also be favorable to ranchers and neighboring landowners, but not to some public who would prefer stricter management of grazing and use of other techniques to control invasive species.

Impacts of Alternative A

Wilderness Characteristics Management Impacts

The primary difference between Alternative A and other alternatives would be the lack of constraints for wilderness characteristics. As a result, this alternative would increase the well-being of the local and non-local public who want to see the fewest restrictions on current and future land uses. However, the nature of the lands having wilderness characteristics, including their remoteness and current lack of development, means that they would likely continue to be primarily open space and maintain a rural and undeveloped character without additional wilderness characteristics protections. Nonetheless, wilderness characteristics would likely degrade over time in portions of the planning area as future management actions are implemented, so the well-being of people who place a higher priority on a wilderness-like experience would be decreased.

Existing open, avoidance, and exclusion area designations for major/minor, and wind and solar energy ROWs would be retained, similar to the No Action Alternative (Maps L-7, L-12, L-17, Appendix 1). Public lands would continue to be available for land use authorizations within open or avoidance areas (subject to appropriate mitigation measures). This alternative also would provide the same amount of mineral estate lands open for leasable and saleable mineral exploration and development as the No Action Alternative (Table 3-3; Maps M-3 and M-10, Appendix 1), but with fewer restrictions. More land use authorizations and salable/leasable mining proposals would be approved under this alternative, which could benefit the Lake/Harney County economies.

This alternative (along with the No Action Alternative) would pose fewer limits on vegetation treatment methods, which could reduce the risk of future wildfires. Alternative A also would allow for higher levels of ecological restoration treatment success across the planning area at less cost per acre and would lead to fewer restrictions and decreased costs associated with other types of development. On the other hand, there would be increased potential for more unnatural intrusions that would not retain existing landscape character.

OHV and Travel Management Impacts

The existing OHV area designations and route network would continue to provide public and administrative motorized access to public lands in the planning area for a wide variety of public and private uses similar to the No-Action Alternative. People who access BLM-managed lands by OHV would have the similar acreage available for both on-road and cross-country travel as the No Action Alternative (Table 3-32; Map OHV-1, Appendix 1). The amount of road maintenance, upgrades, or new road development that would occur under this alternative would maintain or slightly improve motorized access to most of the planning area similar to the No Action Alternative. These actions would provide adequate access for motorized recreation and commodity uses similar to the No Action Alternative.

Livestock Grazing Management Impacts

The effects of livestock grazing management on the Lake/Harney County economies would generally be the same as the No-Action Alternative. However, this alternative would allow permittees and BLM staff the greatest level of flexibility to access allotments, monitor livestock, maintain or construct range improvements, and conduct vegetation management compared to all of the other alternatives. Livestock grazing would continue to be beneficial to invasive species control. This would be favorable to ranchers and neighboring landowners, but not to those who would prefer less livestock grazing and use of other techniques to control invasive species.

Impacts of Alternative B

Wilderness Characteristics Management Impacts

Alternative B would have the greatest level of protection for wilderness characteristics and the most restrictions on development and uses that could degrade them. Along with Alternative A, this alternative would generate the most social conflict. This alternative would increase the well-being of people who place the highest priority on preserving wilderness characteristics. On the other hand, it would be viewed as unnecessarily restrictive by others, and a significant impediment to current and potential future uses of these lands, either restricting activities altogether or making them more costly. Many publics have expressed opposition to the need for more protective management, such as that included in Alternative B,

given the level of existing protective management contained in BLM's current management strategy. These publics would consider the additional restrictions contained in Alternative B as being unnecessary to retain wilderness characteristics in the absence of any specific threats.

Under this alternative, all Category C units and new Section 202 WSA would be designated as ROW exclusion areas for major ROWs and wind/solar energy ROWs. While new minor ROWs would be allowed in Category C units to provide reasonable legal access to inholdings or support development of private inholdings (Maps L-8, L-13, and L-18, Appendix 1), they would be prohibited in new Section 202 WSAs. Collectively this management would restrict the number and location of future land use authorizations across a large portion of the planning area. This would constrain or preclude future ROW projects, but the magnitude of the economic effect is not known.

New leasable and salable mineral development would be restricted or prohibited in all Category C units and new Section 202 WSAs (Maps M-6 and M-11, Appendix 1). There is little commercial use of saleable minerals, but restricting development of salable minerals would have a negative effect on Federal State, and County road maintenance activities, which could affect transportation and transport of commodities, as well as public/recreational access. There is no mineral leasing occurring now and very little potential for mineral leasing in the future, so restricting it further would not be expected to have a substantial economic impact.

Vegetation management on up to 1,655,290 acres would not be as successful as under current management because of additional constraints on vegetation treatment methods. This alternative would restrict BLM's ability to implement effective fuels reduction projects, fuels breaks, and fire suppression activities on up to half of the planning area. Removal or reduction of livestock grazing would also allow the buildup of higher levels of fine fuels and increase the risk of future wildfires. This would result in larger wildfires, with potentially higher suppression and post-fire restoration costs, and could also result in increased loss or damages to private property or other ownerships adjacent to, or inside of inventory units and WSAs.

Alternative B would also hinder the ability of BLM to treat sagebrush steppe, riparian areas, and stream channels, allowing ecological and watershed conditions to degrade in portions of the planning area at the most rapid rate of the alternatives. While Alternative B would provide the least risk of new invasive species introduction from motorized vehicles, the rate of spread from existing sites (12% per year) particularly following wildfire, would exacerbate invasive species spread in portions of the planning area and could exceed the benefits of reduced new infestations. Less cost-effective treatments with less likelihood of success would result in invasive species spreading across portions of the planning area, reducing forage available for livestock, and increasing the potential for spread onto private lands where the landowner would have to pay for treatment or lose production. A recent report described the significant existing negative economic impacts associated with invasive species, the additional costs associated if they expand to new areas, and the positive return on investment associated with control (The Research Group, LLC, 2014). Degraded ecosystem services could be reflected in monetary terms although the losses were not quantified.

Recreation opportunities within the planning area would undergo a major shift from *Semi-Primitive Motorized* settings, activities, and experiences (59.7% reduction) to *Semi-Primitive Nonmotorized* settings, activities, and experiences (63.3% increase) compared to the No Action Alternative. Alternative B would have high negative impacts on users seeking recreational opportunities dependent on facilities/developments, and motorized use and access, while users seeking recreational opportunities

dependent on large, undeveloped, natural appearing areas with a high degree of solitude and/or primitive recreation would benefit.

OHV and Travel Management Impacts

Approximately 2.1 million acres would be closed to OHV use. Open OHV area allocations would decrease to about 252,569 acres (Table 3-32; Map OHV-2, Appendix 1). The level of public and administrative motorized access on up to two-thirds of the public lands in the planning area would be substantially reduced over the long-term compared to the No Action Alternative and Alternative A. This would negatively affect recreation and commodity users in a large portion of the planning area. One study found that changing access to public lands from Open to Limited OHV area designation results in relatively small welfare losses but prohibiting access (closing) results in much larger welfare losses for OHV users (Jakus *et al.* 2010). In economic terms this means that the effects on users of moving areas from either Open/Limited to Closed is greater than moving from Open to Limited OHV area designations.

Livestock Grazing Management Impacts

This alternative would have the largest potential negative impact to the agricultural sector of the County economy of all the alternatives. Alternative B would result in the highest and longest potential negative economic impacts to individual ranchers who are dependent on public land allotments for their ranching operations because livestock use would be permanently removed or reduced in areas failing to meet rangeland health standards without the potential to use other methods to improve rangeland conditions. Based on the assumption that as many as 126,614 acres could fail to meet a rangeland health standard due to grazing, livestock removal/reductions could result in up to an estimated 8,441 AUMs of forage lost over the life of the plan (15-20 years). These AUMs represent about 5% of the 164,000 active AUMs in the planning area.

Voluntary permit relinquishment could also result in significant reductions in grazing use over the life of the plan. The grazing analysis (see *Livestock Grazing* section) assumed that permits could be relinquished on anywhere from 0 to 100% of the remaining grazed portions of Category C units and WSAs in the planning area (up to 1,968,500 additional acres). This could reduce grazing on BLM-administered lands from 0 to 131,233 AUMs over the life of the plan. This is a huge range and shows the uncertainty associated with the assumptions about voluntary relinquishment, which under current management has been negligible in the past (see *Livestock Grazing* section).

A rough estimate of how these grazing reductions would translate into jobs and labor income[15] was developed using estimates from the *Jarbidge RMP/Final EIS* (BLM 2014n). That analysis estimated that each BLM AUM generated .00186 jobs and $31.47 in labor earnings. However, the authors noted that when BLM forage is used as part of an overall grazing system, these values, from the perspective of total ranch production, increased to .00407 jobs and $68.92 in labor earnings per AUM. Using these estimates,

[15] These employment and labor income estimates include direct, indirect, and induced economic effects, as were measured in the Jarbidge analysis using the input-output model IMPLAN. Direct employment is generated in the grazing sector. Indirect effects occur when affected ranchers purchase services and materials, and induced effects occur as ranchers spend their earnings within the local economy.

the potential AUMs lost due to rangeland health standards (up to 8,441 AUMs) could cause a decrease of 16-40 jobs and loss of $266,000 to $582,000 in labor earnings.

The decrease in jobs and earnings due to permit relinquishment could be small or very large, given the variability in the estimated range of AUMs that could be relinquished over the life of the plan. If no permits are relinquished, then there would be no additional AUMs lost and no additional effect on jobs or earnings. However, if the maximum estimated number of AUMs were relinquished (131,233), then the corresponding total loss would range from 244-534 jobs and $4.13 million - $9.05 million in earnings. These decreases would be added to the potential losses of AUMs due to failure to meet rangeland health standards.

Permittees and BLM staff would gradually lose the ability to use motorized vehicles to access and maintain existing range improvements and monitor range/habitat conditions on up to two-thirds of the planning area, resulting in deteriorated range improvements and increased livestock distribution problems over the long-term. As described in the *Livestock Grazing* section, less funding would also be available from grazing fees to expend on maintenance of existing fences and water developments. There would fewer expenditures on maintaining existing range improvements or constructing new improvements, which would add to the negative economic effects over the long-term.

Impacts of Alternative C

Wilderness Characteristics Management Impacts

Alternative C represents a compromise between protecting wilderness characteristics and allowing other resource uses. It would protect the third fewest (or third-most) acres of wilderness characteristics and have the third-fewest barriers to alteration of wilderness characteristics. Alternatives C and E would be similar in regard to protecting wilderness characteristics, although they used different methods for identifying the units which would be protected. Alternative C would protect slightly more acres under Category C management than Alternative E. Except for the No Action Alternative and Alternatives A and D, this alternative would have the fewest acres managed as Category C units. Alternative C would increase the well-being of those local and non-local public who want to see protection of some lands having wilderness characteristics, but not to the extent that it would restrict other multiple uses and activities in most of the landscape. The well-being of those favoring maximum protection of wilderness characteristics would be less than Alternative B because wilderness characteristics in portions of the planning area could degrade over time.

Category C units would be designated as ROW exclusion areas for all major ROWs and wind/solar energy ROWs. New minor ROWs would be allowed in these areas to provide reasonable legal access to inholdings or support development of private inholdings (Maps L-9, L-14, and L-19, Appendix 1). Although Category C units would be managed as ROW exclusion areas, many of them are already ROW exclusion areas because they overlap Greater Sage-Grouse PHMA, so there would be little change in potential effect on economic development opportunities associated with ROWs compared to the No Action Alternative and Alternative A.

After Alternative B and the No Action Alternative, this alternative would be the next most restrictive on salable and leasable mineral development of all the alternatives; only about 7% of the planning area would be open to leasable mineral development or salable mineral disposal and subject to no constraints (Maps M-7 and M-12, Appendix 1). There is no existing mineral leasing occurring now and almost no

potential for mineral leasing in the future, so further restricting it would not be expected to have an economic impact. Nearly half of the planning area would be closed to development of new salable mineral pits or expansion of existing pits. There is little commercial use of saleable minerals, but further restricting development would have a negative effect on Federal State, and County road maintenance activities, which could indirectly impact transportation and transport of commodities, although not as great as Alternative B.

The application of unit boundary setbacks along roads would provide places where minor ROWs or small-scale mineral development could be located along the edge of units in the future, which would lessen the potential economic effects of mineral restrictions/ROW exclusion areas within the interior of the units to some degree.

Impacts to upland vegetation as a result of constraints on treatment and fire suppression methods within Category C units would be similar to those discussed in Alternative B but would affect 1,236,863 fewer acres. Limiting vehicle use to existing routes throughout the planning area would also reduce the likelihood of weeds spread by vehicles to non-infested, roadless areas. However, the effectiveness of the integrated noxious weed and invasive species management program would be reduced on about 427,568 acres. More costly weed treatments with less likelihood of success would result in weeds spreading across larger portions of the planning area, reducing forage available for livestock, and increasing the potential for spread onto private lands where the landowner would have to pay for treatment or lose production. The level of this risk would be higher than the No Action Alternative and Alternative A, but would be less than Alternative B. Alternative C would generally result in maintained or improved ecological and watershed conditions across most of the planning area. These improved ecosystem services could be reflected in monetary terms although the gains were not quantified.

Impacts to recreation opportunities would be similar to Alternative B, except Alternative C would allow continued motorized vehicle use on all existing routes. Compared to the No Action Alternative, Alternative C would shift toward slightly more *Semi-Primitive Nonmotorized* recreation settings, activities, and experiences (12.6% increase) and slightly less *Semi-Primitive Motorized* recreation settings, activities, and experiences (12.4% decrease) across the planning area.

OHV and Travel Management Impacts

OHV Closed area designations would be similar to the No Action and Alternative A. OHV use within most of the planning area (including all wilderness characteristics units and WSAs) would be Limited to Existing Routes, so none of the planning area would be available for cross-country motorized use by the general public (Map OHV-3, Appendix 1). People who prefer to access public lands by motorized vehicle or use OHVs for recreational purposes would have no acreage available for cross-country travel. The level of public motorized access to public lands in the planning area would be substantially reduced compared to the No Action Alternative and Alternative A. This would negatively affect recreation and commodity uses in a sizeable amount of the planning area.

Livestock Grazing Management Impacts

Temporary livestock grazing closures/reductions from rangeland health issues could result in up to 8,441 AUMs of forage lost, but grazing would resume in these areas once standards have been met or livestock grazing is no longer a causal factor. As a result, this alternative could cause a decrease of jobs and labor

earnings, but these would be temporary and less than those associated with rangeland health issues under Alternative B. There is also the potential for permit relinquishment in WSAs and a subsequent reduction of AUMs. However, it is unlikely any existing permits that overlap WSAs would be relinquished during the life of the plan. For these reasons, the potential negative effects of this alternative on the agricultural sector of the Lake/Harney County economies would be higher than the No Action Alternative or Alternatives A, D, or E, but would be less than Alternative B.

Impacts of Alternative D

Wilderness Characteristics Management Impacts

Alternative D would apply wilderness characteristics protections to less than 5,900 acres. This alternative would apply slightly more protection to wilderness characteristics than Alternative A, but much less protection than all other alternatives. People would differ in the extent to which they view this alternative as an appropriate balance between wilderness characteristics protection and other multiple uses. Wilderness advocates or people who want to see minimal change in the planning area would likely not view this alternative as an adequate balance of multiple uses. Though it is slightly more restrictive than Alternative A, those who favor the status quo could view this alternative as a reasonable balance. It poses few barriers to continued use of the landscape for ranching, mining, recreation, and other activities across the majority of the planning area. As such, it would not likely change local social systems or ways of life.

An additional 5,800 acres would be excluded from new major ROW location and about 160 additional acres would be excluded from wind/solar ROW development compared to the No Action Alternative and Alternative A. Other than Alternative A, this alternative would provide the most land available for leasable and saleable mineral exploration and development with the fewest restrictions (Table ES-1, Maps L-10, L-15, L-17, M-8, and M-13, Appendix 1).

The application of unit boundary setbacks along roads would provide places where minor ROWs or small-scale mineral development could be located along the edge of the 2 Category C units in the future that would lessen the potential economic effects of mineral closures/ROW exclusion areas within the interior of these units. As a result, the effects to the Lake/Harney County economies of these minor changes in minerals and ROWs would be fairly similar to those under No Action and Alternative A.

Managing the 2 Category C units for protection of wilderness characteristics would result in a very slight shift toward *Semi-Primitive Non-Motorized* recreation settings, activities, and experiences on about 4,671 acres of the planning area. Overall, the impacts to recreation opportunities would be similar to the No Action Alternative and Alternative A.

OHV and Travel Management Impacts

While there would be a reduction to about 70,573 acres Open to cross-country OHV use (Table 3-32; Map OHV-4, Appendix 1), the existing route network would remain open and would continue to provide public and administrative motorized access to most public lands in the planning area. The amount of road maintenance, upgrades, or new road development that would occur under this alternative would maintain or slightly improve motorized access to most of the planning area similar to the No Action Alternative. These actions would provide adequate access for motorized recreation and commodity uses.

Livestock Grazing Management Impacts

The effects of livestock grazing management on the Lake/Harney County economies and social attitudes would be the same as the No-Action Alternative and Alternative A.

Impacts of Alternative E

Wilderness Characteristics Management Impacts

Alternative E represents a balance between protecting wilderness characteristics and allowing other resource uses. The effects of Alternative E would be very similar to Alternative C. However, Alternative E would protect more units ranked as having an overall higher-quality wilderness values than units in Alternative C. This alternative would likely increase the well-being of the local and non-local public who want to see greater protection of some lands having wilderness characteristics, but not to the extent that it would restrict other resource uses and activities across most of the landscape. The well-being of those favoring higher protection of wilderness characteristics would be higher compared to Alternatives A, D, and No Action because wilderness characteristics would be less likely to degrade over time in a greater portion of the planning area. Some people could be more willing to accept this alternative (compared to Alternative C) because its protection model was developed with wilderness character quality weighted higher in the evaluation process.

While Category C units would be designated as ROW exclusion areas for all major ROWs and wind/solar energy ROWs, this would not result in any net change from current major ROW exclusion area designations because they overlap Greater Sage-Grouse PHMA (BLM 2015a), and previous ROW exclusion area decisions made in the *Lakeview RMP/ROD* (BLM 2003b). Approximately 200,000 acres would shift from wind/solar ROW avoidance areas to exclusion areas compared to the No Action Alternative (Table 3-3; Maps L-11, L-16, and L-20, Appendix 1). However, this would not result in a major change from current wind/solar ROW exclusion area designations. For these reasons, there would be little change in potential effect on economic development opportunities associated with ROWs compared to the No Action Alternative and Alternative A.

Category C units would be closed to new leasable or salable mineral development. However, compared to the No Action Alternative, there would be very little change in leasable mineral restrictions, while about 150,000 additional acres would be closed to new development or expansion of salable mineral pits (Table 3-3; Maps M-9 and M-14, Appendix 1).

The application of boundary setbacks along Category C unit boundary roads would provide places where minor ROWs or small-scale mineral development could be located along the edge of Category C units in the future, which would lessen the potential economic effects of mineral restrictions/ROW exclusion areas within the interior of the units to some degree.

Impacts to vegetation, as a result of constraints on treatment and fire suppression methods within Category C units, would generally be the same as discussed in Alternative B, but affect an estimated 1,285,704 fewer acres than Alternative B and 48,841 fewer acres than Alternative C. The effectiveness of the integrated noxious weed and invasive species management program would be reduced on about 372,218 acres. More costly weed treatments with less likelihood of success would result in weeds spreading across larger portions of the planning area, reducing forage available for livestock, and increasing the potential for spread onto private lands where the landowner would have to pay for

treatment or lose production. The level of risk would be higher than No Action and Alternative A, but less than Alternative B. Alternative E would generally result in maintained or improved ecological and watershed conditions across most of planning area. These improved ecosystem services could be reflected in monetary terms, but the gains were not quantified.

Impacts to recreation opportunities would be similar to Alternative C, resulting in a moderate shift toward slightly more *Semi-Primitive Nonmotorized* recreation settings, activities, and experiences (11.1% increase) and slightly less *Semi-Primitive Motorized* recreation settings, activities, and experiences (10.8% decrease) when compared to the No Action Alternative.

OHV and Travel Management Impacts

The number of acres that would be Open to cross-country motorized use and routes that would be open for use by the public would be similar to the No Action Alternative and Alternative A, but more than Alternatives B, C, and D (Table 3-32). The amount of road maintenance, upgrades, or new road development that would occur under this alternative would maintain or slightly improve motorized access to most of the planning area similar to the No Action Alternative. These actions would provide adequate public and administrative motorized access to public lands in the planning area for recreation and commodity uses.

Livestock Grazing Management Impacts

The effects of livestock grazing management on the Lake/Harney County economies and social attitudes would be the same as the No-Action Alternative and Alternative A.

Environmental Effects – Environmental Justice Populations

Impacts to Minority Populations

As noted in the *Affected Environment* section, Lake and Harney Counties both contain environmental justice (minority) populations, based the percentage of Native Americans in the population. The analysis of impacts in the *Cultural and Paleontological Resources* section is helpful in determining whether any impacts identified would be adverse and disproportionate due to the alternative wilderness characteristics, OHV and travel, and livestock grazing management actions.

Alternative A would have the greatest potential for adverse impacts to cultural resources and traditional uses because it has the highest potential of all the alternatives to allow ground disturbing actions that could negatively impact cultural resources or traditional use areas. However, it is difficult to single out Alternative A as having a negative, disproportionate impact to minority populations. At the implementation level, the BLM would evaluate potential effects to cultural resources through the NHPA Section 106 process and the 2015 Protocol between the Oregon/Washington BLM and Oregon State Historic Preservation Office for specific undertakings within defined locations. The BLM also would complete surveys for cultural resources and traditional cultural properties before implementation of any ground-disturbing management action/project and consider appropriate measures to eliminate, minimize, or mitigate potential impacts within subsequent step-down implementation-level NEPA analyses.

The BLM also would consult with appropriate Native American Tribes, individuals, and the State Historic Preservation Office (SHPO) during proposed plan implementation actions and would consider

their input during the decision-making process. These actions would minimize potential impacts to cultural resources and traditional use areas during project implementation. Given these measures, Alternative A would not constitute an adverse or disproportionate impact to minority populations, nor would any of the other alternatives.

Impacts to Low Income Populations

Lake and Harney counties are both considered environmental justice populations due to their low-income status. Any alternative that restricts or hampers economic development would result in negative or adverse effects on low-income residents of Lake and Harney counties.

Of all the alternatives analyzed, Alternative B has the greatest potential for adverse or disproportionate effects on low-income populations within the planning area because it would have the greatest level of protection for wilderness characteristics and the most restrictions on economic uses/development and other multiple uses. Protection of lands with wilderness characteristics under Alternative B would hamper most types of future economic development that depend on the ability to use and/or modify the landscape but would not necessarily preclude all such activities. However, the potential economic gains and losses to low-income populations are not possible to estimate in the absence of specific projects that are scheduled to occur.

As described in the *Livestock Grazing* section, Alternative B would have the greatest potential for reductions or elimination of grazing use on the largest number of acres compared to all other alternatives. Over the long-term, grazing use on BLM-administered lands in the planning area could be reduced by anywhere from 0 to 131,233 additional AUMs. The high end of these reductions assumes that up to 100% of the land use allocations could have grazing permits voluntarily relinquished and those areas made unavailable for grazing use over the long-term. If the actual impact was at the high end of this range, it would represent a significant adverse economic effect to low-income populations in Lake and Harney Counties. However, if the number or permits relinquished remains at the low end of this reduction estimate there would be little or no adverse economic effects to low-income populations. The huge range of potential AUM losses makes it difficult to predict the severity of the impacts to low-income populations under this alternative.

As a result, the BLM cannot conclude that Alternative B (or any of the other less restrictive alternatives) would cause an adverse, disproportionate impact on low-income populations. However, as implementation-level actions and projects take place under future management, the BLM would evaluate them for possible adverse and disproportionate negative impacts to low-income populations.

Cumulative Impacts Common to All Alternatives

Locatable Mining

Under all alternatives, about 84.4% of the BLM-administered mineral estate within the planning area would remain open to locatable mineral entry, subject to requirements to prevent unnecessary or undue degradation of the public lands (Table 3-3; Map M-2, Appendix 1) (see 43 CFR 3809). Even the 15.1% of the mineral estate within WSAs would remain open to locatable mineral development (subject to the non-impairment standard or the exceptions to this standard; see 43 CFR 3802). For this reason, locatable mineral development (primarily perlite and sunstones; Tables 3-1 and 3-9) would continue to have an additive, incremental cumulative benefit to the Lake/Harney County economies in a similar fashion under

all alternatives. However, development costs would increase in those instances where the mining applicant is required to prepare a plan of operations (see *Affected Environment - Locatable Minerals* section).

Other Existing Protective Management

There are existing, on-going social and economic impacts associated with other current approved management, which includes Greater Sage-grouse habitat management protections (BLM 2015a), WSA management (BLM 2012h), and ACEC management (BLM 2003b) that collectively limit how the public can legally access and use large portions of the BLM-administered lands in the planning area for recreation and commercial uses (grazing, mining, ROWs, OHVs, etc.). All of this existing protective management direction would continue to cumulatively limit social and economic uses on about 2.5 million acres of the 3.2 million acre-planning area under all alternatives (Map P-1, Appendix 1).

Other Regional Management Plans and Social Conflict

One regional cumulative impact consideration is the potential social-economic effects of the proposed decision in the *Southeastern Oregon Proposed RMP Amendment* (BLM 2023d), which covers the management of similar public lands in nearby Oregon counties. The resulting social-economic effects of the *Southeastern Oregon RMP Amendment*, in combination with the potential effects of this plan amendment, could extend to the population and communities within a much broader geographic area, much of southeastern Oregon, as well as to stakeholders living farther away. Even if people are not directly affected economically by the actions in one planning area or another, the knowledge that the BLM chose to enact a certain set of actions in the Southeastern Oregon planning area may affect their future behavior within the Lakeview planning area.

Another potential cumulative social impact that is likely to occur under all alternatives is social conflict. Protection measures for the Greater sage-grouse (BLM 2015b) have been highly controversial within the planning area, generating substantial public interest and litigation. The final outcome of the litigation and preliminary injunction regarding the *Oregon Greater Sage-Grouse Record of Decision and Approved Resource Management Plan Amendment* (BLM 2019f) is likely to be controversial as well. While many people appear to agree about the values of BLM-administered lands in eastern Oregon, they would likely continue to disagree about how to best manage those values for the mutual benefit of all of the American public.

COVID-19

The social and economic effects of the recent COVID-19 pandemic within the planning area are currently substantial, but it is difficult to estimate how long-term or substantial these effects would extend into the future, in the context of the 15–20-year analytical timeframe.

Visitor service industries in Lake County have been affected by the decrease in tourism-related travel. Travel Oregon reports that, in the week ending May 2, 2020, the national travel economy had its first expansion in nine weeks, but was 88% below 2019 levels, a $19.4 billion loss, and that since the beginning of March, the COVID-19 pandemic has resulted in over $138 billion in losses for the U.S. travel economy (traveloregon.com 2020). The U.S. Travel Association reported that total weekly travel spending in Oregon for the week starting May 2, 2020, was estimated as $38 million, compared to $223 million the same week in 2019 (ustravel.org 2020). Travel Oregon also reported that Eastern Oregon

occupancy rates for the week of April 26, 2020, were 37% compared to 60% the same week in 2019, a decrease of about 38%.

The ranching industry has also incurred economic impacts from the recent pandemic. A 2020 study by the Oklahoma Cooperative Extension Service found significant economic damages to the U.S. beef cattle industry due to COVID-19, resulting in a loss of $13.6 billion in total economic damage, an average of $216/head (ncba.org 2020). While these estimates are not specific to southeast Oregon, they would still contribute to a cumulative economic impact to the regional ranching industry.

Reasonably Foreseeable Actions by Others

One potential cumulative social-economic impact by others is the closing of the Warner Creek Correctional Facility originally proposed by the Governor of Oregon in 2022. More recently, the Governor opted to leave the final closure decision to the next Governor, so this proposed closure could still occur at a later date. The Lake County Board of Commissioners has stated that the proposed closure would have a catastrophic impact to the community of Lakeview due to the loss of jobs, accompanying sales of homes, loss of up to 10% of the children in Lakeview school system (and associated loss of school funding from the state), and loss of significant spending within the local economy. They also noted the loss of community support provided by the prison and its employees, as well as through its prison work crews and the many local projects to which they have contributed (letter dated 7/20/2020). Work crews have also contributed directly to past BLM management activities by providing a trained wildfire suppression crew, low-cost labor for fuel reduction/habitat restoration projects (running chainsaws, planting trees, etc.), and growing out sagebrush seedlings at the prison nursery for use in wildfire/habitat restoration.

In June of 2018, Red Rock Biofuels began construction of a $320 million renewable fuels facility just south of Lakeview. The facility is intended to convert approximately 136,000 tons of waste woody biomass via gasification, Fischer-Trospch and hydro-processing into about 15.1 million gallons/year of renewable fuels (Biofuels Digest 2018). While the project was originally planned to be operational by December 2019, the original owner filed for bankruptcy in 2022 and the partially completed facility has been purchased by a new owner. The facility completion date is currently unknown.

Monetized Impacts from Greenhouse Gases

The social cost of greenhouse gases (SC-GHG) are estimates of the monetized damages associated with incremental increases in GHG emissions in a given year. This estimate of the monetary value of the net harm to society "includes the value of all climate change impacts, including (but not limited to) changes in net agricultural productivity, human health effects, property damage from increased flood risk natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services" (IWG 2021). In the context of this analysis, climate change represents a reasonably foreseeable environmental trend rather than a reasonably foreseeable future agency action.

In January 2021, President Biden issued Executive Order No. 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis.* Consistent with E.O. 13990, the CEQ rescinded its (2019) Draft Guidance on Greenhouse Gas Emissions and began updating its *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews* (CEQ 2016). In the interim the CEQ (2021) has instructed agencies to consider and use all tools and resources available to them in

assessing GHG emissions and climate change effects including the CEQ (2016) GHG Guidance. The CEQ (2016) guidance noted that NEPA does not require monetizing social costs and benefits. It also noted that "the weighing of the merits and drawbacks of the various alternatives need not be displayed using a monetary cost-benefit analysis and should not be when there are important qualitative considerations."

Section 5 of E.O. 13990 emphasized that federal agencies should "capture the full costs of greenhouse gas emissions as accurately as possible, including by taking global damages into account". This section also established an Interagency Working Group on the Social Cost of Greenhouse Gases (IWG) which has subsequently published the *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide: Interim Estimates under Executive Order 13990* (IWG 2021) that updated CEQ (2016) guidance.

In accordance with this direction, this analysis provides estimates of the monetary value of changes in GHG emissions that could result from each alternative. Such analysis should not be construed to mean a cost determination is necessary to address potential impacts of GHGs associated with specific alternatives. These estimates were monetized. However, they do not constitute a complete cost-benefit analysis, nor do the SC-GHG numbers present a direct comparison with other social-economic impacts analyzed in this document. SC-GHG is provided only as a useful measure of the benefits of GHG emissions reductions to inform agency decision-making.

For Federal agencies, the best currently available estimates of the SC-GHG are the interim estimates of the social cost of carbon dioxide (SC-CO_2), methane (SC-CH_4), and nitrous oxide (SC-N_2O) developed by the IWG (2021). These estimates are based on complex models describing how GHG emissions affect global temperatures, sea level rise, and other biophysical processes; how these changes affect society through, for example, agricultural, health, or other effects; and monetary estimates of the market and nonmarket values of these effects. One key parameter in the models is the discount rate, which is used to estimate the present value of the stream of future damages associated with emissions in a particular year. A higher discount rate assumes that future benefits or costs are more heavily discounted than benefits or costs occurring in the present (i.e., future benefits or costs are a less significant factor in present-day decisions). The current set of interim estimates of SC-GHG have been developed using three different annual discount rates: 2.5%, 3%, and 5% (IWG 2021).

As expected with such a complex model, there are multiple sources of uncertainty inherent in the SC-GHG estimates. Some sources of uncertainty relate to physical effects of GHG emissions, human behavior, future population growth and economic changes, and potential adaptation (IWG 2021). To better understand and communicate the quantifiable uncertainty, the IWG method generates several thousand estimates of the social cost for a specific gas, emitted in a specific year, with a specific discount rate. These estimates create a frequency distribution based on different values for key uncertain climate model parameters. The shape and characteristics of that frequency distribution demonstrate the magnitude of uncertainty relative to the average or expected outcome.

To further address uncertainty, the IWG recommends reporting four SC-GHG estimates in any analysis. Three of the SC-GHG estimates reflect the average damages from the multiple simulations at each of the three discount rates. The fourth value represents higher-than-expected economic impacts from climate change. Specifically, it represents the 95th percentile of damages estimated, applying a 3% annual discount rate for future economic effects. This is a low probability, but high damage scenario, represents

an upper bound of damages within the 3% discount rate model. The estimates in Tables 3-56 and 3-57 follow the IWG recommendations.

The SC-GHGs associated with estimated emissions from the agriculture, transportation, and land use sectors are shown below. These estimates represent the present value of future market and non-market costs associated with these emission estimates. The carbon sequestration described in the climate section by alternative should also be considered in the decision, even though the social cost was not estimated.

Estimates are calculated based on IWG estimates of social cost per metric ton of emissions for a given year and BLM's estimates of annual emissions (Table 3-39). The analysis assumes that the emissions would begin in 2023 and would be constant every year for the next 20 years. The estimates are rounded to the nearest $100. The estimates are shown in ranges due to the associated uncertainty of the emissions from each sector (transportation, agriculture, and land use). Estimates associated with 1) wildland fire and 2) cut, pile, and burn vegetation management contributed to most of the disparity between the low and high ends of the range for total GHG emissions (see *Climate* section). The emissions from grazing are the same for Alternatives A, D and E, and the emissions from transportation, wildland fire, and vegetation treatment are the same for Alternatives A and D.

The estimated social cost of methane (CH_4) emissions from livestock grazing are shown in Table 3-56.

Table 3-56. Social Cost of Methane (CH_4) Emissions from Livestock Grazing

Alternative	CH_4 metric tons produced annually)[1]	Present Value (in Base Year) of Estimated SC-GHG emissions from grazing, 2020$ Average, 5%	Present Value (in Base Year) of Estimated SC-GHG emissions from grazing, 2020$ Average, 3%	Present Value (in Base Year) of Estimated SC-GHG emissions from grazing, 2020$ Average, 2.5%	Present Value (in Base Year) of Estimated SC-GHG emissions from grazing, 2020$ 95th Percentile, 3%
No Action/A	475-722	$5,820,300 - $8,846,800	$14,510,900 - $22,056,500	$19,468,200 – $29,591,600	$38,636,700 - $58,727,800
B	78-722	$1,070,300 - $8,846,800	$2,716,400 - $22,056,500	$3,658,800 - $29,591,600	$7,236,800 - $58,727,800
C	291-722	$3,565,700 - $8,846,800	$8,889,800 - $22,056,500	$11,926,800 - $29,591,600	$23,670,100 - $58,727,800
D	475-722	$5,820,300 - $8,846,800	$14,510,900 - $22,056,500	$19,468,200 - $29,591,600	$38,636,700 - $58,727,800
E	475-722	$5,820,300 - $8,846,800	$14,510,900 - $22,056,500	$19,468,200 - $29,591,600	$38,636,700 - $58,727,800

[1] CO_2 equivalent emission estimates for grazing from Table 3-39 were converted back to CH_4 emissions by dividing by 25.

The estimated social cost of carbon dioxide (CO_2) emissions from all other sources are shown in Table 3-57.

Table 3-57. Social Cost of Carbon Dioxide (CO_2) Emissions from Transportation, Wildland Fire, and Vegetation Treatments

Alternative	$C0_2$ metric tons produced annually[1]	Present Value (in Base Year) of Estimated SC-GHG emissions, $C0_2$, 2020$ Average, 5%	Present Value (in Base Year) of Estimated SC-GHG emissions, $C0_2$, 2020$ Average, 3%	Present Value (in Base Year) of Estimated SC-GHG emissions, $C0_2$, 2020$ Average, 2.5%	Present Value (in Base Year) of Estimated SC-GHG emissions, $C0_2$, 2020$ 95th Percentile, 3%
No Action/A	15,246 – 882,101	$3,815,300 - $220,743,100	$14,434,300 - $835,138,700	$21,834,100 - $1,263,276,400	$43,785,300 - $2,533,326,000
B	13,592 – 868,764	$3,401,400 - $217,405,500	$12,868,400 - $822,511,700	$19,465,400 – $1,244,176,200	$39,035,200 - $2,495,023,200
C	16,611 – 831,107	$4,156,900 - $207,982,000	$15,726,600 - $786,859,500	$23,788,200 - $1,190,246,700	$47,705,500 - $2,386,875,200
D	15,246 – 882,101	$3,815,300 - $220,743,100	$14,434,300 - $835,138,700	$21,834,100 - $1,263,276,400	$43,785,300 - $2,533,326,000
E	16,655 – 831,225	$4,167,900 - $208,011,500	$15,768,300 - $786,971,200	$23,852,000 – $1,190,415,700	$47,831,900 - $2,387,214,100

[1] From Table 3-39.

Chapter 4 - Consultation and Coordination

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Introduction

Public involvement, agency coordination, and tribal consultation are an integral part of the BLM's planning process (43 CFR § 1610.3). This chapter summarizes the public outreach and participation opportunities provided during the development of the Lakeview Resource Management Plan Amendment (RMPA), as well as the consultation and coordination efforts with native American tribes and other government agencies.

Public Involvement, Coordination, and Consultation

Inventory Submissions

The BLM completed the *Lakeview RMP/ROD* in November 2003. In April 2005, the Oregon Natural Desert Association submitted its *Wilderness Inventory Recommendations* report (ONDA 2005) to the Lakeview District, BLM which contained 19 proposed new wilderness study areas (WSAs) in the Lakeview Field Office, along with a cover letter (dated April 1, 2005) requesting the BLM initiate a plan amendment to designate these areas as WSAs or ACECs. The BLM responded via letter (dated April 28, 2005) stating that its authority to designate WSAs under Section 603 of the FLPMA expired in 1993. In addition, the BLM responded that the criteria for ACECs and WSAs were substantially different and protecting areas with wilderness characteristics under the ACEC designation authority (see 43 CFR § 1610.7-2) was not appropriate. The BLM also responded that it had recently completed a land use planning effort where the entire planning area had been examined for potential designation as ACECs, including public lands within ONDA's proposed WSAs and determined they did not "contain relevant or important resource values requiring special management". For these reasons, ACEC designation was not appropriate.

ONDA and several other groups filed lawsuits challenging both the *Lakeview* and *Southeastern Oregon RMP/RODs* in 2006. During this litigation, ONDA submitted two supplemental sets of inventory information in 2007 containing digital photos and photo logs for two of their earlier WSA proposals (Beaty Butte and Juniper Mountain areas). In addition, the group submitted a separate inventory report covering adjacent public lands in the Burns District in 2007 (ONDA 2007). Three of the proposals presented in that inventory document covered WSA proposals (Lonesome Lakes, Buzzard Creek, and Keg Springs) in both the Burns and Lakeview Districts. As a result of litigation, the Vale and Lakeview Districts entered into a Settlement Agreement with the plaintiffs in June 2010 that ultimately led to the need to develop this plan amendment (see *2010 Settlement Agreement* section of Chapter 1).

Public Scoping and Agency Coordination

The BLM began the plan amendment process by publishing a *Notice of Intent* to prepare an EIS in the *Federal Register* (75(67):17950-17951) on April 8, 2010. This notice included a list of three primary issues from the 2010 Settlement Agreement that the BLM expected to address in the plan amendment and invited comments on these issues.

In April 2010, the BLM mailed a letter and map to approximately 950 individuals, organizations, agencies, and local governments, and requested input on the preliminary issues and planning criteria. Legal notices were published in the *Lake County Examiner, Herald and News, Bend Bulletin, Oregonian,* and *Burns Times Herald* newspapers. News releases were also sent out to local media. These notices announced the dates and locations of five public meetings.

Five public scoping meetings were held between May 25 and June 2, 2010, in Lakeview, Burns, Bend, Christmas Valley, and Portland. Approximately 85 people attended one or more of these meetings. The comment period extended 90 days from April 8 through July 7, 2010. Approximately 65 written comment

letters, faxes, or emails were received during the scoping period. These comments were analyzed and published within a *Scoping Report* (BLM 2012a) that was mailed to interested public, agency representatives, and Native American tribes. Copies of the *Scoping Report* have also been made available for review at the BLM Lakeview District Public Room and on its ePlanning website at https://eplanning.blm.gov/eplanning-ui/home.

Additional Public Input

Following publication of the *Scoping Report* (BLM 2012a) the BLM received additional comment letters and public input.

ONDA submitted another inventory report to the BLM Prineville District in 2012 (ONDA 2012). One of the WSA proposals contained in this document covered a shared area (Yreka Butte) in the Prineville, Burns, and Lakeview Districts. In 2015, ONDA submitted additional information that primarily represented a critique of BLM's inventory findings as of that point in time.

The Theodore Roosevelt Conservation Partnership (TCRP) submitted numerous letters and emails between 2014 and the present suggesting that an additional alternative regarding backcountry conservation area designation should be addressed in the plan amendment. This is discussed further under the *Alternatives Considered but Eliminated from Detailed Study* section of Chapter 2.

From 2016 to the present the BLM has also received approximately 100 form letters, emails, and postcards from individuals expressing a preference for adoption of a final decision that protects wilderness characteristics, restricts off-highway vehicle use, and establishes a mechanism for voluntary grazing permit relinquishment.

In September 2018, the BLM notified over 300 individuals on its mailing list that it was re-initiating this planning effort, that it had completed its wilderness characteristics inventory update, and that it had made these findings available on its inventory website at https://www.blm.gov/programs/planning-and-nepa/plans-in-development/oregon-washington/lakeview-wci. In response, the BLM received 15 comment letters from individuals and agencies expressing a number of concerns with the BLM's inventory process or findings. Several of the letters also contained comments, photos, or other information related to specific inventory units, along with a request for the BLM to consider this information and update its inventory findings for those units. The BLM reviewed these comment letters and did the following:

- Evaluated unit specific information to determine if the BLM had already considered this information in its current inventory findings. If the information was, in fact, new information that the BLM had not previously considered, the staff revised its inventory write-up for the specific unit(s). If the BLM had already considered this information in the inventory, this was also documented, but no changes were made to the write-up for the specific unit(s). Overall, BLM found very few of the unit specific comments represented new information that it had not already considered in its most recent inventory findings. None of this information resulted in a need for the BLM to change an overall finding regarding the presence of wilderness characteristics for any specific unit (see Appendix 2).
- Provided individual letters responding to commenters' concerns. These responses are available in the administrative record.

Tribal Consultation

Prior to initiating scoping in April 2010, the BLM sent letters to five local tribal governments (Confederated Tribes of the Warms Springs, The Klamath Tribes, Burns Paiute Tribe, Fort Bidwell Paiute Tribe, and Fort McDermitt Paiute Tribe) initiating government-to-government consultation on the plan amendment and requesting input on the preliminary issues and planning criteria. No written input was provided to the BLM at that time. The tribes were also provided a copy of the Scoping Report (BLM

2012a) in 2012. In September 2018, the BLM contacted these tribes in writing to determine if they were interested in serving as a cooperating agency during the development of this plan amendment. Though none of the tribes expressed an interest, they were provided opportunities to review and comment on advance drafts of Chapters 1 and 2 of the *Lakeview Draft RMPA/Draft EIS* prior to publication. Hard copies were also sent to representatives of the five native American tribes.

Cooperating Agencies

In September 2018, the BLM contacted representatives of over 40 local, state, and federal agencies, and Native American tribes to determine if they were interested in serving as a cooperating agency during the development of this plan amendment. Four agencies accepted this invitation (Lake County Commissioners, Lake County Soil and Water Conservation Districts, Oregon Department of Fish and Wildlife, and Fremont-Winema National Forests), signed MOUs, and participated in meetings and advance opportunities to review and comment on draft documents prior to publication of the *Lakeview Draft RMP Amendment/EIS*.

U.S. Fish and Wildlife Service Consultation

The BLM must consult with the U.S. Fish and Wildlife Service (USFWS) whenever a Federal project or action may affect a species listed under the Endangered Species Act (ESA) of 1973 or a specie's designated critical habitat. The BLM first notified the USFWS of the initiation of this plan amendment in April 2010. In September 2018, the BLM notified the USFWS that it was re-initiating this planning effort. A copy of this *Lakeview Draft RMP Amendment/EIS* will be provided to the USFWS for 90-day review as part of the public/agency review process. Following completion of the *Lakeview Draft RMP Amendment/EIS*, the BLM will prepare a Biological Assessment addressing ESA-listed species in the planning area and submit to the USFWS for review. The USFWS will then issue either a Letter of Concurrence or a Biological Opinion addressing the BLM's preferred alternative.

State Historic Preservation Office Consultation

The BLM consults with the Oregon State Historic Preservation Office (SHPO) on proposed undertakings that may affect historic properties. The BLM also invites SHPO to participate in broader BLM management processes such as planning efforts per the *BLM-SHPO State Protocol* (BLM 2015aa). Consultation for the RMP Amendment effort will follow Section III.A of the State Protocol. A copy of this *Lakeview Draft RMP Amendment/EIS* will be provided to SHPO for 90-day review as part of the public/agency review process.

Review of the Lakeview Draft RMPA/EIS

Both U.S. Environmental Protection Agency (USEPA) and BLM *Federal Register* notices announced the availability of the *Lakeview Draft RMPA/EIS* for a 90-day review in accordance with 43 CFR § 1610.2-2(b). Legal notices were also published in local newspapers announcing this public review period. About 200 electronic notifications of the availability of the document were sent to individuals who commented on the plan amendment (during or after scoping), but only provided an email address as a point of contact.

The document was made available for review at area libraries and in the BLM Lakeview District Public Room. An electronic copy was also posted on the BLM's ePlanning website at https://eplanning.blm.gov/eplanning-ui/home.

Copies of the *Lakeview Draft RMPA/EIS* were sent directly to individuals who expressed interest in reviewing the plan amendment, as well as local, state, and federal agencies, and Native American tribes. In total hard copies were sent to representatives of 4 cooperating agencies, 5 native American tribes, and over 200 local and state agencies, federal agencies, elected officials, organizations, and individuals. A complete mailing list is contained in the administrative record.

List of Preparers

The preparation of this document was an inter-disciplinary team effort. The document was developed and reviewed by both District and State Office staff. Table 4-1 list the specialists at the Lakeview District Office that prepared the document.

Table 4-1. List of Preparers

Name	Title	Education
James (Todd) Forbes	District Manager	BS in Wildlife Science, Oregon State University
Jami Ludwig	Field Manager	BS in Hydrology, University of Nevada - Reno; MS in Environmental Engineering Sciences, University of Florida
William Cannon	Cultural Resource Specialist	BA in Anthropology, Portland State University; BS in Conservation of Wildland Resources, University of Washington
James Leal	Fisheries Biologist	BS in Fisheries, Humboldt State University
Matt Haskins	Fuels Specialist	BA in Animal Science, Oregon State University
Philip D'Amo	Geologist	BS in Geology, University of Massachusetts; MS in Geology, University of Florida; MS in Conservation Science, University of Florida
Shannon Theall	GIS Specialist	BS in Recreation and Resource Management, Oregon State University
Steven Harvey	GIS Analyst (Contractor)	BS in Geography & Environmental Studies, University of Oregon; Post Baccalaureate GIS Certification, Pennsylvania State University - State College
Les Boothe	Assistant Field Manager	BS in Range Management, University of Wyoming; MS in Range Animal Nutrition Colorado State University
Lori Crumley	Rangeland Management Specialist	BS at in Range Ecology, University of Idaho; MS in Plant Science, University of Idaho
Rene Wahl	Lands and Realty Specialist	Juris Doctorate, University of New Mexico
Kathryn Stewardson	Lands and Realty Specialist	BS in Geological Sciences, University of Texas – Austin; MA in Curriculum and Instruction, University of Texas - Austin
Christopher Bishop	Recreation and Wilderness Specialist	BS in Forest Recreation Resources, Oregon State University
Shane Garside	Recreation Specialist	BS in Forestry, Humboldt State University
David Mcghee	Recreation Specialist	BS in Parks and Recreation Management, Northen Arizona University
James Price	Wild Horse Specialist	BS in Criminal Justice, Western Oregon University; MS in Technical Fire Management, Colorado State University
Kate Yates	Wildlife Biologist	BS in Wildlife Science, Auburn University; Grad. Certification in Wildlife Management, Oregon State University; PSM in Fish and Wildlife Administration, Oregon State University; AWB certification through TWS
Kathy Rose-Carrette	Writer/Editor (Contractor)	MFA, University of Denver; BA, Montana State University
Paul Whitman	Planning and Environmental Coordinator	BA in Biology, Illinois Wesleyan University; MS in Zoology, Southern Illinois University - Carbondale
Grace Haskins	Project Manager/Weed Specialist	BS in Agriculture Science, Oregon State University
Matt Lewis	Botanist	BS in Conservation and Restoration Ecology, Utah State University; MS in Ecology, Utah State University
Stewart Allen	Social/Economic Specialist	BA in Mass Communications, BA in Psychology, University of Utah; M.A. in Social and Environmental Psychology, Claremont

		Graduate School; Ph.D. in Forestry, University of Montana
Blair Street	Wild Horse Specialist	BA in Environmental Science, Montana State University-Billings; M Natural Resources Management, North Dakota State University
Carolyn Temple	Cultural Resource Specialist	BS in Anthropology, Eastern Oregon University; MA in Anthropology, University of Idaho
Katherine Gendron	Cultural Resource Specialist	AA in Anthropology, Cal State University Dominguez Hills, BA in Archaeology, Cal State University Dominguez Hills, MS in GIS, University of Denver
John Owens	Botanist	BS in Wildlife Biology, West Texas A&M; MS in Geographic Information Science, Northwest Missouri State University
Lauren Pidot	Wilderness Specialist	BA in Government, Wesleyan University, Connecticut; MS in Environmental Policy and Planning, University of Michigan

The following is a list of BLM staff at the Oregon/Washington State Office who were responsible for guidance and/or review of the analysis:

Brenda Lincoln-Wojtanik
Bruce Hollen
James Regan-Vienop
Lauren Pidot
Chris Knauf
Erin McConnell
Robert Hopper
Molly Anthony
Timothy Barnes
Marcus Tobey
John Colby
Michael Brown
Scott Lightcap
Kristen Martine
Rebecca Carter
Todd Curtis
Aaron Curtis